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SOCIALLY RESPONSIBLE INVESTMENT FUNDS IN POLAND. MARKET DIAGNOSIS AND PERFORMANCE ASSESSMENT

Abstract: The paper presents the contribution of socially responsible investment funds (SRI funds) to the realization of a sustainable development concept as well as the outcomes of research on the condition of the Polish SRI funds market. Polish SRI funds were identified and their strategies were systematised referring to the classification used by Eurosif. Moreover an analysis of the effectiveness of Polish SRI funds in comparison with Polish hedge funds, that are completely financially motivated, was conducted. The generalised Sharpe ratio, the Sharpe-Omega ratio and the modified Sharpe ratio were used to assess the effectiveness of analysed funds. The study reveals that Polish SRI funds do not perform very well in comparison to hedge funds.

Keywords: socially responsible investing, SRI funds, effectiveness measures, Polish market.

JEL classification: G11, G23.

FUNDUSZE INWESTYCYJNE ODPOWIEDZIALNE SPOŁECZNIE W POLSCE. OCENA RYNKU I WYNIKÓW INWESTYCYJNYCH

Streszczenie: Artykuł został poświęcony przedstawieniu wkładu funduszy inwestycyjnych, działających w sposób odpowiedzialny społecznie (fundusze SRI),

w realizację koncepcji zrównoważonego rozwoju oraz ocenie stanu rynku polskich funduszy SRI. Zidentyfikowano polskie fundusze SRI i dokonano klasyfikacji ich strategii zgodnie z podziałem stosowanym przez Eurosif. Ponadto przeprowadzono badanie efektywności funduszy SRI w porównaniu do funduszy hedge, które kierują się wyłącznie motywami finansowymi. W tym celu wykorzystano uogólniony miernik Sharpe'a, miernik Sharpe-Omega i zmodyfikowany miernik Sharpe'a. Wyniki analizy pozwalają na wyciągnięcie wniosku, że fundusze SRI nie osiągają co do zasady tak dobrych wyników jak fundusze hedge.

Słowa kluczowe: inwestowanie społecznie odpowiedzialne, fundusze SRI, wskaźniki efektywności, rynek polski.

Introduction

Corporate social responsibility (hereinafter CSR) is a widely recognized idea of integrating responsibility for the well-being of all stakeholders into business activity to the extent that is greater than stipulated by the law [Dziawgo and Dziawgo 2014, p. 32]. The International Organisation for Standardisation (hereinafter ISO [2016]) uses a broader definition of social responsibility and applies it to all organisations, including businesses. The ISO uses the term social responsibility to refer to 'responsibility of an organization for the impacts of its decisions and activities on society and the environment, through transparent and ethical behaviour that:

- contributes to sustainable development, including health and the welfare of society;
- takes into account the expectations of stakeholders
- is in compliance with applicable law and consistent with international norms of behaviour; and
- is integrated throughout the organization and practised in its relationships.'

The idea of socially responsible investing (hereinafter SRI) is an integral part of the CSR concept. While the CSR approach refers to business operations, SRI applies to investment activity exclusively. It is important to clarify what is meant by SRI. The European Sustainable Investment Forum (an organisation that aims to promote the SRI concept at the European level, hereinafter Eurosif) has published several reports regarding the state of development of SRI in Europe since 2003. Originally, the acronym SRI stood for socially responsible investment in the organisation's reports. In 2008 they switched to 'sustainable and responsible investment' and they keep this

meaning. Apart from all the attempts at giving the concept a proper name, yet there is no one generally accepted definition of the concept. The term is used by Eurosif [2014, p. 8] to refer to “any type of investment process that combines investors’ financial objectives with their concerns about Environmental, Social and Governance (hereinafter ESG) issues”.

The aim of this paper is to present the contribution of SRI funds to sustainable development as well as to assess the stage of the Polish SRI funds market development, and to evaluate the effectiveness of identified Polish SRI funds. A hypothesis that is to be tested reads: the effectiveness of Polish SRI funds at least equals the effectiveness of Polish funds aiming to achieve absolute returns.

