

# Mutual Funds Investment Strategies

LIBĚNA KANTNEROVÁ  
 Department of finance and accounting  
 University of South Bohemia  
 Studentská 13, České Budějovice  
 THE CZECH REPUBLIC  
 kantner@ef.jcu.cz

*Abstract:* - The main purpose of this market survey was to compare bond, stock and mixed funds domiciled in the United States and selected countries of the European Union using of modern methods to give proof to people, that it is possible to increase their personal wealth by this way of the investment, which is now possible in the transition economies too. However, not everyone here knows the inherent risks involved in investing or how to strike a correct balance between risk taking and making a profit. In such situation, there is a possibility to ask professionals or consultants for their choice of what they believe to be the best investment alternative(s) or to determine own strategies in selecting risk level and attempt to find the best investment alternatives. In this paper the strategy based on the large collections of historical data sets (6,385 calculations were made) is shown.

*Key-Words:* - Mutual funds, investment, bond, stock

## 1 Introduction

The mutual funds are a portfolio of multiple company's stocks, picked and managed by a professional fund manager (Mincher, 2007).

Over the past decade American investors increasingly have turned to mutual funds to save for retirement and other financial goals (Kyiosaki, 2011). Mutual funds can offer the advantages of diversification and professional management. However, as with other investment choices, investing in mutual funds involves risk. And fees and taxes will diminish the fund's returns. It pays to understand both the upsides and the downsides of mutual fund investing and how to choose products that match your goals and tolerance for risk (<http://www.sec.gov/investor/pubs/inwsmf.htm>).

Money market mutual funds offer a convenient parking place for cash reserves when an investor is not quite ready to make an investment or is anticipating a near-term cash outlay for a non-investment purpose. Money market mutual funds offer ultimate safety and liquidity. This means that investors will have an expected sum of cash at the very moment that they need it

(<http://www.investopedia.com/articles/mutualfund/04/081104.asp>). By Rose, Marquis (2009) the household – individuals and families – are the dominated holders of corporate stocks, followed by pensions funds, mutual funds and insurance companies.

The brutal collapse of financial markets a few years ago and some specific problems of transformed economics – e.g. promotion of idea that huge profit could be recognised before being realized by churning non-liquid assets (Gregoriou, 2010) - are the reasons for poor confidence in them. However, this was not the end of mutual funds because they remain a viable investment vehicle for many people although they should be very cautious. In truth, mutual funds are still the best way to achieve long-term financial goals for many of us. But we need to collect more information from long-term periods and hope that, after the passage of time, they will be stable once again. By Kiyosaki (2011) - there is no such thing as a safe investment. There are only smart investors. By Valach (2010) is obtaining of update and true information for making a decision more and more difficult. It is necessary to calculate all information available in the market (Ingersoll,

1987). But there exists one unpredictable risk – political (Kohout, 2005), which is more expected in some countries. They are not convenient for the investment.

One of the advantages of mutual funds is that they are diversified, what is one of most important reasons for the investment of our money (Escalda, Vaz, 1998). There are many such funds worldwide that offer many a numerous variety of benefits and risks and which, when combined with the approach a client chooses, they can offer a very good profit result even in difficult times for investing. Due to the short history of these investments in the Czech Republic, the comparison of funds of the Czech Republic with those of foreign funds was chosen. Specifically, the performance of Czech, American and European funds was compared. During this process 6,385 calculations were made. For this reason a decision to find some new method how to do calculations more easy and exact was made. The new method which offers more easy way to the optimal and easier strategy of investing while avoiding lot of calculation and mistakes was found in the co-operation of two universities in the Czech Republic.

Information technologies play a key role in industry and in the development of the transition economies as a whole. The requirements of the application sphere and foreign investors are connected with the rapid growth of IT technologies, yet science and research have not responded adequately to this newly emerging situation. Additionally, the growing complexity of the tasks solved in the application sphere – in industry and society – brings a growing need to create a modern computer infrastructure based on high-powered supercomputers, including the development of related scientific disciplines. The lack of a supercomputer centres represents a key competitive disadvantage of the Czech Republic. The IT4Innovations Centre of Excellence in Ostrava (<http://www.it4i.cz/en/index.php>) solves this problem in the present time and responds to these needs, representing a tool for the integration and development of IT research. The infrastructure created by the IT4Innovations will thus not only work as a high-quality partner for the application sphere, but will also motivate industry to develop new and innovative products and solutions based on the effective use of these modern technologies.

