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*Changes in Markets Trends and Effectiveness of Equity Mutual  
Funds in Poland in the Years 2005–2014*

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Zmiany trendów rynkowych a efektywność akcyjnych funduszy inwestycyjnych w Polsce w latach  
2005–2014

**Keywords:** mutual funds; equity mutual funds; profitability of funds; changes in share prices

**Słowa kluczowe:** fundusze inwestycyjne; akcyjne fundusze inwestycyjne; dochodowość funduszy; zmienność cen akcji

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### **Introduction**

Analyzing the dynamic changes of mutual funds' assets, we can raise the questions if the state of the economy, the level of prices on the WSE and the value of the mutual funds' industry impact the efficiency of investment operations of the equity fund sector in Poland in 2005–2014. Activities of 18 funds with equity investment profile which uninterruptedly operated in the years 2005–2014 were examined to answer these questions. The main source of monthly data was the Chamber of Fund and Asset Management (IZFiA) and the Warsaw Stock Exchange (WSE), as well as the Central Statistical Office of Poland (CSO), Polish Financial Supervision Authority (PFSA) and the National Bank of Poland (NBP). The degree of efficiency of mutual funds was calculated using logarithmic monthly returns, the risk coefficient  $\beta$  and a risk-adjusted measure of return – the Treynor ratio. To assess the impact of the market trends on the

funds' efficiency, three periods were identified: the years 2005–2007, 2008–2011 and 2012–2014. The first one was characterized by strong economic growth and an increase of share prices on the WSE, the second fell for the period of the financial crisis and the collapse of the earlier upward economic trends and the third was characterized with stabilization and gradual improvement in the country's economic and financial situation.

The remaining part of the study has the following structure. The next section reviews the literature on assessment of the efficiency of mutual funds, including changes in their performance during the financial crisis. The following presents the research methods used in the funds' evaluation, the data, results of the research and their discussion.

### 1. Mutual funds and their macroeconomic environment in Poland

Mutual funds appeared in the European economy in the second half of the eighteenth century. The first collective investment scheme called *Eendragt maakt magte* was founded in 1774 by Danish broker Abraham van Ketwich [Rouwenhorst, 2004]. In the following centuries, the strongest mutual fund sector developed in the United States. In this country, in 1904 the first closed-end mutual fund was established and in 1924 the first open-ended mutual fund. At the beginning of the financial crisis of 1929, around 400 funds with total assets of USD 3 billion operated on the US market [Stańczak-Strumiłło, 2013, p. 14]. Before the World War II in Europe and Japan, long-term household savings were stored almost exclusively on the banking term-deposits. In the USA, the mutual funds industry began to enjoy high popularity

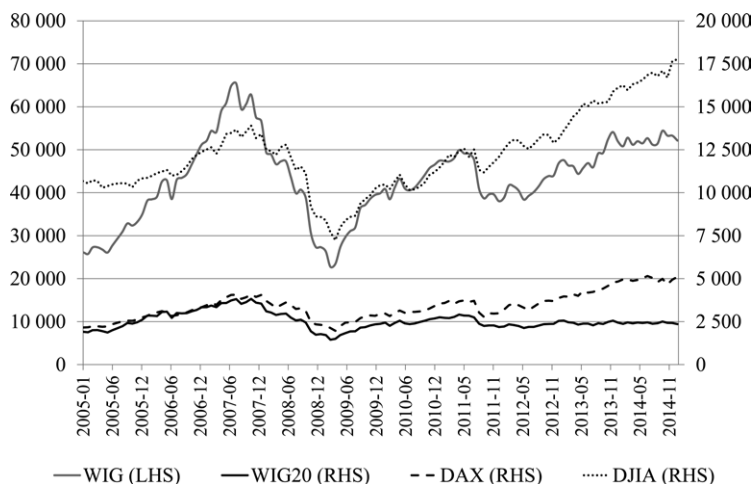


Figure 1. Indices on the Polish and global stock markets (2005–2014)

Source: [Reuters].

in the 1990s. Also in Europe during this decade, the value of assets of the mutual funds increased several times, i.e. from less than EUR 500 million to more than 4.500 billion [Bojańczyk, 2007, pp. 97–101]. Initially, mutual funds focused their investment activities on the money market and the debt securities market. In subsequent years, they expanded their operations to the stock markets.