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1. Overview of SRI funds role in transition to sustainable development

According to the commonly cited definition, sustainable development is a development that ‘meets the needs of the present without compromising the ability of future generations to meet their own needs’ [The United Nations World Commission 1987]. Researchers studying the theoretical and empirical aspects of sustainable development agree on the interdisciplinary nature of the concept and they emphasise that it comprises economic, environmental and social dimensions [cf. Barbier 1989, p. 441; Barbier and Markandya 2013, p. 39; Munasinghe 2003, pp. 9–10; Munasinghe and Swart 2005, pp.112–120; Rogall 2010, pp. 37, 46–48]. What is more, the sustainable development concept recognizes the need for intra- as well as intergenerational equity [Goodland and Ledec 1986].

Investment decisions are not made in a vacuum. They are a part of existing economic structures and are made in the social and political context. Therefore, if achieving sustainable development implies extensive changes to multiple spheres of human activity affecting the environment and society, then investment activity should be altered too. Steurer, Margula and Martinuzzi [2008, p. 7] analysed some documents on the CSR of the European Commission and European Council and they noted that CSR is considered to be a voluntary business contribution towards the “societal guiding model of sustainable development”. From this perspective, SRI can be viewed as “an application of CSR and sustainable development

principles in investment decisions⁹. Such an approach is not isolated [Eurosif 2012, p. 9].

Eurosif, which aims at fostering SRI in Europe, makes efforts to systematize SRI strategies that are actually implemented. The strategies are still evolving. An up-to-date classification is presented below in Table 1.

Table 1. Strategies implemented by SRI funds

Strategy	Explanation
Sustainability themed investment	Focusing on specified assets or issues (e.g. transition to low carbon economy, healthcare) that contribute to the development of sustainability (ESG analysis of each investment required)
Best-in-class investment selection	Defining a list of ESG criteria and selecting companies within a given universe or asset class that meet them to the greatest extent (financial analysis also performed)
Norms-based screening	Screening companies with regard to their compliance with certain standards and norms on ESG issued by international organisations (e.g. OECD, UNICEF, UN); divestment or engagement with a company that fails to meet the standards
Exclusion of holdings from investment universe/Negative screening	Exclusion of some sectors, asset classes or companies involved in certain activities from a permissible investment universe (exclusion criteria set individually)
Integration of ESG factors in financial analysis	Clear inclusion of ESG-risks and -opportunities into a traditional financial analysis and investment decision process
Engagement and voting on sustainability matters	Performing the active ownership of holdings and engagement with companies to influence the companies' ESG practices (corporate governance issues regarded as insufficient)
Impact investment	Combining financial results with social and environmental benefits for local communities (including microfinance, community investing, entrepreneurship funds etc.)

Source: [Eurosif 2012, pp. 9–10; Eurosif 2014, pp. 10–30].

An important point to remember is that most asset managers combine more than one strategy presented above.

SRI funds are collective investment vehicles enabling individual investors (in particular retail investors) to gain a portfolio of investments that are consistent with sustainable development principles based on previously agreed criteria.

2. Literature review on Polish SRI funds

The Polish SRI market is still at an early stage of its development [Eurosif 2014, pp. 55–56]. Thus, the literature on Polish SRI funds is rather modest.

The subject was pioneered by Czerwińska [2009] who investigated the implementation of the SRI concept by Polish pension funds. Krupa [2012] presented the essence of SRI funds operations and the types of their strategies, however she did not analyse any aspect of the operations of Polish SRI funds because she focused on American and European markets. Stańczak-Strumiłło [2013] analysed the investment policy of Polish SRI funds based on information provided in their prospectuses and identified limitations to the potential increase of SRI funds operations in Poland. Lulewicz-Sas and Kilon attempted to analyse the effectiveness of Polish SRI funds using the Sharpe ratio [2014b] as well as the Treynor ratio and alpha from the one-factor model [2014a].

It is obvious that there are many research gaps regarding Polish SRI funds, especially when it comes to the assessment of their effectiveness in comparison with other investments.

3. Methodology of the empirical study on Polish SRI funds

The first step of the analysis was an identification of Polish SRI funds. The scope of the analysis is limited to open-end funds¹. Only funds operating at the end of 2015 were taken into account. The decision if the fund is SRI or is not SRI was made with regard to two main criteria:

- the content of the fund's name – if there is a word (either in Polish or English) suggesting focusing on ESG factors, i.e. bio, climate, eco, ethic, future, green, innovation/innovative, renewable, responsibility/responsible, society/social, sustainable;
- the consistency of the fund's strategy as described in the fund's prospectus with the SRI strategies presented above.