Economic and financial modelling, that is included in the Numerical Modelling for Engineering research area, creates one of the basic exact tools for

economic and financial decision-making, analysis, and prediction. A specific feature for these models is that there are extensive dimensions, and extensive data is necessary to be processed. In addition, it concerns dynamic models for risks, uncertainty, and flexibility (Martiník, 2012).

The above-mentioned implies that model applications are demanding on computing technology from the point of view of the quantity of processed and stored data as well as computations range and speed. Thus it is necessary and it is also the application precondition to dispose of performing computing technology. It looks to be a good way for the new research not only in the field of finance in the Czech Republic.

The heading of each section should be printed in small, 14pt, left justified, bold, Times New Roman. You must use numbers 1, 2, 3, ... for the sections' numbering and not Latin numbering (I, II, III, ...)

## 2 Problem Formulation

Mutual funds are good financial instruments if you know how to use them to your advantage. The first decision one has to consider is **timing**. Time plays a very important role because mutual funds are usually not short term investments but rather long term investments for the reason that one has to expect the possibility of changes in the market in the long term. It is also necessary to keep them long enough to ride out business cycles as they will occur. This means holding them at least 5 years but it is probably better to keep them 10 to 20 years. As one can see, investing in mutual funds is rather similar to investing in real estate, Benz (2005).

The second step is to obtain enough **information** to decide which funds to choose. It is necessary to obtain reliable data in order to select the best funds in the market, both foreign and domestic.

The third step is to **reduce the risk**, with the help of diversification.

For all of these decisions, it is necessary to understand the **performance** of a fund and the **risk** for that investment (Steigauf, 2003). The financial markets have been very uncertain especially the last five years. What is the difference between risk and uncertainty? While it might seem like a same term, it is not quite so. Risk can be quantified, which means that there is a measurable probability of

possible outcomes. The probabilities of outcomes can be attained either by deduction or induction. For example economists induce probability distributions from stock market returns from the history of past returns.

Contrary to risk, uncertainty is not quantifiable. In this situation the world is not well charted. Our world view might be insufficient or the way world operates might change, so that the past observation become obsolete. Typically, when making an investment decision, both risk and uncertainty are present. Given that risk is quantifiable, most of literature on the subject of financial markets, deals predominantly with risk, but not with uncertainty. Complete ignorance of uncertainty may result in poor investment.

The financial markets are very important object taught now at different schools. They are e.g. one of part of the lessons at high schools (Dvořáková, 2011) and universities in the Czech Republic. The topics of investing in mutual funds are the part of standards of Ministry (2011) of Education, Youth and Sports of the Czech Republic in the System of building of financial literacy at schools too.

## 2.1 Indicators showing the performance and risk

### Performance indicators

The fund performance should be compared within the same category of funds. For example, there is big difference between funds that focus on stocks and those that focus on bonds. It is also better to do the comparison within a long time period because the data is less affected by cyclical bull and bear markets if a longer period is chosen. It is necessary to know if fund costs and expenses such as management salaries, advertising, operating costs, duties and taxes etc. are deducted before the publishing of return results. If not, it might be that the profit will shrink because of these “invisible” costs, and the fund might not be such an optimal choice (Lack, 2011).

### Risks indicators

**Time** is the most important indicator (Steigauf, 2003). Time is very important in any financial activity and the longer the time period often means

the greater the risk. It works the same way in mutual funds. An investor, that chooses mutual funds, usually looks at mutual funds as long-term investment. The price of mutual funds is determined once-per day. The only time it would make sense to follow the price movements much closer would be if there is a situation, when one tries to find a perfect moment to enter particular mutual fund.

The **risk** (Benz, 2005) can be further influenced by the interest rate and, of course, by changes in monetary market if some foreign currency is used. There is, more or less, only one risk-free investment – state bonds provided they are issued in some relatively safe country, but in this case it is not possible to talk about investment in mutual funds. However we should underline the adjective “safe” because....How we can define a “safe country” nowadays?

**Measurement of turnover.** It may not appear very relevant to cost, but if a particular fund trades its securities often, there are transaction fees applied which increases the cost of the fund and lowers its net profit.

**Management and its changes.** When there is a long time period associated with the favourable performance of a particular fund and the good performance was a result of good management, a change in management can cause certain problems.

