RESEARCH PAPERS OF WROCŁAW UNIVERSITY OF ECONOMICS No. 138
Financial Sciences 5 2010

Mariusz Staniszewski
Warsaw School of Economics

Tomasz Smolarek
Cracow University of Economics

PERFORMANCE PERSISTENCE IN POLISH MUTUAL FUNDS[1]

Summary: Many academic studies present strong evidence in favour of performance persistence in mutual fund industry. In this research we decided to examine if it is also true for mutual funds in Poland. We analyse 14 Polish equity funds that operated on the Polish market from 2002 to 2009. Tests are based both on net return and risk-adjusted measure (Jensen's alpha). Our results on the one hand do not confirm performance persistence of good results (hot hands phenomenon), particularly when longer time interval is considered (one year). On the other hand we prove icy hands phenomenon, both for short and long time interval.

Key words: mutual funds, performance persistence, hot hands phenomenon, icy hands phenomenon.

1. Introduction

Mutual fund managers find this very important to outperform both relative (peers) and absolute (market) benchmarks. The easiest way to assess the occurrence of superior ability is to monitor past results of a fund. If a manager wins in a preceding period and repeats the success in the following period, we can say about the persistency of good performance. Measuring the persistence of mutual funds' performance has been the goal of many academic studies for over four decades. The question is, whether past relative performance has any predictive power of future relative performance.

This study focuses on Polish equity open-ended mutual funds. We want to verify whether the past performance may be used to predict future relative performance.

The article is organized as follows. In Section I we review the academic articles on the performance persistence. In Section II we explain our research methodology,

[1] Mariusz Staniszewski, MBA (University of Chicago), Phd (Warsaw School of Economics), Tomasz Smolarek (Masters in Finance from Cracow University of Economics). Corresponding author Mariusz Staniszewski (mstanisz@chicagogsb.edu).

and describe the data set used in the test. Section III reports the results of the performance persistence test. A concluding section summarizes these results.

2. Section I

Background

The early researches on performance persistence of mutual funds gave many contradictory opinions. Sharpe [1966] used his "Sharpe ratio" to measure fund performance over two periods 1944-53 and 1954-63. He concluded that differences in performance can be predicted, although imperfectly. The most influential article on that issue is the work of Jensen [1968]. He examined mutual fund performance over the period 1945-64. To compute the risk adjusted abnormal returns he employed "Jensen's alpha". He concluded that the prediction of the individual fund performance was not very different from that predicted by a mere random chance. However, Carlson [1970] found evidence that funds with above-median returns over the preceding year typically repeat their superior performance.

It is important to note that by the early 1970's the efficient market hypothesis became the accepted paradigm in the academy [Malkiel 1995]. In relation to mutual fund business the hypothesis determines that no helpful information is provided by past performance in predicting future performance, after adjusting for risk or pricing factor. If it were true not only would the average manager not be expected to outperform passive management, but even managers with the best historical records would not be expected to outperform in the future. Therefore excess performance is, according to efficient market hypothesis, the result of luck, not skills [Goetzmann, Ibbotson 1994].

By the early 1980's, however, several cracks appeared in the efficient market theory. Many empirical studies demonstrated that the relative performance of equity mutual funds (relative to business's average) persists from period to period.

Grinblatt and Titman [1992] found persistence in fund performance. They examined 279 funds during the period 1975-84 using eight portfolio benchmarks with evaluation periods consisting of five years and found persistence for the next five years.

Positive results were also obtained in studies carried out by Brown, Goetzmann, Ibbotson and Ross [1992]. They put emphasis on the relationship between volatility and returns in a sample which showed evidence of survivorship bias. They used data from 1976-87 with a three year evaluation period. Their conclusion was that such a relationship created an occurrence of predictability. They found persistence in two out of three 3 yearly periods. This study, but also the study by Grinblatt and Titman [1992] showed that survivorship bias is the important factor influencing results. Therefore in the later research there were attempts to adjust results for this factor. The fact is that most of the early studies, such as Sharpe [1966], Jensen [1968], Carlson [1970] did not take into account survivorship bias.