In Poland, the mutual fund industry started its activities with the creation of Pioneer First Polish Trust Fund in July 1992. Its formation was associated with opening the Warsaw Stock Exchange in the same year. The strong growth in assets of mutual funds in Poland fell for the years of a sharp prices' increase on the WSE (Figure 1), which resulted, among others, from the improving economic situation after Poland's accession to the EU in 2004 (Table 1).

Table 1. Macroeconomic situation of Poland (2005–2014)

Variables	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
GDP growth (%)	4.4	6.6	6.6	3.2	3.2	4.7	5.1	0.2	3.0	3.3
Unemployment rate (%)	16.7	12.2	8.5	6.7	8.5	9.3	9.7	10.1	9.8	8.1
CPI (%)	0.7	1.4	4.0	3.3	3.5	3.1	4.6	2.4	0.7	-1.0
Wages growth (%)	1.5	8.5	7.2	5.4	6.8	5.4	4.4	2.4	2.7	3.7
Household financial assets (PLN billion)	615	677	751	551	649	695	680	853	963	1,001

Source: [Central Statistical Office].

The financial crisis that emerged on the global markets in mid-2007 in Poland contributed to a strong outflow of funds from the mutual fund sector in 2008 (Table 2). The balance of payments and redemptions this year became negative and reached nearly PLN -30 billion. Such significant outflow led, among others, to a decline in the value of assets of the fund sector from PLN 133.9 billion to 73.7 billion. In 2008, along with the decreased importance of funds in the financial sector the ratio of their assets to GDP fell from 12% to 5% [NBP, 2010, pp. 123–124].

Table 2. State of the mutual fund sector in Poland (2005–2014)

Variables	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Net assets value (PLN bn)	61	99	134	74	93	117	115	146	189	209
Balance of payments and redemptions (PLN bn)	16	24	31	-30	3	9	-3	14	22	12
Number of mutual funds	203	263	291	331	362	370	387	421	437	481
Number of TFI	23	24	33	39	43	50	50	54	55	58

Note: TFI – Mutual Fund Management Company.

Source: [Chamber of Fund and Asset Management].

Improvements in the economic situation in 2010, led to the gradual restoration of confidence of individual investors to mutual funds and strengthening demand for their shares. This process was accelerated by monetary easing policy conducted by

the NBP. Series of interest rate cuts initiated in the fourth quarter of 2012 significantly weakened demand for ever lower interest-bearing bank deposits (Figure 2).

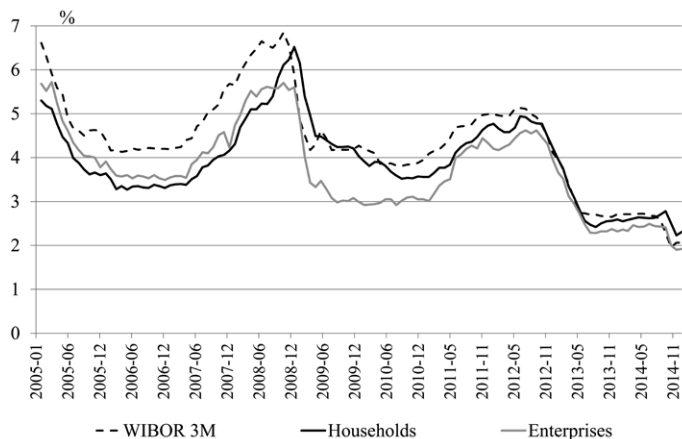


Figure 2. Interest rates on interbank, household and enterprise term deposits in 2005–2014

Source: [NBP].

On the bond market, interest rate cuts and improving assessment of the Polish economy by investors and rating agencies<sup>1</sup> contributed to a decrease in government bond yields (Figure 3). In addition to that, the rising performance of the fund sector

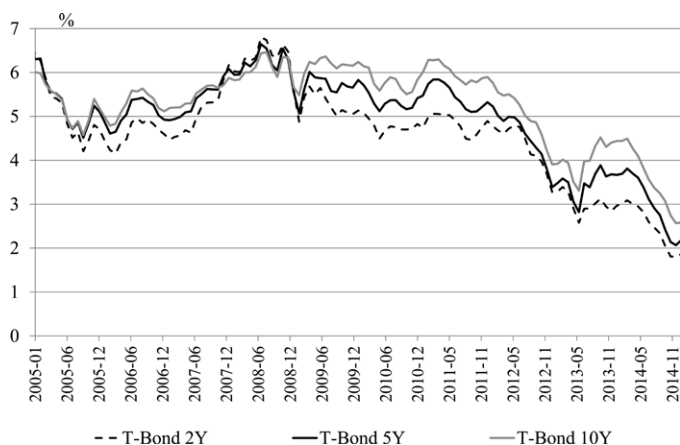


Figure 3. Yield on Treasury bonds in Poland in 2005–2014

Source: [Reuters].

<sup>1</sup> Rating agencies upgraded the rating of Poland for the foreign issuances of T-bonds from BBB+ to A-: Fitch on January 18, 2007 and Standard & Poor's on March 29, 2007 [MF, 2008].

was impacted by the improving situation on the global capital markets including the WSE. In a result, at the end of 2014 the fund sector composed 481 funds managed by 58 mutual fund management companies (TFI). The value of the sector's assets under management rose to PLN 208.9 billion and was more than three times higher than in 2005.

## 2. Efficiency of the funds' investment activities – literature review

In the literature, the studies on funds efficiency to a great extent are focused on the US market. Among others, Du, Huang and Blanchfield [2009], examining the performance of funds investing in corporate bonds in the USA in 1992–2003, found that the funds' profits significantly depend on experience and investment skills of their management teams and the appropriate methods of risk diversification.

In turn, the research conducted among European funds by Dietze et al. [2009] showed that operators investing mainly in bonds of German companies do not achieve better results than other types of funds. It was also found that in the long term, the results of individual funds positively affect a longer period of their activity, the use of lower fees and less exposure to bonds with low credit rating.

Babalos, Mamatzakis and Matousek [2015], examining the effectiveness of the investment performance of equity funds in the USA in 2002–2011, point out that the financial crisis negatively impacted their financial results, although the effect was only of short-term nature. Funds reached the weakest performance in 2008, but in the preceding and the following years the negative disturbances were only slight. In other years, funds' performance remained relatively high and stable. The financial crisis also contributed to the emergence of the strongest dispersion of rates of return on equity funds in 2008.

Witkowska [2009], examining equity funds operating in Poland in 2005–2007, shows that the investment efficiency was increasing with the improving situation on the WSE. Additionally, the research indicates that the rates of return and indicators of funds' performance are closely related to the situation on the market in which funds invest.

In turn, Moneta [2013] indicates that bond funds suffered significant losses from the public finance debt crisis. This statement is based on the results of research on funds operating in 2010–2013 and investing in Treasury bonds of Southern European countries (including Portugal, Italy, Greece and Spain). Moneta states that the deterioration of funds' earnings was rather of short-term nature. This beneficial effect and resistance of funds to macroeconomic shocks could predominantly result from the adequate geographic and product diversification of funds' portfolios.

### 3. Methods for assessing the efficiency of mutual funds

The assessment of the efficiency of the fund's activity is most frequently conducted using methods proposed by Sharpe's [1966], Treynor [1965] and Jensen [1968]. In this study, fund's performance is evaluated using monthly returns, the risk coefficient  $\beta$  and the Treynor ratio – a risk-adjusted measure of return based on systematic risk.

Using the procedure for assessment of funds' efficiency proposed by Witkowska [2009] the logarithmic rate of return is defined as:

$$R_t = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

where:

$R_t$  – rate of return in the month

$t, P_t$  i  $P_{t-1}$  – value of fund unit, respectively, in the month  $t$  and  $t-1$

For the assessment of average returns over analyzed periods, the value of the average rate ( $R_T$ ) in the period T was determined:

$$R_T = \frac{1}{T} \sum_{t=1}^T R_t$$

The analysis of the level of risk undertaken by mutual funds was conducted using the risk coefficient  $\beta$ . Its value is affected by deviation of returns of funds from their average value, and the deviation of market rates of return from the average value in the period. The beta ratio is calculated by the following formula:

$$\beta_p = \frac{\sum_{t=1}^T (R_{pt} - R_p)(R_{mt} - R_m)}{\sum_{t=1}^T (R_{mt} - R_m)^2}$$

where:

$T$  – number of analyzed months

$R_{pt}$  and  $R_{mt}$  – rate of return of, respectively, fund  $p$  and the market (represented by WIG) at month  $t$

$R_p$  and  $R_m$  – for the period T the average rate of return of, respectively, fund  $p$  and the market

The effectiveness of an individual mutual fund is assessed with Treynor ratio calculated with the formula:

$$WT_p = \frac{R_p - R_f}{\beta_p}$$

where for the period T:

$R_p$  – average rate of return of the fund  $p$

$R_f$  – average rate of return on risk-free investment

$\beta_p$  – risk coefficient

The study involved 18 open-ended equity funds continuously operating in years 2005–2014. The data on the values of the participation units and the funds' assets come from the IZFiA ([www.izfa.pl](http://www.izfa.pl)), the values of stock market indices from the WSE ([www.gpw.pl](http://www.gpw.pl)). As rates of the risk-free investment, the rates of one-year IRS contracts were accepted. In the literature, the investment in Treasury bills is treated as the risk-free investment rate. However, in Poland since 2012 there is no quotation on T-bills due to the cessation of their emissions by the Minister of Finance. On the other hand, accepting for this purpose 6M or 1Y WIBOR may be a subject to errors due to the low liquidity of interbank loans with such long maturities. The published 6M and 1Y WIBOR rates do not represent the real state of the market and are more statistical in nature because they are based on declarations of banks, rather than on actual transactions [Pawłowicz, 2010].

The entire period was divided into three sub-periods with characteristic upward or downward trends in the national economy, value of assets of the mutual fund sector and the shares on the WSE, i.e.:

- 2005–2007 – increase in the value of assets of the fund sector and share prices on the WSE,
- 2008–2011 – declines and volatility of the funds' assets and share prices on the WSE,
- 2012–2014 – gradual increase and stabilization of the value of the funds' assets and share prices on the WSE.

As the first stage, the monthly returns on funds and the market were calculated (Eq. 1), and then for the analyzed sub-periods – average returns and the risk coefficients  $\beta_t$  (Table 3).

Table 3. Average monthly rate of return  $R_t$  and risk coefficients  $\beta$  (2005–2014)

Fund	2005–2007		2008–2011		2012–2014		2005–2014	
	$R_t$	$\beta_t$	$R_t$	$\beta_t$	$R_t$	$\beta_t$	$R_t$	$\beta_t$
ARKA	0.033	0.186	-0.009	0.976	0.005	0.162	0.008	0.718
AVIVA1	-0.003	0.016	0.000	0.236	0.010	0.110	0.002	0.108
AVIVA2	0.023	0.246	-0.006	0.890	0.009	0.403	0.007	0.659
BPH1	0.022	0.094	-0.009	0.774	0.006	0.248	0.005	0.580
BPH2	0.015	0.246	-0.014	1.029	0.009	0.506	0.001	0.732
BPH3	0.010	0.044	-0.006	0.697	0.001	-0.389	0.001	0.403
BPH4	0.013	0.051	-0.002	0.458	0.004	0.135	0.004	0.320
ING1	0.021	0.258	-0.004	0.654	0.009	0.190	0.007	0.516
ING2	0.020	0.253	-0.008	0.796	0.009	0.154	0.005	0.599
INVR1	0.020	0.129	-0.005	0.747	0.005	0.163	0.005	0.526
INVR2	0.021	0.243	-0.013	0.810	0.013	-0.377	0.005	0.600
INVR3	0.026	0.707	-0.019	1.098	0.013	0.949	0.004	0.977
KBC1	0.010	0.092	-0.002	0.488	0.006	0.100	0.004	0.326
KBC2	0.016	0.134	-0.004	0.660	0.003	0.172	0.004	0.462
PNR1	-0.002	0.012	0.004	0.321	0.012	-0.164	0.005	0.111
PNR2	0.019	0.154	-0.016	1.003	0.005	0.260	0.000	0.732

Fund	2005–2007		2008–2011		2012–2014		2005–2014	
	$R_t$	$\beta_t$	$R_t$	$\beta_t$	$R_t$	$\beta_t$	$R_t$	$\beta_t$
NOVO	0.019	0.221	0.004	0.058	-0.003	-0.200	0.006	0.185
LMNA	0.027	0.282	-0.004	0.688	0.007	0.343	0.008	0.580
Average	0.017	0.187	-0.006	0.688	0.007	0.153	0.005	0.507
Median	0.019	0.170	-0.005	0.722	0.007	0.163	0.005	0.553
Q3-Q1	0.010	0.164	0.008	0.410	0.004	0.226	0.003	0.010
Mini- mum	-0.003	0.012	-0.019	0.058	-0.003	-0.389	0.000	0.108
Maxi- mum	0.033	0.707	0.004	1.098	0.013	0.949	0.008	0.977

Notes: ARKA – Arka BZ WBK Akcji Polskich, AVIVA1 – AVIVA Investors Aktywnej Alokacji, AVIVA2 – Aviva Investors Polskich Akcji, BPH1 – BPH Akcji, BPH2 – BPH Akcji Dynamicznych Spółek, BPH3 – BPH Akcji Europy Wschodzącej, BPH4 – BPH Zrównoważony, ING1 – ING Akcji 2 SFIO, ING2 – ING Akcji, INVR1 – Investor Akcji Dużych Spółek, INVR2 – Investor Akcji, INVR3 – Investor Top 25 Małych Spółek, KBC1 – KBC Aktywny, KBC2 – KBC Beta Dywidendowy SFIO, PNR1 – PIONEER Akcji Amerykańskich, PNR2 – PIONEER Akcji Polskich, NOVO – NOVO Akcji, LMNA – Legg Mason Akcji; Q3-Q1 – interquartile range.

Source: own deliberation.

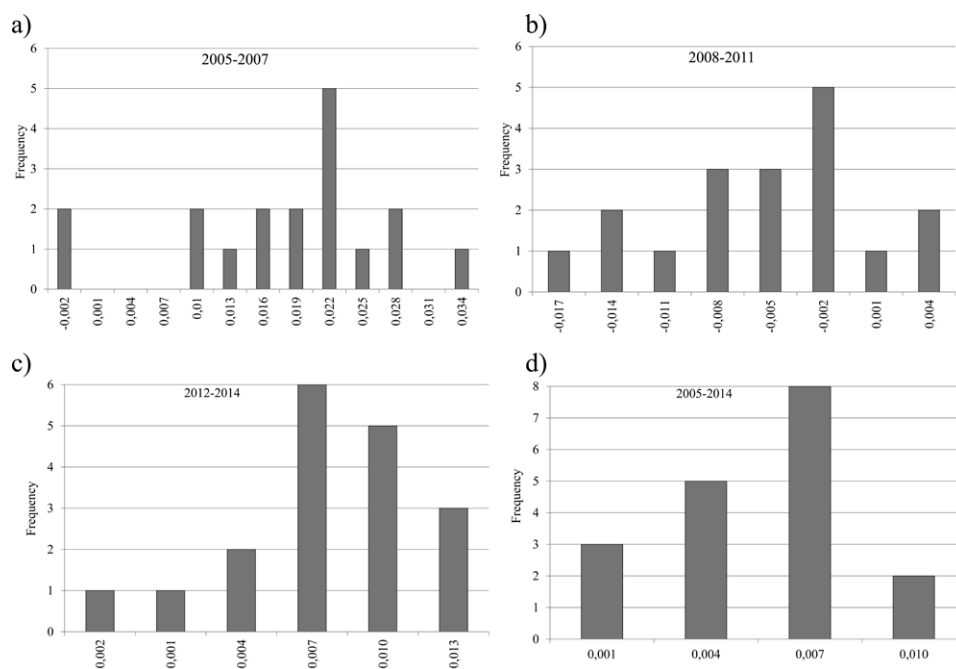


Figure 4. Distribution of funds in terms of rates of return achieved during the period of  
a) 2005–2007, b) 2008–2011, c) 2012–2014, d) 2005–2014

Note: on the graphs: horizontal axis – profitability of funds  $R_t$ .

Source: own deliberation.

The results of the analysis indicate that during periods of dynamic changes in share prices on the WSE, i.e. before (2005–2007) and during the financial crisis (2008–2011), there was a significant stratification in terms of fund's profitability (Figure 4). For these two periods, the interquartile range amounted to, respectively, 0.010 and 0.008 comparing to 0.004 for the period of 2012–2014, what was consistent with findings of Babalos, Mamatzakis and Matousek [2015]. In the period of a stable growth on the WSE, the distribution of funds was much more even. This enabled to increase uniformity in the distribution of funds' profitability throughout the entire period of 2005–2014.

Significant and dynamic changes of prices on the WSE in 2005–2007 can be considered as factors conducive to achieving high rates of return of funds (Figure 5). The average monthly rate of return for this period amounted to 0.017 and was more than two times higher comparing to the average in 2012–2014. Volatility of prices on the WSE also contributed to the higher investment risk. The average value of the risk coefficient  $\beta$  for the period 2005–2007 amounted to 0.187 and was significantly higher than the average in 2012–2014. Comparing the rates of return and risk of individual funds, three best performing funds are: Arka BZ WBK Akcji, Investor Top 25 Małych Spółek and Legg Mason Akcji (Table 2).

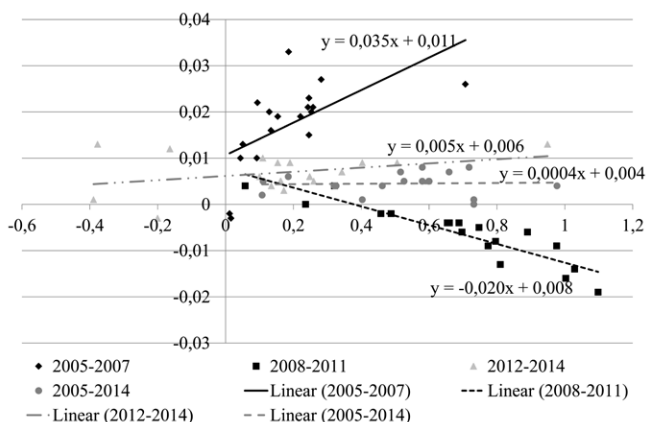


Figure 5. Relationship between fund's returns and the level of risk incurred by fund in 2005–2014

Note: on the graph: horizontal axis – the risk coefficient  $\beta$ , vertical axis – the fund's rate of return.

Source: own deliberation.

The downward trend in stock prices and the consequent declines in the value of mutual fund's assets significantly weakened the profitability of the funds in 2008–2011, i.e. during the financial crisis of 2008–2009 and the crisis in public finances in the euro zone in 2010–2011. The crisis also favored the build-up of risk in the portfolios of the funds. In this period, the best performing funds were: Pioneer Akcji Amerykańskich, NOVO Akcji and AVIVA Investors Aktywnej Aloкации. They were also characterized by the lowest levels of risk in their investment portfolios (Table 2, Figure 5).

In the period of stabilization and moderate growth (2012–2014) mutual funds reached relatively low rates of return and simultaneously did not expose themselves to high investment risk (Table 2). Just as before the crisis, although to a much lower extent, the portfolios of the best-performing funds were characterized by a higher level of risk. The best performing funds were: Investor Akcje, Investor Top 25 Małych Spółek, Pionier Akcji Amerykańskich.

To assess the overall investment effectiveness of mutual funds Treynor ratios (WT) were calculated according to Eq. 4. The ratio compares rates of return on the fund with the rate of return on risk-free investment and then refers this to the size of the risk undertaken by the fund. The results show that the most effective in investment activities were funds: BPH Akcji, BPH Zrównoważony and Arka BZ WBK Akcji Polskich (Table 3). During the period of crisis, all funds reached a negative value of the Treynor ratio, which means that their rates of return were lower than the rate of risk-free investments, i.e. one year IRS contracts.

Table 4. Rank of funds and Treynor ratio (WT) in 2005–2014

Fund	WT (2005–2007)	WT (2008–2011)	WT (2012–2014)	WT (2005–2014)	Funds' rank
ARKA	0.1568	-0.0139	0.0174	0.0055	5
AVIVA1	-0.4566	-0.0187	0.0675	-0.0157	18
AVIVA2	0.0766	-0.0109	0.0162	0.0055	6
BPH1	0.1944	-0.0167	0.0153	0.0022	10
BPH2	0.0432	-0.0178	0.0131	-0.0031	15
BPH3	0.1311	-0.0148	0.0032	-0.0070	17
BPH4	0.1716	-0.0138	0.0110	0.0016	11
ING1	0.0667	-0.0126	0.0334	0.0071	4
ING2	0.0626	-0.0158	0.0398	0.0024	9
INVR1	0.1268	-0.0124	0.0159	0.0035	7
INVR2	0.0708	-0.0205	-0.0281	0.0026	8
INVR3	0.0308	-0.0214	0.0106	0.0000	14
KBC1	0.0661	-0.0133	0.0345	0.0007	13
KBC2	0.0914	-0.0116	0.0008	0.0012	12
PNR1	-0.4784	0.0002	-0.0548	0.0098	2
PNR2	0.0951	-0.0205	0.0078	-0.0046	16
NOVO	0.0696	-0.0078	0.0279	0.0143	1
LMNA	0.0822	-0.0125	0.0122	0.0079	3

Note: description of abbreviations as in Table 2.

Source: own deliberation.

The stabilization and moderate growth of the economy occurred in 2012–2014 provided to funds an opportunity to reach again the positive values of Treynor ratio indicating a positive assessment of the investment efficiency of funds. The average rates of return of 16 funds were higher than the rate of risk-free investment. The best results were achieved by funds AVIVA Investors Aktywnej Aloкации, ING Akcji and KBC Aktywny.

Assessing the efficiency of the funds' investment operations throughout the entire period the research indicates that in case of 14 out of 18 funds the investing performance indicators were positive, i.e. their average rates of return were higher than rates on risk-free investments. The top ranked funds (NOVO Akcji, PIONEER Akcji Amerykańskich, Legg Mason Akcji and ING Akcji) to the greatest extent invest in shares of Polish companies listed on the WSE. Additionally, it should be noticed that these funds achieved relatively high profits in all sub-periods. Such feature might mean that they performed stably and were able to effectively adapt their investment policy to the current macroeconomic situation and trends on the WSE. Most of them concentrated investment portfolio in shares of companies listed on the WSE. These results are consistent with assessments of Du, Huang and Blanchfield [2009] indicating that the results of the funds depend largely on the skill and experience of the investment team and conclusions of Witkowska [2009] indicating that the results of the funds depend on the situation in the markets in which they invest.

## Conclusions

The performance of equity funds operating in Poland in 2005–2014 significantly correlates with the prices of shares listed on the WSE, as well with changes in the value of the fund industry assets what is consistent with the results achieved by Witkowska [2009].

During the periods of growth on the WSE, higher profitability achieved funds which undertaken higher investment risk. This relationship was stronger in times of more dynamic growth of prices on the WSE and the stronger increase in the value of the fund sector assets.

In periods of crisis or economic slowdown, the best profitability achieved funds to a less extent exposing their portfolios to investment risk.

Assessment of funds throughout the entire ten-year period shows that the highest investment efficiency reached funds with relatively high efficiency in periods of prosperity, recession or economic slowdown, i.e. during periods of upward and downward trends on the WSE. This means that funds whose investment teams better adapt investment policy to the current stage of the economy achieved the best investment efficiency, which is consistent with the findings of Du, Huang and Blanchfield [2009].

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### **Zmiany trendów rynkowych a efektywność akcyjnych funduszy inwestycyjnych w Polsce w latach 2005–2014**

Po gwałtownym spadku wartości akcyjnych funduszy inwestycyjnych w 2008 r., w kolejnych latach ich sytuacja uległa poprawie. W 2014 r. doprowadziło to do potrojenia akcji w stosunku do 2005 r. Na podstawie danych miesięcznych dotyczących 18 funduszy akcyjnych, działających nieprzerwanie w Polsce w latach 2005–2014, zbadano rentowność, poziom ryzyka i efektywności funduszy. Wyniki wskazują, że rentowność i efektywność funduszy są skorelowane z trendami cen na GPW. Podejmowanie wyższego ryzyka inwestycyjnego przynosi dodatkowe pozytywne rezultaty, zwłaszcza w okresach tendencji wzrostowych cen akcji. W okresach kryzysu mniejsze straty ponoszą fundusze mniej agresywnej polityki inwestycyjnej. W dłuższej perspektywie lepsze wyniki uzyskują fundusze przez cały czas osiągające relatywnie stabilne stopy zwrotu i lepiej dostosowane do polityki inwestycyjnej na obecnym etapie gospodarki.

### **Changes in Markets Trends and Effectiveness of Equity Mutual Funds in Poland in the Years 2005–2014**

After a sharp decline in the value of mutual funds' assets in 2008 in subsequent years, their situation has improved. In 2014 it resulted in tripling their assets comparing to 2005. Using monthly data on 18 equity funds operating continuously in Poland in 2005–2014, the profitability, level of risk and efficiency of funds were examined. The results indicate that profitability and efficiency of funds are significantly correlated with the trends in prices on the WSE. Taking higher investment risk brings additional positive results especially during periods of upward trends in share prices. In periods of crisis, smaller losses are suffered by funds with less aggressive investment policy. In the long term, better efficiency is obtained by funds reaching relatively stable rates of return throughout the entire period and better adapting current investment policy to the current stage of economy.