William J. O’Neil (2002) author of the book “How to Make Money in Stocks” suggests a different approach. His method of making money with mutual funds is based on his strategy, “CAN SLIM”, which has to do with choosing the right growth stock based on indicators that show significant growth, e.g.: growing earnings per share, growing sales, being a leader in the industry or sector, and correctly timing the investment. When it comes to mutual funds, O’Neal (2002) suggests that the only type of fund worth investing in is a U.S. based growth stock fund. He also suggests that the minimal time for investment should be at least 15 years, and that the fund must be one of the top performers in the growth fund group.

*The main purpose of this market survey was to compare bond, stock and mixed funds domiciled in the United States and selected countries of the European Union with the using of modern methods to give proof to people how it is possible to increase their personal wealth by this way of the investment. This research was so much specific*

*and unique, that there is not any other for the comparing of it. The period being monitored was 2007 – 2012, which was impacted by the current financial crisis. However a longer period is necessary to minimise all the side effects.*

## 2.2 Methodology

The investment companies from the United States are: Fidelity Investments, Vanguard Group, Morgan Stanley, and American Funds. All of these companies manage certain mutual funds. The data was collected from web pages in [www.finance.yahoo.com](http://www.finance.yahoo.com) and verified on [www.morningstar.com](http://www.morningstar.com). Prices were adjusted for dividends and operating costs.

In the Czech Republic, the following investment companies and their funds were chosen: Investiční společnost České spořitelny a.s. (ISČS), Investiční kapitálová společnost Komerční banky a.s., ČSOB Investiční společnost a.s., ČP Invest a.s.

German mutual funds work under the management of the Deutsche Bank AG and the prices were acquired from their web page.

French funds are managed by the group BNP Paribas. Historical prices were mostly acquired from the official web pages of this bank, which the exception of one particular fund found in the pages [www.conseq.cz](http://www.conseq.cz).

British funds are managed by the group Barclays PLC. Prices were acquired from their official web page.

The last funds analysed are globally based. These funds are members of the investment group Franklin Templeton. They are specifically stock funds: FT Asian Growth Fund and FT Latin American Fund. These stock funds were added because they were recommended by investment-consultant based on web pages [www.investicni-konzultant.cz](http://www.investicni-konzultant.cz), which offer advice on mutual fund investments. These two funds were specifically offered as a good investment opportunity at <http://www.investicni-konzultant.cz>.

The funds are measured with respect to absolute profit/loss without the consideration of risk, the standard deviation of a five-year period recalculated to one year to emphasise the risk, beta coefficient, the Sharpe ratio, the Treynor ratio and the

coefficient of variation (by the way described in Levy, Marshall, 1991).

The purpose of all these calculations is to discover if a certain fund could be considered a good investment when taking risk into consideration.

The calculations are performed in the following manner by ([www.morningstar.com](http://www.morningstar.com), [www.finance-management.cz](http://www.finance-management.cz))

1. **Profitability of funds** – arithmetic and geometric means. The arithmetic mean is calculated on a monthly basis and was used as the average return of a fund in the Sharpe and Treynor ratios.
2. **Standard deviation**  $s_x$  is the rate of variability as the standard rate of total risk of individual assets and portfolios:

$$s_x = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2}$$

where  $n \in N$  is the number of values  $x_i$  in the set of data for  $1 \leq i \leq n$  ( $N$  denotes the set of all natural numbers),  $x_i$  is taken as random values from a data set,  $\bar{x}$  is the arithmetic mean of the values  $x_i$  for  $1 \leq i \leq n$ .

3. **Beta coefficient** – for this indicator it is necessary to have the broader market data. Beta measures the systematic risk. There are many benchmarks used such as the general market, e.g. the S&P 500 or EuroStoxx 50. The logic was to find a benchmark that is the most related to the assets of a certain fund. Beta shows changes in the value of a fund, if the market (the benchmark) would change. If the value of the coefficient is 1 then the fund will change in the exact same proportion as the market. Beta coefficient is calculated using the coefficient of covariance between a particular fund and a relative market, divided by the coefficient of determination  $R^2$
4. **Coefficient of determination  $R^2$**  - shows the percentage of changes that can be explained by the changes in the market (the benchmark). The Coefficient of determination was used as a supporting indication for Beta coefficient. It shows what percentage of changes in the fund's performance are determined by the compared benchmark (the market). The higher the coefficient of determination, the

more reliable is the coefficient Beta as a value of likely variation. For example, if the Coefficient of determination has a low value, this means that the fund does not correlate very well with the market compared, and could be a good choice if one wants to diversify portfolio further. The higher the coefficient of determination, the more we can rely on the beta:

$$R^2 = \sigma_i / r_i$$

where  $\sigma_i$  is the standard deviation of assets  $I$  for  $1 \leq i \leq n$ , where  $n \in \mathbf{N}$ ,  $r_i$  is the average of profitability of assets  $I$  for  $1 \leq i \leq n$ , where  $n \in \mathbf{N}$ .