Hendricks, Patel and Zeckhauser [1993] also showed that performance persistence phenomenon appeared robustly to a variety of risk-adjustment measures. They concluded that during the 1975-88 period substantial gains were available from investing in the mutual fund equivalents of last year's winners. In their analysis no-load growth oriented mutual funds that performed relatively well to their peers, continued to show superior performance in the near term (1-8 quarters). They used term "hot hands" to funds that delivered sustained short-run superior performance. Superior performing funds in one period may simply have taken very risky bets and won. If the bets fail in the next period the performance will be often below average. However, if the bets continue to be successful the fund will be above average again. In their study they used "Jensen's alpha" to adjust the results for risk. They also took care of survivorship bias, but they found from subsample analysis that the factor is probably not an important issue for performance studies with typical mutual funds samples.

Goetzmann and Ibbotson [1994] also found that past returns and relative rankings are useful in predicting returns. They employed different measures: raw returns, Jensen risk-adjusted alpha and style-categorized subgroups. Each time they obtained similar results confirming the appearance of performance persistence. They examined performance covering 1976-88 and similarly to most past researchers focused on long-term performance: one and two-year. However, they found that due to enough long time series shortage, many studies suffered from the lack of statistical power because of cross-sectional dependence of fund returns, what they referred to as a "style" problem. In their view, simple risk adjustments cannot eliminate the problem. Therefore in their study they also used monthly rankings. The monthly results were also consistent with the repeat-winner hypothesis.

In another study Brown and Goetzmann [1995] tried to explore performance persistence in mutual funds using absolute and relative benchmarks. Their sample also indicated that relative risk-adjusted performance persisted, however, the persistence was mostly due to funds that lag the S&P500. The analysis indicated that poor performance increased the probability of disappearance. Icy hands phenomenon was also confirmed by Hendricks, Patel and Zeckhauser [1993]. Using one-year intervals they examined data between 1976-88. The results were consistent with many other academic studies in which the persistence was the most pronounced among the best and the worst funds. The average funds move in and move out of the best and the worst groups in a rather unpredictable manner.

Malkiel [1995] found the presence of partial persistence. He found performance persistence among mutual funds during the 1970's but not in the 1980's.

Blake and Morey [1999] used data for 1993-97 to see whether Morningstar's star system could predict future performance. They formed portfolios of mutual funds using Morningstar's star system and found that during each year the top funds had a superior performance compared to the bottom funds.

The same was true in more recent research performed by Ibbotson and Patel [2002]. They indicated that winning funds did repeat good performance. They adjusted the fund performance for the manager style. Taking style adjusted alphas as a measure they found that the highest persistence was exhibited by funds which alphas were greater than 10% and also which alphas ranked in the top 5% of the sample.

3. Section II

Data set and methodology

On the contrary to many studies using data for funds with different types/styles of management (dividend fund, growth only, value only, small-, mid- or large-cap etc.) we choose fourteen universal Polish equity funds. The universal type means that in principle each fund demonstrates similar management style. Moreover each fund is compared to the same benchmark index, which is WIG index. Small and mid-cap funds are not taken into account in our study. We use net asset value per share (NAV) that is gross value (as a result of price appreciation/depreciation) less management fee. We decided to use NAV because all available funds take almost the same management fee (usually 4% p.a.) and therefore change in their NAV reflects the skills we look for.

Our date base consists of monthly returns over eight-year period (2002-09). The data set includes only these funds surviving in 2009, so an unknown number of funds may have existed within that period and yet be absent from our sample. Therefore, the results are not free from survivorship bias. The eight-year period contains two bear and two bull markets (if we count the stock market rally, which began in 2009, as the new bull market).

The investment performance of an individual mutual fund is likely to contain both a skill component and a noise component. According to Goetzmann and Ibbotson [1994] the skill component would cumulate over time, while the noise component would usually be serially independent so that its average would tend toward zero over time. The performance time periods should be neither too short nor too long. Moreover, to obtain statistical important results, we should use many independent time series. For net return tests first we choose quarterly intervals and thus obtain 30 observations. The same conclusions are achieved by lengthening the interval to semi-annual (not presented in the study). Then we use one-year period to reduce noise component. For test with Jensen's alpha we use only one-year intervals.

Our methodology is similar to Goetzmann, Ibbotson [1994] and Malkiel [1995]. We carry out two types of tests. First we use net return for each fund. Knowing that net returns can be influenced by risk taking, to improve comparison between high-risk and low-risk fund (an investor demands higher returns from riskier funds) we

employ Jensen's alpha in the second test. Alpha represents the risk-adjusted fund measure. To calculate it we use return for all twelve months of a particular year.

In both tests we use a simple procedure. For example: after ranking the performance of funds for IIQ'02 we categorize them as winners and losers. We define a winner (loser) as a fund with a rate of return over the calendar quarter that exceeds (is lower than) the average fund return (average for all fourteen funds). Next we do the same ranking for IIIQ'02 performance and again categorize the funds as winners and losers. We follow the same procedure for the remaining quarterly periods. As for Jensen's alpha rankings in the tables presented in the article we define a winner as the fund with positive alpha (and loser with negative alpha).

4. Section III

Quarterly net return test

The first quarter of 2002 serves as a base for ratings. WW (Winner-Winner) in a specific record in the tables that follow means that a fund was a winner both in the preceding quarter and the current one. WL (Winner-Loser) means that a fund was a winner in the preceding period but failed to repeat it in the following quarter. The similar explanation is for LL and LW.

In Table 2 we summarize above observations. WW column (Winner-Winner) is the number of winners in the preceding period that were also winners in the next quarter. To assess the hot hands phenomenon (winning by winning) we use the column of "percentage repeat winner" (we use also "percentage repeat losers" column for icy hands hypothesis). For example: in the IIIQ'09 there were six winners. In the IVQ'09 five of them repeated success and one failed (five-WW and 1-WL). Therefore the percentage of winners was: 5/6 = 83.3%. In order to verify the persistence performance hypothesis we used the z-test. The z-test for repeated winners (WW) was calculated according to Malkiel [1995]. Let p be the probability that a winning fund continues to be a winning one in the next period, and assume independence across funds. If there is no persistence, we would expect p to equal ½. Therefore, evidence against persistence in winning would be provided by failing to reject the hypothesis that p= ½. Since the random variable Y of the number of persistently winning funds will have a binomial distribution $b(n,p)$, we can construct a binomial test to see if the probability p of consistent winning is greater than ½. When n is reasonably large (n>=20) the random variable

$$Z = (Y - np)/\sqrt{np\,(1-p)},$$

which is shown in the table, will be approximately distributed as normal with mean zero and standard deviation one. The similar test can be used to verify icy hands phenomenon (LL).

Table 1. Fourteen examined Polish equity mutual funds categorized into four groups (WW, WL, LL and LW) based on their net return over quarterly intervals. Data from 2002-2009

Quarter	Arka Equity Fund	BPH Equity Fund	Aviva Equity Fund	DWS Equity Fund	DWS Plus Equity Fund	ING Equity Fund	Legg Mason Equity Fund	Millennium Equity Fund	PKO/ Credit Su-isse Equity Fund	PZU Krakowiak Equity Fund	Pioneer Equity Fund	Novo Equity Fund	Skarbiec Equity Fund	UniKorona Equity Fund
IV'09	WW	WW	WW	LW	LW	LL	LL	LL	LL	LW	WW	WL	LL	WW
III'09	WW	LW	WW	LL	LL	WL	LL	LL	LL	LL	WW	WW	LL	WW
II'09	WW	LL	LW	LL	WL	LW	WL	WL	WL	LL	LW	WW	WL	LW
I'09	LW	WL	LL	WL	LW	WL	WW	WW	LW	WL	LL	LW	WW	WL
IV'08	LL	WW	WL	WW	LL	WW	WW	WW	LL	WW	LL	LL	LW	LW
III'08	WL	LW	LW	WW	LL	LW	WW	WW	LL	LW	LL	LL	WL	WL
II'08	LW	LL	WL	LW	WL	WL	WW	WW	LL	WL	LL	WL	LW	WW
I'08	WL	WL	LW	WL	LW	LW	WW	LW	WL	WW	LL	LW	WL	LW
IV'07	WW	LW	LL	WW	LL	LL	LW	LL	WW	LW	LL	LL	WW	WL
III'07	LW	WL	WL	LW	WL	LL	WL	WL	WW	WL	LL	LL	LW	WW
II'07	LL	WW	WW	LL	WW	LL	WW	WW	LW	LW	WL	WL	LL	LW
I'07	WL	LW	WW	LL	LW	LL	WW	LW	LL	WL	LW	WW	LL	LL
IV'06	WW	LL	WW	LL	LL	WL	WW	WL	LL	WW	LL	LW	LL	LL
III'06	LW	WL	LW	LL	WL	WW	WW	LW	LL	WW	LL	WL	WL	WL
II'06	WL	LW	WL	LL	WW	LW	WW	LL	LL	WW	LL	LW	WW	WW
I'06	WW	WL	LW	WL	WW	LL	LW	LL	LL	LW	LL	LL	WW	LW
IV'05	WW	WW	LL	LW	LW	WL	WL	LL	LL	LL	LL	WL	WW	WL
III'05	WW	WW	WL	LL	LL	WW	LW	LL	WL	LL	LL	LW	WW	LW
II'05	WW	WW	LW	LL	LL	LW	LL	WL	WW	LL	WL	LL	LW	WL
I'05	WW	WW	LL	LL	WL	LL	WL	LW	WW	LL	WW	WL	WL	WW
IV'04	WW	WW	WL	LL	WW	LL	LW	LL	WW	WL	LW	WW	WW	WW
III'04	LW	LW	WW	WL	WW	LL	WL	LL	WW	WW	LL	LW	LW	WW
II'04	WL	WL	WW	LW	LW	LL	LW	WL	LW	LW	LL	LL	LL	WW
I'04	WW	LW	WW	LL	WL	LL	LL	LW	LL	LL	LL	LL	WL	WW
IV'03	WW	LL	WW	LL	LW	WL	LL	LL	WL	LL	WL	LL	LW	WW
III'03	LW	LL	WW	LL	LL	WW	LL	WL	LW	LL	WW	LL	WL	WW
II'03	LL	WL	WW	LL	LL	LW	LL	WW	LL	LL	LW	LL	WW	LW
I'03	WL	LW	WW	LL	LL	WL	WL	LW	LL	LL	WL	LL	WW	LL
IV'02	LW	WL	WW	WL	LL	LW	WW	WL	LL	WL	LW	WL	LW	LL
III'02	LL	LW	LW	WW	WL	LL	LW	LW	WL	WW	LL	WW	LL	LL

Source: own research based on quarterly net returns.

Table 2. Summary of Table 1 Test of performance persistence based on raw total returns

Quarter	WW	WL	LL	LW	Percentage repeat winners	Percentage repeat losers	z-test for WW
IV'09	5	1	5	3	83,3%	62,5%	1,63
III'09	5	1	7	1	83,3%	87,5%	1,63
II'09	2	5	3	4	28,6%	42,9%	–1,13
I'09	3	5	2	4	37,5%	33,3%	–0,71
IV'08	6	1	5	2	85,7%	71,4%	1,89
III'08	3	3	4	4	50,0%	50,0%	0,00
II'08	3	5	3	3	37,5%	50,0%	–0,71
I'08	2	5	1	6	28,6%	14,3%	–1,13
IV'07	4	1	6	3	80,0%	66,7%	1,34
III'07	2	6	3	3	25,0%	50,0%	–1,41
II'07	5	2	4	3	71,4%	57,1%	1,13
I'07	3	2	5	4	60,0%	55,6%	0,45
IV'06	4	2	7	1	66,7%	87,5%	0,82
III'06	3	5	3	3	37,5%	50,0%	–0,71
II'06	5	2	4	3	71,4%	57,1%	1,13
I'06	3	2	5	4	60,0%	55,6%	0,45
IV'05	3	4	5	2	42,9%	71,4%	–0,38
III'05	4	2	5	3	66,7%	62,5%	0,82
II'05	3	3	5	3	50,0%	62,5%	0,00
I'05	5	4	4	1	55,6%	80,0%	0,33
IV'04	7	2	3	2	77,8%	60,0%	1,67
III'04	5	2	3	4	71,4%	42,9%	1,13
II'04	2	3	4	5	40,0%	44,4%	–0,45
I'04	3	2	7	2	60,0%	77,8%	0,45
IV'03	3	3	6	2	50,0%	75,0%	0,00
III'03	4	2	6	2	66,7%	75,0%	0,82
II'03	3	1	7	3	75,0%	70,0%	1,00
I'03	2	4	6	2	33,3%	75,0%	–0,82
IV'02	2	5	3	4	28,6%	42,9%	–1,13
III'02	3	2	5	4	60,0%	55,6%	0,45
Sum	107	87	136	90	55,2%	60,2%	*1,44*
Average	3,6	2,9	4,5	3,0	56,1%	59,5%	

Source: own research based on quarterly net returns.

The results do not support hot hands phenomenon. Over the whole period 55% of winners tended to repeat their success, which is not considerably above 50%, the level confirming efficient market theory. The data, however, to a greater extent indicate cold (icy) hands phenomenon. Over the whole period almost 60% of losers tended to repeat bad result. We achieved almost exactly the same results for semi-annual periods.

Yearly net returns test

We now analyze the results assuming that winners and losers are ranked over one-year period, and then ranked again over the subsequent one-year period.

Table 3. Summary of a yearly net return test. Test of performance persistence based on net return

Year	WW	WL	LL	LW	Percentage repeat winners	Percentage repeat losers	z-test for WW
2009	1	7	2	4	12,5%	33,3%	–2,12
2008	4	4	2	4	50,0%	33,3%	0,00
2007	4	2	4	4	66,7%	50,0%	0,82
2006	1	3	5	5	25,0%	50,0%	–1,00
2005	3	3	7	1	50,0%	87,5%	0,00
2004	4	2	6	2	66,7%	75,0%	0,82
2003	2	5	3	4	28,6%	42,9%	–1,13
Sum	17	21	26	20	44,7%	56,5%	–0,65
Average	2,8	3,5	4,3	3,3	45,1%	54,9%	

Source: own research based on yearly net returns.

While for a short time period we can find 55% persistence of good performance, after lengthening intervals the result is much worse. About 45% of the previous winners were able to repeat success in the following year. But again the test confirms persistence of poor performance, but to a lesser extent than previously. About 56% of losers disappointed their shareholders in the subsequent year.

Jensen's alpha test

The last test employs Jensen's alpha. The market portfolio consists of the equity index WIG (85%) and 52-week T-Bills (15%). A winner is a fund with "positive alpha". In the previous tests we examined performance relative to an average fund. Now we examine results relative to the market index. We try to find out whether Polish funds are able to beat the market (after adjusting funds returns for risk level) persistently.

Table 4. Fourteen examined Polish equity mutual funds categorized into 4 groups (WW, WL, LL and LW) based on their Jensen's alpha over yearly intervals. Data from 2002-2009

Quarter	Arka Equity Fund	BPH Equity Fund	Aviva Equity Fund	DWS Equity Fund	DWS Plus Equity Fund	ING Equity Fund	Legg Mason Equity Fund	Millennium Equity Fund	PKO/ Credit Suisse Equity Fund	PZU Krakowiak Equity Fund	Pioneer Equity Fund	Novo Equity Fund	Skarbiec Equity Fund	UniKorona Equity Fund
2009	LW	LL	LW	WL	LL	LL	WL	LL	LL	LL	LL	WW	WL	LW
2008	WL	WL	WL	LW	WL	LL	WW	LL	WL	LL	LL	LW	WW	WL
2007	WW	WW	WW	LL	WW	WL	WW	WL	LW	WL	LL	WL	WW	WW
2006	WW	WW	LW	LL	LW	LW	LW	LW	WL	LW	LL	LW	LW	LW
2005	WW	WW	WL	WL	WL	LL	WL	LL	WW	WL	LL	LL	WL	WL
2004	WW	LW	WW	LW	WW	WL	WW	WL	WW	LW	WL	WL	WW	WW
2003	LW	LL	WW	LL	LW	LW	WW	WW	LW	LL	LW	LW	WW	LW

Source: own research based on monthly raw returns.

Table 5. Summary of Table 4 Test of performance persistence based on Jensen's alpha

Year	WW	WL	LL	LW	Percentage repeat winners	Percentage repeat losers	z-test for WW
2009	1	3	7	3	25,0%	70,0%	–1,00
2008	2	6	4	2	25,0%	66,7%	–1,41
2007	7	4	2	1	63,6%	66,7%	0,90
2006	2	1	2	9	66,7%	18,2%	0,58
2005	3	7	4	0	30,0%	100,0%	–1,26
2004	7	4	0	3	63,6%	0,0%	0,90
2003	22	25	19	18	46,8%	51,4%	–0,44
Sum	44	50	38	36	46,8%	51,4%	–0,62
Average	6,3	7,1	5,4	5,1	45,8%	53,3%	

Source: own research based on monthly raw returns.

The results are unfavourable for Polish fund managers. Over the whole eight-year period only 47% of winners repeated positive alpha next year. But every second loser (51.4%) was a loser next year.

5. Conclusion

Our study confirms no performance persistence among Polish mutual funds. The results are better for short time intervals, but become more pessimistic after lengthening intervals (to one-year periods). Positive results persistence does not occur both in relation to relative (peers) and absolute (market) benchmark (after adjusting fund performance for risk level).

We can say that it is much easier to find the cold hands phenomenon (repeated losers). Losing fund in the initial period is more likely to be a loser in the subsequent period. The evidence of cold hands is stronger than hot hands (both for short and long intervals; raw returns and risk-adjusted ones) but has no statistical power to confirm negative performance persistence.

Therefore the results for Polish mutual funds are consistent with other academic studies, such as Jensen [1968], where performance persistence has not been confirmed.

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POWTARZALNOŚĆ WYNIKU INWESTYCYJNEGO POLSKICH FUNDUSZY AKCJI

Streszczenie: Wiele prac akademickich opisujących zagadnienie powtarzalności wyniku wskazuje na jego występowanie wśród funduszy inwestycyjnych działających na rynkach rozwiniętych. W poniższej pracy staraliśmy się odpowiedzieć na pytanie, czy takie zjawisko można również zaobserwować na polskim rynku funduszy inwestycyjnych. Do analizy wykorzystaliśmy dane dla 14 polskich funduszy akcyjnych działających w latach 2002-2009. Szukając powtarzalności wyniku inwestycyjnego przeprowadziliśmy analizę opartą zarówno na stopie zwrotu netto, jak i na stopie zwrotu skorygowanej o ryzyko (Jensen's alpha). Rezultaty badań nie potwierdziły powtarzalności dobrych wyników inwestycyjnych, zwłaszcza przy wydłużaniu okresu badań. Z drugiej strony zaobserwowaliśmy większą powtarzalność słabych wyników, ale jednocześnie nie potwierdziliśmy statystycznie takiej powtarzalności wśród polskich funduszy.