After the SRI funds had been chosen I analysed their main features (year of creation, investment manager, size etc.) and characterized their investment policy referring to Eurosif's classification. Afterwards, I calculated the SRI funds effectiveness measures and compared them to those calculat-

¹ Close-end funds were ruled out due to data availability. Although I did not exclude ex ante specialised open-end funds, none of the identified SRI fund is a specialised open-end fund.

ed for Polish quasi-hedge funds, as Perez [2014] used to call them. Quasi-hedge funds are Polish open-end funds. Since they are regulated, their managers are not allowed to use all the tools available for regular hedge funds; however they implement some elements of hedge funds' strategies when managing their portfolios and aim to achieve abnormal returns. I chose this group of funds because they focus on financial gains exclusively. Therefore, I find them in opposition to SRI funds in terms of objectives. I selected Polish quasi-hedge funds on the basis of the classification made by the Polish Chamber of Fund and Asset Management (Izba Zarządzających Funduszami i Aktywami) [2016]. All the selected quasi-hedge funds fulfil the following requirements:

- they were operating at the beginning of 2012 and until the end of 2015;
- they are open-end (since all the identified SRI funds are open-end too).

I decided to compare the effectiveness of the SRI funds and quasi hedge funds regardless of what type (fixed income or equity) they are. I opted for that because of the relatively small number of funds.

I have collected daily values of net assets per unit of participation (net asset value per share, NAVPS) of all the analysed funds and calculated log returns (r_t) for each fund using the formula:

$$r_t = \ln \frac{NAVPS_t}{NAVPS_{t-1}},$$

where:

r_t is a rate of return observed in period t ($t = 1, 2, \dots, T$),

$NAVPS_t$ is a value of net assets per unit of participation in time period t ,

$NAVPS_{t-1}$ is a value of net assets per unit of participation in time period $t-1$.

Then I have tested the normality of rates of return distribution for each fund (SRI and hedge). The significance level was set to 5%. I used Shapiro-Wilk and Lilliefors (modified Kolmogorov-Smirnov test) tests for normality.

To evaluate the effectiveness of Polish SRI funds in comparison with Polish quasi-hedge funds I have decided to use a conventional effectiveness measure as well as some alternative ones and compare the outcomes. The generalised Sharpe [1994] ratio is regarded as a conventional measure, while the Sharpe-Omega ratio as well as the modified Sharpe ratio falls into the category of alternative measures.

The formula for the generalised Sharp ratio calculated ex post is as follows [Sharpe 1994]:

$$S_h = \frac{\frac{1}{T} \sum_{t=1}^T D_t}{\sqrt{\frac{\sum_{t=1}^T \left[D_t - \left(\frac{1}{T} \sum_{t=1}^T D_t \right) \right]^2}{T-1}}},$$

where:

$$D_t = r_{It} - r_{Bt}$$

So D_t (differential return) is equal to a difference between the rate of return on a particular investment in period t (r_{It}) and rate of return on the benchmark (r_{Bt}) portfolio in period t ($t = 1, 2, \dots, T$).

The second measure – the Sharpe-Omega ratio – is a modification of the regular Sharpe ratio. In contrast to the latter, it does not penalise the portfolio performance for upside volatility. The measure includes only deviations below MAR (minimal acceptable rate). The formula is as follows [Kazemi, Schneeweis and Gupta 2003²; cf. Bacon 2008]:

$$S_h \Omega = \frac{R_I - MAR}{\frac{1}{T} \sum_{t=1}^T \max(MAR - r_{It}, 0)},$$

where:

MAR is a minimal acceptable return (threshold chosen by the investor),

R_I is an average return on a particular investment,

r_{It} is a rate of return in period t ($t = 1, 2, \dots, T$).

Finally, the difference between the generalised Sharpe ratio and the modified Sharpe ratio is that, in the latter the standard deviation of dif-

² Kazemi, Schneeweis and Gupta [2003] showed that the Omega ratio is equal to the quotient of discounted (risk-free rate used) prices of European call and pull options on the investment. Thus they used the discounted put option price as the denominator of their Sharpe-Omega ratio. However, researchers used to calculate the Sharpe-Omega ratio according to the formula presented above.

ferential return is replaced with the modified VaR (at chosen level of probability) in the denominator. The formula for the modified Sharpe ratio is as follows [Gregoriou and Gueyie 2003]:

$$MS_n = \frac{R_I - R_F}{MVaR},$$

where:

R_I is a rate of return on a particular investment (average),

R_F is a risk-free rate (average).

MVaR is Favre and Galeano's [2002] modification of value at risk, calculated as follows:

$$MVaR = W \left\{ \mu - \left[z_\alpha + \frac{1}{6}(z_\alpha^2 - 1)S + \frac{1}{24}(z_\alpha^3 - 3z_\alpha)K - \frac{1}{36}(2z_\alpha^3 - 5z_\alpha)S^3 \right] \sigma \right\},$$

where:

W is an investment value (I assumed that it is equal to 1 for every fund),

μ is a mean (assumed to be equal to R_I for every fund),

z_α is a critical value for probability $(1-\alpha)^3$,

S is a skewness,

K is an excess kurtosis (while the kurtosis of normal distribution is 0).

If the rate of return on benchmark in the equation for the generalised Sharpe ratio and MAR in the equation for the modified Sharpe ratio are assumed to be equal to risk-free rate, then all the selected measures have the numerator in common (excess return) and different denominators. Denominators reflect an approach to the risk estimation.

I assumed that the return on benchmark and MAR are equal to the risk-free rate which is defined as follows:

$$r_{Ft} = \frac{\ln(R_{free} + 1)}{k},$$

where:

r_{Ft} is a risk-free rate in period t ($t = 1, 2, \dots, T$),

³ It is -1.96 for $\alpha = 5\%$.

R_{free} is WIBOR 1Y,
 k is a number of base periods in a year (365).

I have used the above presented measures to rank the funds. The analysis of effectiveness covers the period of 01.01.2013 – 31.12.2015. I calculated the effectiveness ratios for the whole period as well as on an annual basis.

4. Results

In accordance with the criteria defined above three Polish SRI funds were identified. Table 2 presents the basic characteristics of the Polish SRI funds.

Two out of the three SRI funds identified employed the strategy of negative screening. They were managed by the same asset manager. They ex-

Table 2. Basic characteristics of identified Polish SRI funds

Name of the fund	Skok Etyczny 1	Skok Etyczny 2	PZU Energia Medycyna Ekologia***
Year of inception	2008	2008	2011
Investment manager	Altus TFI* S.A.	Altus TFI S.A.	TFI PZU S.A.
Form	Subfund of an open-end fund <i>Skok Parasol FIO**</i>	Subfund of an open-end fund <i>Skok Parasol FIO</i>	Subfund of an open-end fund <i>PZU FIO Parasolowy</i>
Type	Bond/Fixed-income	Equity	Equity
SRI strategy	Negative screening	Negative screening	Sustainability themed investment
NAV at the end of 2015 (PLN)	5 364 877.38	109 993 374.34	986 592 566.51

*TFI (pol. Towarzystwo Funduszy Inwestycyjnych) – Investment Fund Company.

**FIO (pol. Fundusz Inwestycyjny Otwarty) – Open-end Investment Fund.

***The strategy of this fund does not meet the requirements of the sustainability of a themed investment strategy fully. In accordance with the definition of the sustainability themed investment presented by Eurosif, the strategy involves the analysis of ESG factors in every case (since 2008, before that date Eurosif did not require any special analysis). There is no proof of performing such a kind of analysis by PZU Energia Medycyna Ekologia. Moreover not all the fund's interests can be viewed as consistent with the idea of sustainable development (cf. later). However taking into account that the SRI market is in its infancy in Poland and there is a relatively small number of SRI funds in Poland, I decided to include this fund into the analysis.

Source: Author's own work on the basis of: Polish Chamber of Fund and Asset Management 2016, *Prospekt informacyjny – SKOK Parasol FIO*, pp. 54–55, 63–64, *Prospekt informacyjny PZU FIO Parasolowy*, pp. 88–89.

cluded weapon, alcohol and tobacco manufacturers as well as casino owners and energy producers using nuclear fuel (*Skok Etyczny 1* only) from the investment universe. They also avoided investing in securities issued by companies that benefit from pornography, money laundering and producing or spreading radioactive waste. Finally, they did not invest in securities issued by companies that use open-hearth furnaces to manufacture steel or employ the Soderbergh process for smelting aluminium [Prospekt informacyjny – SKOK Parasol FIO, pp. 54–55, 63–64]. *PZU Energia Medycyna Ekologia* invested in companies operating in the energy sector (energy producers and distributors as well as constructors of power stations and energy infrastructure), healthcare (hospitals, manufacturers of OTC medicaments and generics etc.) and environment protection (renewable energy producers, recycling companies) [Prospekt informacyjny PZU FIO Parasolowego, pp. 88–89].

As I have signalled above, all the identified SRI funds were open-end funds. Therefore, only the open-end quasi hedge-funds were included in the analysis. The quasi hedge funds that met my requirements are as follows:

- Altus FIO Parasolowy Subfundusz Absolutnej Stopy Zwrotu Dłużny (hereinafter Altus Dłużny),
- Altus FIO Parasolowy Subfundusz Absolutnej Stopy Zwrotu Rynku Polskiego (hereinafter Altus Rynku Polskiego),
- Aviva Investors Optymalnego Wzrostu FIO (hereinafter Aviva Optymalnego Wzrostu),
- BPH FIO Strategii Akcyjnej (hereinafter BPH Strategii Akcyjnej),
- BPH Subfundusz Selektyny (hereinafter BPH Selektyny),
- Skarbiec Subfundusz Market Neutral (hereinafter Skarbiec Market Neutral).

The results of the Shapiro-Wilk tests and Lilliefors tests (modified Kolmogorov-Smirnov test) indicate that rates of return on every fund cannot be regarded as normally distributed (only Lilliefors test for *Skarbiec Market Neutral* indicates that the distribution is normal). The results of the tests for normality pinpoint the validity of using alternative measures to evaluate funds' effectiveness.

Table 3 presents the outcomes of the effectiveness analysis.

Table 3. Results of the effectiveness analysis

2013–2015									
Rank	Generalised Sharpe ratio		Sharpe-Omega ratio		Modified Sharpe ratio				
	fund	value	fund	value	fund	value			
1.	<i>Altus Rynku Polskiego</i>	0.060996	Altus Rynku Polskiego	0.192661	Altus Rynku Polskiego	0.024811			
2.	<i>BPH Selektyny</i>	0.058995	Altus Dłużny	0.185765	Skarbiec Market Neutral	0.022798			
3.	<i>Altus Dłużny</i>	0.054187	BPH Selektyny	0.177121	BPH Selekt	0.022421			
4.	<i>PZU Energia Medycyna Ekologia</i>	0.051276	PZU Energia Medycyna Ekologia	0.159244	<i>Altus Dłużny</i>	0.020263			
5.	<i>Skarbiec Market Neutral</i>	0.048068	Skarbiec Market Neutral	0.131709	PZU Energia Medycyna Ekologia	0.019663			
6.	<i>Aviva Optymalnego Wzrostu</i>	-0.01303	Aviva Optymalnego Wzrostu	-0.03522	Aviva Optymalnego Wzrostu	-0.00438			
7.	<i>Skok Etyczny 2</i>	-0.01459	Skok Etyczny 2	-0.04084	Skok Etyczny 1	-0.00486			
8.	<i>Skok Etyczny 1</i>	-0.01481	Skok Etyczny 1	-0.04614	Skok Etyczny 2	-0.00503			
9.	<i>BPH Strat Akcyjnej</i>	-0.02455	BPH Strategii Akcyjnej	-0.06718	BPH Strategii Akcyjnej	-0.00761			
2013									
Rank	Generalised Sharpe ratio		Sharpe-Omega ratio		Modified Sharpe ratio				
	fund	value	fund	value	fund	value			
1.	<i>Altus Rynku Polskiego</i>	0.23822	Altus Rynku Polskiego	1.04393	Altus Dłużny	0.054873			
2.	<i>BPH Selektyny</i>	0.170474	BPH Selektyny	0.577498	PZU Energia Medycyna Ekologia	0.034832			
3.	<i>PZU Energia Medycyna Ekologia</i>	0.153927	PZU Energia Medycyna Ekologia	0.506475	Skok Etyczny 1	0.014159			
4.	<i>Skarbiec Market Neutral</i>	0.117998	Skarbiec Market Neutral	0.355439	Skok Etyczny 2	-0.00312			
5.	<i>Aviva Optymalnego Wzrostu</i>	0.076385	Aviva Optymalnego Wzrostu	0.215271	Altus Rynku Polskiego	-0.00735			

Table 3 – cont.

2013									
Rank	Generalised Sharpe ratio		Sharpe-Omega ratio		Modified Sharpe ratio				
	fund	value	fund	value	fund	value	fund	value	value
6.	<i>Altus Dłużny</i>	0.037189	<i>Altus Dłużny</i>	0.133889	<i>Skarbiec Market Neutral</i>	0.133889	<i>Skarbiec Market Neutral</i>		-0.01359
7.	<i>Skok Etyczny 2</i>	-0.01656	<i>Skok Etyczny 2</i>	-0.04671	<i>Aviva Optymalnego Wzrostu</i>	-0.04671	<i>Aviva Optymalnego Wzrostu</i>		-0.01952
8.	<i>Skok Etyczny 1</i>	-0.04882	<i>Skok Etyczny 1</i>	-0.14518	<i>BPH Selektywny</i>	-0.14518	<i>BPH Selektywny</i>		-0.03375
9.	<i>BPH Strategii Akcyjnej</i>	-0.06315	<i>BPH Strategii Akcyjnej</i>	-0.15339	<i>BPH Strat Akcyjnej</i>	-0.15339	<i>BPH Strat Akcyjnej</i>		-0.04108
2014									
Rank	Generalised Sharpe ratio		Sharpe-Omega ratio		Modified Sharpe ratio				
	fund	value	fund	value	fund	value	fund	value	value
1.	<i>Altus Dłużny</i>	0.182893	<i>Altus Dłużny</i>	0.751961	<i>Altus Dłużny</i>	0.751961	<i>Altus Dłużny</i>		0.0698
2.	<i>Skok Etyczny 1</i>	0.081058	<i>Skok Etyczny 1</i>	0.294684	<i>PZU Energia Medycyna Ekologia</i>	0.294684	<i>PZU Energia Medycyna Ekologia</i>		0.035028
3.	<i>PZU Energia Medycyna Ekologia</i>	0.077892	<i>PZU Energia Medycyna Ekologia</i>	0.235698	<i>Skok Etyczny 1</i>	0.235698	<i>Skok Etyczny 1</i>		0.03066
4.	<i>Altus Rynku Polskiego</i>	-0.01038	<i>Altus Rynku Polskiego</i>	-0.02765	<i>Skok Etyczny 2</i>	-0.02765	<i>Skok Etyczny 2</i>		-0.00422
5.	<i>Skok Etyczny 2</i>	-0.01107	<i>Skok Etyczny 2</i>	-0.03	<i>Altus Rynku Polskiego</i>	-0.03	<i>Altus Rynku Polskiego</i>		-0.00481
6.	<i>Skarbiec Market Neutral</i>	-0.03026	<i>Skarbiec Market Neutral</i>	-0.07453	<i>Aviva Optymalnego Wzrostu</i>	-0.07453	<i>Aviva Optymalnego Wzrostu</i>		-0.01567
7.	<i>Aviva Optymalnego Wzrostu</i>	-0.03614	<i>Aviva Optymalnego Wzrostu</i>	-0.0898	<i>Skarbiec Market Neutral</i>	-0.0898	<i>Skarbiec Market Neutral</i>		-0.01581
8.	<i>BPH Selektywny</i>	-0.06336	<i>BPH Selektywny</i>	-0.16724	<i>BPH Selektywny</i>	-0.16724	<i>BPH Selektywny</i>		-0.02342
9.	<i>BPH Strategii Akcyjnej</i>	-0.10159	<i>BPH Strategii Akcyjnej</i>	-0.25162	<i>BPH Strategii Akcyjnej</i>	-0.25162	<i>BPH Strategii Akcyjnej</i>		-0.03735

2015							
Rank	Generalised Sharpe ratio		Sharpe-Omega ratio		Modified Sharpe ratio		value
	fund	value	fund	value	fund	value	
1.	<i>BPH Selektywny</i>	0.078825	BPH Selektywny	0.241879	Skarbiec Market Neutral	0.029598	
2.	<i>Skarbiec Market Neutral</i>	0.06146	BPH Strategii Akcyjnej	0.180528	BPH Selektywny	0.027712	
3.	<i>BPH Strategii Akcyjnej</i>	0.056984	Skarbiec Market Neutral	0.173015	BPH Strategii Akcyjnej	0.015895	
4.	<i>Altus Rynku Polskiego</i>	0.02299	Altus Rynku Polskiego	0.066381	Altus Rynku Polskiego	0.009829	
5.	<i>PZU Energia Medycyna Ekologia</i>	-0.00882	PZU Energia Medycyna Ekologia	-0.02466	PZU Energia Medycyna Ekologia	-0.00374	
6.	<i>Skok Etyczny 2</i>	-0.0166	Skok Etyczny 2	-0.04609	Skok Etyczny 2	-0.00657	
7.	<i>Altus Dłużny</i>	-0.02634	Altus Dłużny	-0.07626	Altus Dłużny	-0.01192	
8.	<i>Skok Etyczny 1</i>	-0.03783	Skok Etyczny 1	-0.10647	Aviva Optymalnego Wzrostu	-0.01724	
9.	<i>Aviva Optymalnego Wzrostu</i>	-0.05259	Aviva Optymalnego Wzrostu	-0.14153	Skok Etyczny 1	-0.01734	

Source: Author's own work based on data from Stooq.pl (<https://stooq.pl/t/?i=602>).

5. Discussion

The number of Polish SRI funds, that met my criteria, is very small. It reflects an early stage of the development of the Polish SRI market.

The identified SRI funds employed two strategies. Two of them excluded some companies from their investment universe while one fund invested thematically (this strategy is perceived to be a 'pure' SRI strategy [Eurosif 2014, p. 11] because these assets are closely related to some issues around sustainability, as opposed to applying extra ESG criteria to standard portfolio creation methods). Exclusions were by far the most typical.

The Polish SRI funds did not perform very well in comparison with the analysed quasi hedge funds. In 2013–2015 only one fund – *PZU Energia Medycyna Ekologia* – achieved results placing it among five of the most effective funds. Other SRI funds performed poorly in comparison with quasi hedge funds. They were ranked 7th and 8th in the whole group. Two measures (the generalised Sharpe ratio and the Sharpe-Omega ratio) indicate that *Skok Etyczny 2* performed slightly better than *Skok Etyczny 1*. The modified Sharpe ratio ranked them inversely.

The results computed on a yearly basis differ significantly. In 2013 *PZU Energia Medycyna Ekologia* was ranked 3rd according to the generalised Sharpe ratio and the Sharpe-Omega ratio while the funds managed by *Skok TFI* were placed almost at the bottom of the ranking. Surprisingly according to the modified Sharpe ratio all three funds performed very well in comparison to the quasi hedge funds.

In 2014 SRI funds achieved quite good results in comparison to the quasi hedge funds. All of them were ranked among five of the best funds. Unfortunately, a subsequent year was not so fruitful for SRI funds. All of them performed poorly and all the indicators were negative for them.

PZU Energia Medycyna Ekologia proved to be the best SRI fund but was still worse than a few quasi hedge funds.

The results of the effectiveness analysis are not surprising. Hedge funds are supposed to achieve absolute (and abnormal) returns regardless of market conditions (however some of them were not able to beat the risk-free rate (cf. Table 3)). The same requirement does not apply to SRI funds. On the financial grounds the SRI funds lose.

It should be noted that the generalised Sharpe ratio and the Sharpe-Omega ratio give very similar results (Spearman's rank correlation coefficient equals to 0.98 for the whole period of analysis and there are similar coefficients for yearly data) but the modulus of relevant value is much big-

ger in the case of the Sharpe-Omega ratio. Thus, the differences between the compared funds are more significant. The modified Sharpe ratio does not reproduce the ranks of the previous measures (Spearman's rank correlation coefficients equal to 0.88 (the generalised Sharpe ratio) and 0.87 (the Sharpe-Omega ratio) for the whole period of 2013–2015 while the coefficients for 2014 and 2015 are close to 1 and both the coefficients for 2013 are equal to 0⁴). The absolute values of the modified Sharpe ratios are smaller in comparison to both the generalised Sharpe ratio and the Sharpe-Omega ratio.

Conclusions

The emergence and activity of SRI funds is a way of applying CSR and sustainable development principles to investment activity.

The number of Polish SRI funds is small. Polish SRI funds implement negative screening and sustainability themed investment strategies. The study has demonstrated that Polish SRI funds are not the star funds in terms of effectiveness. However, one should have in mind that due to sustainable development it is not purely a financially and economically driven concept; the financial effectiveness measures have some deficiencies in the evaluation of SRI funds' performance. Thus, studies like this one bring to mind a need for a measure that enables to evaluate not only financial performance but also ESG factors. The methods of evaluating these factors as well as the creation of such an effectiveness measure are both worth further exploration.

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⁴ All the Spearman's rank correlation coefficients are statistically significant (at $\alpha = 5\%$) except for coefficient for a pair 'generalised Sharpe ratio – modified Sharpe ratio' and a pair 'Sharpe-Omega ratio – modified Sharpe ratio' in 2013.

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