5. **Sharpe ratio  $SR$**  - calculated by dividing the excess average return by the standard deviation of a certain fund.

$$SR = (r_i - r^*) / \sigma_i$$

where  $r_i$  is the average profitability of assets  $i$  for  $1 \leq i \leq n$ , where  $n \in \mathbf{N}$ ,  $r^*$  is the risk-free rate of profitability and  $\sigma_i$  is the standard deviation of profitability of assets  $i$  for  $1 \leq i \leq n$ , where  $n \in \mathbf{N}$ .

6. **Treynor ratio  $TR$**  - calculated similarly to the Sharpe ratio of a fund but instead of using the standard deviation, the excess return is divided by the beta, (i.e. the market risk).

$$TR = (r_i - r^*) / Beta_i$$

where  $r_i$  is the average profitability of assets  $i$  for  $1 \leq i \leq n$ , where  $n \in \mathbf{N}$ ,  $r^*$  is the risk-free rate of profitability and  $\sigma_i$  and  $Beta_i$  is the beta coefficient of assets  $I$  for  $1 \leq i \leq n$ , where  $n \in \mathbf{N}$ .

7. **Coefficient of Variation  $CV$**

$$CV = \sigma_i / R_i$$

where  $\sigma_i$  is standard deviation of profitability of assets  $i$  for  $1 \leq i \leq n$ , where  $n \in \mathbf{N}$ , and  $R_i$  is the average profitability of assets  $i$  for  $1 \leq i \leq n$ , where  $n \in \mathbf{N}$ .

To obtain these results, it was necessary to make more than 6,500 calculations and to accept risk of some mistakes in such way or to ask somebody to help us with some PC programmes.

### 3 Problem Solution

**Figures and Tables are enclosed as enclosure.**

The Figure 1 shows an example of a bar graph which was made for all types of mutual funds (by [www.investing-in-mutual-funds](http://www.investing-in-mutual-funds)), (i.e. stock funds, mixed funds and bond funds). Figure 1 shows the performance results of all stock funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank, Franklin Templeton Asia, Franklin Templeton.

It is clear that the best results are shown by the American fund, Morgan Stanley. The calculation of all coefficients and ratios were done for all types of funds. In total, there were 18 tables and 18 graphs.

The following figure (Figure 2) shows the performance results of all bond funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank..

The performance of the bond funds was calculated using the same formula as for the stock funds. The best performance is shown by the investment company Vanguard Group. The only fund that showed loss was the Barclays British fund.

The following figure (Figure 3) shows the performance results of all mixed funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank.

The performance of the mixed funds was calculated using the same formula as for the other two types of funds. Mixed funds are composed mainly of stocks and bonds, and also sometimes other types of securities. The best performance is shown by the investment company Morgan Stanley. The worst performing mixed fund in the time period analysed was a Czech fund of the ČSOB. The Performance of the European mixed funds altogether lagged behind their American counterparts. The only European fund that showed profit was a Czech fund of the ISČS.

The following figure (Figure 4) shows the standard deviation of all stock funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank, Franklin Templeton Asia, Franklin Templeton Latin (the same position as in the figure but the picture is too small for detailed reading).

The standard deviation is used to determine the individual risk of each fund (also known as volatility). In this case, the standard deviation was calculated using the monthly net asset value and converted to yearly bases. The global funds of the company Franklin Templeton are the riskiest funds

to invest in. These two funds invest predominantly in China and Latin America. It is necessary to point out that the standard deviation of the Czech investment companies is not publicised anywhere and has to be calculated from the net asset value in order to evaluate it. The least individual risk is associated with the ČP Invest investment company.

The following figure (Figure 5) shows the standard deviation of all bond funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank.

The standard deviation for the bond funds was calculated in the same way as for the stock funds. The riskiest of the bond funds is the fund of the company ČP Invest. The least risky is the fund of the company ČSOB.

The following figure (Figure 6) shows the standard deviation of all mixed funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank.

The standard deviation for the bond funds was calculated in the same way as for the stock and bond funds. The biggest individual risk is associated with the fund of Fidelity Investments. The least risky mixed fund is the fund of the ISČS.

The following figure (Figure 7) shows the beta coefficient of all stock funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank, Franklin Templeton Asia, Franklin Templeton Latin (the same position as in the figure but the picture is too small for detailed reading).

The results of the beta coefficient comparison were quite different for each fund. The financial markets were very turbulent during this time period. The biggest systematic (market) risk is associated with the Morgan Stanley fund. This means that if the market moves up 1 %, this particular fund will move up 1.12 %.

The following figure below (Figure 8) shows the beta coefficient of all bond funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank

The biggest systematic (market) risk is associated with the Vanguard Group bond fund. The beta coefficient is 2,075. The funds of the companies Barclays and ISČS show negative beta coefficient, and this means that they are negatively correlated with the broad market. They move the opposite direction to the broader market movement.

The following figure (Figure 9) shows the beta coefficient of all mixed funds, i.e. American,

Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank.

Based on the graph above, the funds based in the United States have a greater beta coefficient. The fund of Fidelity Investments has the greatest beta, closest to 1. This means that this fund moves nearly perfectly with the market. The European funds are not correlated very much with the broader market.

The following figure (Figure 10) shows the coefficient of variation of all stock funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank, Franklin Templeton Asia, Franklin Templeton Latin (the same position as in the figure but the picture is too small for detailed reading).

The coefficient of variation can be interpreted as units of risk per a unit of profit. This means that the lower the coefficient, the better the results. If the profits were in fact negative, the results could not be interpreted. This is the case with all the funds where there is a zero instead of a number of units of risk per unit of profit. According to the graph above, the best results were shown by the Morgan Stanley stock fund.

The following figure (Figure 11) shows the coefficient of variation of all bond funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank.

Based on the graph above, the best results are shown by the Vanguard bond fund, which has the lowest coefficient of variation. The only bond fund that did not yield any profit is the Barclays bond fund.

The following figure (Figure 12) shows the coefficient of variation of all mixed funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank.

Based on the graph above, the best results are shown by the ISČS mixed fund, based in the Czech Republic. This is the only fund of the European mixed funds that had positive average profits.

The following figure (Figure 13) shows the Sharpe ratio of all stock funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank, Franklin Templeton Asia, Franklin Templeton Latin.

The Sharpe ratio is negative for all of the funds in this time frame. This would mean that based on this graph, the risk associated with investment is too great and it would be wiser to invest in the risk-free asset. This time period was affected by the

economic crisis the most. The collapse of the stock markets is the immediate cause of such bad results for all of the stock funds. The American stock funds showed slightly better results than the European funds. The fund of the company Morgan Stanley has the highest Sharpe ratio.

The following figure (Figure 14) shows the Sharpe ratio of all bond funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank.

The Sharpe ratio is negative for all of the bond funds in this time period. This means that based on this graph, it would be safer to invest in a risk-free asset. The fund of the Czech company ČSOB has the worst Sharpe ratio. The best performing bond funds are the two funds based in the United States: Vanguard Group and Fidelity Investments.

The following figure (Figure 15) shows the Sharpe ratio of all mixed funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank.

The Sharpe ratio is negative for all of the mixed funds in this time period. This is the same case as with stock and bond funds. Based on this graph, it a risk-free asset seems like a better investment. The funds based in the United States are again performing slightly better than their European counterparts. The fund of the company Fidelity Investments has the best ratio, while the worst Sharpe ratio is found in the French fund of BNP Paribas.

The following figure (Figure 16) shows the Treynor ratio of all stock funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank, Franklin Templeton Asia, Franklin Templeton Latin. Based on the negative Treynor ratios of all stock funds in this time period, it would make more sense to invest in a risk-free asset. The cause of ratios being negative in this time frame is the low average profits of each fund. Also the market risk, which is used to calculate the Treynor ratio, was been very high in the current period. The best performing stock fund is Morgan Stanley. The worst investment would have been into the ČP Invest stock fund during this time period.

The following figure (Figure 17) shows the Treynor ratio of all bond funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank.

The Treynor ratios of the bond funds conclude in similar results as the stock funds in this time period. It is necessary to exclude the funds Barclays and ISČS. These funds are negatively correlated to the broader markets, so their Treynor ratios are positive.

However this is not a result of average profits exceeding the risk, the profits are actually negative, thus resulting in a positive number, when a negative average profits are divided by the negative beta coefficient. The best ratio is shown by the bond fund of the company Vanguard Group. The worst performing fund in this time frame is the BNP Paribas.

The following figure below (Figure 18) shows the Treynor ratio of all mixed funds, i.e. American, Vanguard, