

## ORIGINAL PAPER

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## The relation between management fees and the mutual funds` performance in Poland in 2015

**JEL Classification:** D53; G11; G23; C58

**Keywords:** *mutual funds; fees; rates of return; risk; regression*

### Abstract

**Research background:** The investor`s expectation of better performance in the case of more expensive mutual funds seems natural and fully justified. However, the rise of passive funds and their surprisingly good results, especially when taking into account their low fees, triggered the discussion. Recent years have brought more and more studies, conducted mostly for the American market, discrediting high-charging, aggressive funds. First analyses in Poland also indicate that the level of fees is not always linked with the fund`s performance.

**Purpose of the article:** The purpose of the study is to investigate the relation between the fees imposed by the mutual funds and the funds` performance. The idea is to verify, whether higher management fees are associated with top performance and whether it is rational to pay more for capital management.

**Methods:** In the first step of the study, linearity and direction of the dependency was explored, using scatterplots and correlation analysis. In the second part, the linear regression was created to verify the strength of the relation. One-factor models have been built with the rate of return and standard deviation as independent variables for 1-, 3- and 5-year time horizons. Moreover, two-factor models, including both rate of return and risk has been created, to compare the significance of return and risk factor.

**Findings & Value added:** The results indicated that more expensive Polish mutual funds in 2015 tended to perform worse in all tested time horizons — both in terms of lower rates of return and higher risk. Especially unexpected are the results of rates of return regression analysis — it turns out that within a sample 1% higher fee implied over 0.6% lower rate of return before fees (in yearly period). Nonetheless, the risk turned out to be more important, explaining the charges variability much better than the rate of return. Another interesting finding of the study is that merely two simple factors (return and risk) explain even as much as 60% of the management fee variability.

## Introduction

Behind all the contemporary mutual funds stands an old idea of common investing, enabling virtually everyone to share the risk and the costs of professional advice. It opened the possibility to take part in global financial markets and benefit from them to the ordinary people, not only highly professional and knowledgeable, often international, institutional entities.

Mutual fund may be perceived as a financial product, with its price and the value it brings to the customer. The price is reflected by the cost of the fund, i.e. diverse charges, which are imposed on the investor on various stages of the investment process. On the other hand, the value is built on the return from capital — mainly its size and safety (Bogle, 2014). However, fund financial results are not the only value-adding factors considered by the investor. Fund and manager reputation, accessibility and many others are also often taken into account.

Nevertheless, a customer may expect that for a higher price he or she would buy a better product. In the case of mutual fund, one may assume that “better” is more convenient and probably bringing higher rate of return for same level of risk. This hypothesis has been already tested for American market, but the research contradicted the positive impact of higher fees on the quality of the product (especially in terms of rate of return), which will be described in the first section of the present paper (Gil-Bazo & Ruiz-Verdu, 2009; Haslem *et al.*, 2007).

The goal of the following research is not only to review the state of the art in the area of fees and the funds results, but also to examine this relation on the Polish market. The main purpose of the article is to answer the question whether (based on the information available) it makes sense for an investor to pay more for the investment fund management.

At first, the general characteristics of the relations will be tested (the linearity and correlations). The null hypothesis is that as the management fee goes up, so does the rate of return, at least before fees. One can expect that portfolio managed by better-paid fund would outperform others in

terms of returns. Yet, in case of risk the direction of the dependency on the theoretical level is not clear. On the one hand, higher price would suggest a better product, therefore the investor may assume that some funds impose a higher charge for decreasing risk — the unwanted good, while maintaining high rates of return. However, the observation of the management fees structure shows that the things go the other way around — more aggressive funds are more costly in maintenance, and although exposed to higher risk, they also offer chances for higher returns (at least in theory). That is why initially we would rather endorse the hypothesis that higher risk implies higher charges, which we will try to verify in the study.

### **Past research on mutual funds` fees and performance**

In the past, many researchers tried to investigate the topic of fees imposed by mutual funds on the investors, especially their impact on the rates of return, fund flows, risk and the incentives they rise for the fund managers. Due to strong switch towards cheap index funds on western markets (Sirri & Tufano, 1998), broad studies has been conducted to test whether the high charges levied by active funds with aggressive strategies are justified (Diaz-Mendoza *et al.*, 2014; Elton *et al.*, 2003; Sharpe, 1991).

Already in 1995 it was proved that US stock mutual funds on average did not beat the benchmarks neither before, nor after fees. The research included twenty years` period (1971 to 1991). The conclusion was that previous research, suggesting attractiveness of active management, was unreliable due to survivorship bias<sup>1</sup> (Malkiel, 1995). A year later another study was published, where M. J. Gruber posed a question of why active funds grew so fast, although their results had been worse than the index funds (Gruber, 1996). The author identified two types of investors — the “sophisticated” ones, pursuing the funds exhibiting best performance, and the “disadvantaged” ones, who follow advertisement and brokerage advice<sup>2</sup>. Only thanks to “disadvantaged investors” can the inferior active funds operate. The expense ratios were compared with the funds` performance measured with 4-factor alphas, but no relationship has been found. However, when the first and the last decile had been collated, it turned out

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<sup>1</sup> Survivorship bias is a tendency to exclude failed companies from the studies, as they no longer exist.

<sup>2</sup> “Disadvantaged” clientele included also „institutionally disadvantaged”, mainly pension funds limited by restricted plan, and “tax disadvantaged”, holding funds; long enough, that capital gain taxes would make it inefficient to withdraw the money.

that the costs of the worst performers was on average much higher (1.36%) than the top ones (1.04%).

Another interesting research on mutual funds shows that the average stock holding portfolio in the sample outperformed the benchmark by 1.3%, however when taking the fees into account, it lagged behind by 1.0% (Wermers, 2000). The 2.3% of the difference was credited partly to lower results of non-stock holdings of the funds (0.7%), whereas the rest was assigned to transaction costs and fund expenses. Wermers published his further analysis three years later, proving that more active funds tend to achieve better outcomes than the risk averse ones, however even demonstrating aggressive investment strategy they are unable to beat their benchmarks in a long run (Wermers, 2003).

In 2009 Nobel Prize winners, Fama and French, using a bootstrapping simulations, provided evidence that very few fund managers had the ability and skill to beat the benchmark (after fees). Moreover, the estimated alphas for the best active funds are no better than for large, efficient passively managed ones (Fama & French, 2009). Deep and sophisticated analyses were provided by Petajisto in many of his research papers. Among others, he unveiled that some funds declaring to be active are in fact so-called “closet indexers”, which means that their portfolios almost exactly reflect the benchmark composition. Those funds bring especially little value for the investors, while charging fees as high as genuinely actively managed funds (Petajisto & Cremers, 2009; Petajisto, 2013).

Finally, in a broad review of existing academic work on profitability of active management on mature markets, Wermers and Jones conclude that risk-adjusted actively managed funds` rates of return after fees are close to zero, however they have a very important role in the capitalist economies. They act as a catalyst for efficient market allocation mechanism multiplying general wealth of the society. Active funds sometimes achieve extraordinary rates of return. This encourages investors to search for the best-performing ones and avoid those which make losses (Jones & Wermers, 2011).

General research on the topic of mutual fund fees and performance in Poland was conducted last year by the author of this paper (Fraś, 2017). The methodology covered distribution, correlation and quantile analysis of performance and fund fees level. The data from Poland and the UK from 2015 has indicated none or slightly negative correlation between the fees and the rates of return before fees. When it comes to the rates of return after fees, the correlations were significantly negative. Those outcomes, contrary to hypothesis, encouraged further study on the topic.

Concluding, many researchers in recent years have contested the idea, that more expensive and active funds are more likely to outperform and bring higher value for the investor. The natural mechanism that paying more one can expect better quality seems not to work here. This remains in contradiction with all we know about the economy and human decisions, and may be the case in favor of behavioral explanations.

## **Research methodology**

The aim of the present study is to investigate the relation between Polish mutual funds' fees and their performance, taking into account both rate of return and risk factor.

The data has been downloaded from Thomson Reuters Eikon database and covers a sample of 93 Polish open-ended mutual funds. The data on fees was only available for 2015, which is the most significant limitation of the research. The business cycle, especially stock market in Poland was declining at that time, however the decline was not very strong, and did not cover the whole period. Nonetheless, the shortness of the timeframe may affect the results, thus these must be interpreted with caution. All the open pension funds have been excluded from the sample. Their quasi-public, obligatory character and imposed regulations result in a different way of functioning. Therefore, they are also not comparable to less regulated, voluntary open-ended mutual funds. The fees will be confronted with 1-year, 3-year and 5-year rates of return. For further in-depth insight, also the risk factor will be included, measured as 1-year, 3-year and 5-year standard deviation. The full set of data (1, 3 and 5-year rates of return and standard deviations) was available for 93 mutual funds. The data on fees was from 2015, thus 1-year time horizon (for both rate of return and standard deviation) covers year 2014, 3-year time horizon concerns years 2012–2014, and 5-year time horizon refers to years 2009–2014. All the calculations were performed in R language, using R Studio programming environment.

In general, the analysis can be divided into two parts. The first one was to check the linearity of the relation. The very first tool for investigating the general shape of the relation was generating and reviewing the scatter diagrams of the rates of return and the fees, and also standard deviations and fees. The next one was calculating the correlations and assessment of their statistical significance.

Here, an important methodological note must be made: correlation only answers the question concerning the linearity of the relation, but it does not say anything about its strength. To test how meaningful the rate of return or

risk for the level of fees is, a regression analysis was necessary. That is the second part of the research. Simple regression model was built and parameters calculated, to check whether the rate of return is statistically significant, what is the time horizon (1, 3 or 5 years) that matters most and how firmly the results affected the fees. In the first step, one-factor models for all variables has been estimated, to assess each variable separately. Then, two-factor models including rate of return and risk have been created, to compare which of the factors impacts more the fees level and how well this simple models explain the charges variability. Finally, the parameters of the models had been assessed in terms of their significance and strength of impact.

The general fit of the two-factor models will be assessed with the coefficient of determination ( $R^2$  ratio). Depending on the analysis area, the determination coefficient satisfactory level may differ. For broad studies with lots of erratic variables, even as low as 10% may be good enough, while for example in the case of carefully controlled physics experiments 0.99 may be insufficient. In the literature the acceptable  $R^2$  ratio for general economic studies considered as "moderate" is from 0.4 up to 0.67 (Taylor, 1990; Yarnold, 2014). In this study, we assume the value of 0.6  $R^2$  level sufficient.

## Results

As the first stage of the analysis, the scatter diagrams have been generated. Figure 1 presents the relation between fees and rates of return before fees. The negative slope is easily visible, especially for 1- and 5-year time horizon.

Both in Figure 1 and 2 we observe negative or neutral correlation between fees and return. This remains in contradiction with the assumed hypothesis that more expensive funds would demonstrate better performance. Strongly negative correlations in Figure 2 (stronger than in Figure 1) are the consequence of the fact that among expensive funds the charges decrease returns stronger than among cheaper ones. Especially in 1-year perspective, positive returns were generated almost only by funds with the fee lower than 2%, while the funds more expensive than 2% were losing money.

To understand better the character of fees-risk relation, one can investigate the scatter diagram of annual charges and standard deviations in three different time horizons presented in Figure 3.

As the opposite to the rate of return, standard deviation seems to be positively linked with the level of fees. This observation is in line with the expectation — rising risk implies more managerial work to be done and more expenses incurred by the fund. We may also observe some kind of non-linear relationship, probably logarithmic, however this would have to be tested. Nonetheless, a negative tendency is clear. What is observed in Figures 1 and 2 appears not natural. Why do investors tend to pay more for funds that bring less profit? Why do more expensive funds maintain worse portfolios? At this point, we are unable to answer this question, but we can try to verify chart observations with correlations statistics.

Table 1 contains all the calculated correlations. The values that turned out to be statistically significant within 95% confidence interval are marked in bold. In all the tables, standard error values are included in the brackets below the estimates. In this case, almost all the correlations are statistically significant. The correlation analysis outcomes are in line with the first observation of the scatterplots. The strongest linearity can be observed for standard deviations, especially in 5-year time period. Moreover, the correlations are definitely positive in all cases. It indicates that more aggressive funds are likely to impose higher charges.

On the other hand, estimates of all the correlations for the rates of return (both before and after fees) are negative. That leads to the conclusion that the rate of return goes down with the rise of the fee. It is strongly observed for the rates of return after fees, which are the most important for the investor. The correlations before fees are less negative, as the rates of return before subtracting fees are higher. However, they are still negative, and statistically significant for 1 and 5-years horizons. Even at the level of portfolio performance (before fees), more expensive funds tend to deliver worse results.

Nevertheless, the correlation analysis results only provide the evidence on the linearity and the direction of the relation, not its slope. This phenomenon is illustrated on Figure 4. The variables may be highly correlated, but the relation may be at the same time very flat. Thus, it may not cause a strong enough effect in economic terms, although statistically is very significant. To assess the slope of the relation dependency in the next stage of the analysis, a one-factor linear regression models was built and its parameters estimated. The parameters can help to answer the question of how strong the relations between returns, risk and the fees are.

Table 2 presents the estimated parameters of all the variables for all three time horizons. Similarly, to Table 1, the values that are statistically significant within 95% confidence interval are bold. There are also standard error values included (below the estimates, in brackets).

In all cases, the intercept for rates of return is between 2.3-3%, which can be understood as the rate of return when there is no fee. For 1-year time horizon, on average 1% higher fee implies 0.63% lower rate of return (or 0.80% after fee). The drop is smaller for longer time horizons, however still the outcome seems counterintuitive. In the case of standard deviation, the intercept is between -0.50-0.11. When rising the fee, meaningful growth in risk level is observed for all the time horizons. Every one percentage point of rise in standard deviation goes with circa 0.2 percentage points of fee growth.

The Author took a look at the interrelations between the risk and the rate of return. Three models (for each time horizon) have been built, including as an independent variable both the rate of return and the standard deviations. This way, the Author will try to discover which factor is more important for the fee level and how precisely those two-factor, simple models can predict the charge.

In Table 3 and 4, the outcomes of the two-factor models have been summarized. In addition to the model parameters together with the intercept, the table contains also coefficient of determination ( $R^2$  ratio) for all the models, determining the proportion of the variance in the dependent variable that is predicted by the independent variable. In this case, it indicates the percentage of fees variability explained by the rate of return and risk.

In all three models before fees returns, the only statistically important factor is the standard deviation, reflecting the level of risk. In the case of 5-year time period, this very simple relation explains even as much as over a half of the fees variability. The rate of return seems not important when linked with risk in one model, however one needs to bear in mind that for one-factor models all the rate of return variables have been significant. After fees' returns models show that in short-term the rate of return after fees was more significant in the model than the risk. However, in longer time horizons the conclusions are similar to before fees analysis. There may be the case, that 2014 was especially inconvenient for more expensive funds, which could explain differences in short and longer term analysis. However, to confirm this hypothesis, further research needs to be done.

## **Conclusions**

The study indicates that for open-ended funds in Poland the relation between the rate of return and the fees is definitely negative, however the risk explains the charges variability much better than the rate of return. One-

factor linear regression models` parameters exhibit that one percent higher charge is linked with even 0.6% lower rate of return before fees in a yearly time horizon. On the other hand, the risk goes up together with the charges, which remains in line with the entry hypothesis. More aggressive funds tend to impose higher fees, though it is not clear why their performance (even on the portfolio level i.e. before fees) is worse than the cheaper ones. Here, an important remark needs to be done — the study does not answer the question of whether the performance has impact on fees or the other way around. The only thing that can be concluded basing on the gathered data is that there is a negative relation between fees and returns, however the direction of impact is not clear.

One possible explanation of the conclusions above is that there is a lot of inefficiency in the Polish mutual funds market. The inefficiencies appear especially in those areas, where the investors are less educated and knowledgeable. Needless to say, open-ended funds market is that kind of space. Access to this type of investments is actually unlimited, and everyone can participate. Non-professional investors may follow advertisement or a financial advisor`s suggestion, thus neglecting fundamental factors associated with performance (Jain & Shuang Wu, 2000). One more argument in favor of the market inefficiency may be relatively low market maturity, which implies lack of education in terms of entrepreneurship and capital management, no traditions of investing money, low popularity of mutual funds and citizens` awareness.

Those considerations may lead to the conclusions that investment managers utilize the incompetence of the investors, waste money on advertisement, impose too high fees and do not deliver performance while increasing risk. That remains in complete contradiction with the mutual fund goal, which is bringing returns (on predefined level of risk) to the investor for possibly low cost of management. Some regulatory bodies, for example SEC in The United States, have tried to solve the problem. They put limits on marketing expenses, which cannot be deducted for mutual fund assets, unless the plan of marketing expenses is disclosed. Mutual fund track record must be audited, so that the published results are reliable. There are many ways in which regulatory bodies try to control mutual funds operations, like diversification limits (maximum investment in one issuer), managers` authorization, financial reporting or restrictions on transactions with affiliates. Both SEC in USA and KNF in Poland issue also investors tutorials, to remind all the important aspects that needs to be considered by the buyer. However, nothing will substitute the healthy dash of common sense.

The Polish market immaturity hypothesis may lead to the conclusion that further research needs to be done in order to verify that idea. One con-

cept could be to compare open-ended funds with more professional type of funds in Poland, e.g. closed-ended funds. However, in this case methodological issue may occur, as closed-ended funds are very diversified and subject to separate, individual rules and are difficult to compare. Another idea to test the hypothesis of Polish market immaturity may be to compare the relation for Polish and some developed markets, like UK or Germany. Summing up, to resolve doubts concerning Polish market immaturity, a deeper analysis needs to be conducted.

Another explanation for the counterintuitive outcomes of the rate of return impact is the accuracy of the data and the sample size. The weakest part of the research is the fact that, due to the data availability, the calculations are conducted for only one year, i.e. 2015. Admittedly, verified rates of return are also considered in 3- and 5-year time horizons, however revising the study with the charges data for a few years would definitely help strengthen the research credibility. An important remark here is the condition of the Polish market in 2015. Broad WIG index was growing in the first quarter, but then declining during the rest of the year (see Figure 5), which suggests poor market situation in most of the analyzed period. During unfavorable periods, riskier funds tend to lose more than the safe ones. That may also explain, to some extent, why more expensive and at the same time more active and risky funds turned out to bring less profit. Consequently, further wider time frame study would be definitely recommended.

The last remark, which the Author would like to emphasize, is that at the end it is worth to come back to the initial idea. In the introduction, the Author described a mutual fund as a product which may be assessed on the basis of its performance. Clients are likely to pay more for better product, but what the research eventually demonstrates is that for higher price one would receive lower rate of return and more risk. When continuing the research on that topic, it would definitely be worthwhile to check how fund efficiency ratios and risk-adjusted returns are related with the fee (e.g. Sharp ratio). At present, it is not possible to say why this phenomenon appeared and what the reason is, but further research may for sure bring more light to these outcomes.

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## Annex

**Table 1.** Correlations between fees and rates of return (before and after fees) and standard deviations in 1-year, 3-years and 5-years' time horizons

	1-year	3-years	5-years
Rate of return before fees	<b>-0.37</b>	-0.06	<b>-0.30</b>
Rate of return after fees	<b>-0.51</b>	<b>-0.27</b>	<b>-0.46</b>
Standard deviation	<b>0.44</b>	<b>0.60</b>	<b>0.73</b>

Source: own calculations based on Thonson Reuters Eikon database.

**Table 2.** Estimated parameters of the variables in one-factor models in 1-year, 3-years and 5-years' time horizons

	1-year	3-years	5-years
Rate of return before fees	<b>-0.63</b> (0.16)	-0.06 (0.11)	<b>-0.19</b> (0.06)
Rate of return after fees	<b>-0.80</b> (0.14)	<b>-0.28</b> (0.10)	<b>-0.27</b> (0.05)
Standard deviation	<b>1.67</b> (0.35)	<b>2.22</b> (0.30)	<b>1.97</b> (0.19)

Source: own calculations based on Thonson Reuters Eikon database.

**Table 3.** Estimated parameters of the variables in two-factor models (rate of return before fees and standard deviation) in 1-year, 3-year and 5-year time horizons

	Intercept	Rate of return before fees	Standard deviation	R <sup>2</sup>
1-year	0.65 (0.68)	-0.03 (0.02)	<b>0.13</b> (0.04)	21%
3-years	0.56 (0.48)	0.01 (0.01)	<b>0.23</b> (0.03)	37%
5-years	-0.71 (0.41)	0.00 (0.01)	<b>0.21</b> (0.02)	54%

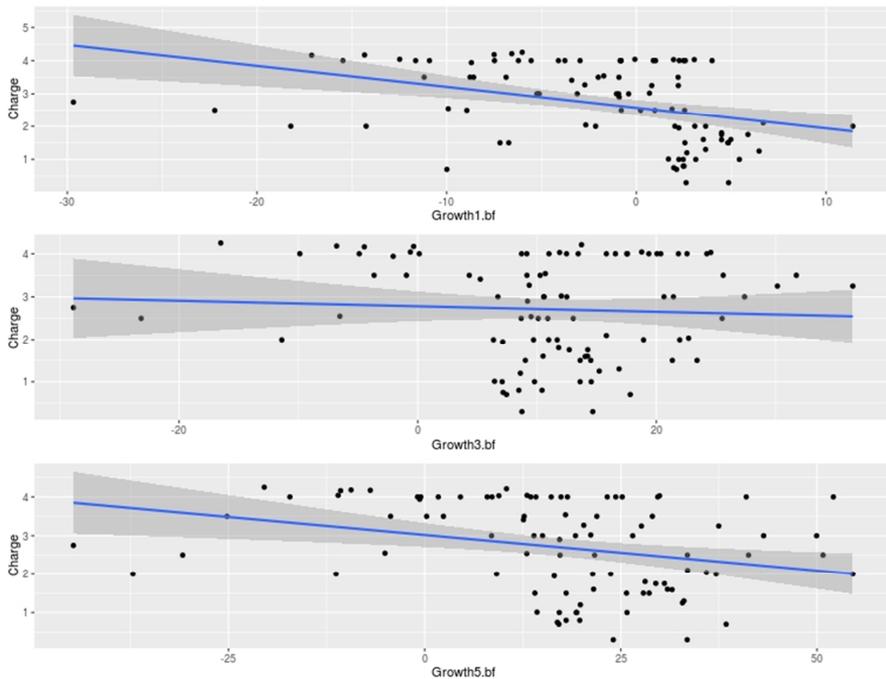
Source: own calculations based on Thonson Reuters Eikon database.

**Table 4.** Estimated parameters of the variables in two-factor models (rate of return after fees and standard deviation) in 1-year, 3-year and 5-year time horizons

	Intercept	Rate of return after fees	Standard deviation	R <sup>2</sup>
1-year	1.25 (0.64)	<b>-0.06</b> <b>(0.02)</b>	0.08 (0.09)	28%
3-years	-0.20 (0.48)	-0.01 (0.01)	<b>0.21</b> <b>(0.03)</b>	37%
5-years	-0.34 (0.42)	0.00 (0.00)	<b>0.19</b> <b>(0.02)</b>	54%

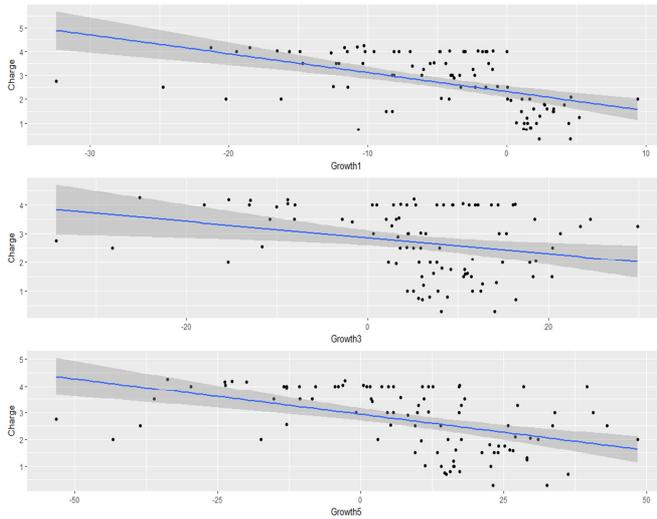
Source: own calculations based on Thonson Reuters Eikon database.

**Figure 1.** Scatter diagram: relation between fees in % and rates of return (before fees) in % (1-year, 3-years and 5-years) with regression line and its 95% confidence interval



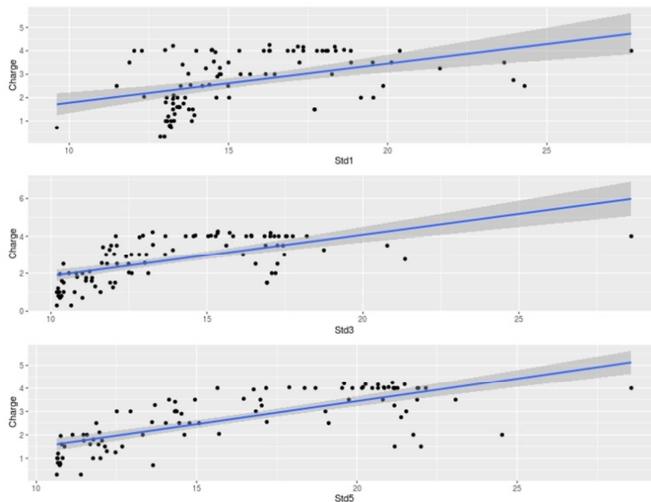
Source: own calculations based on Thonson Reuters Eikon database.

**Figure 2.** Scatter diagram: relation between fees in % and rates of return (after fees) in % (1-year, 3-years and 5-years) with regression line and its 95% confidence interval



Source: own calculations based on Thonson Reuters Eikon database.

**Figure 3.** Scatter diagram: relation between fees in % and rate of return standard deviation (1-year, 3-years and 5-years) with regression line and its 95% confidence interval



Source: own calculations based on Thonson Reuters Eikon database.

**Figure 4.** High correlation and the slope



**Figure 5.** Warsaw Stock Index (WIG) quotations 2014–2016



Source: money.pl.

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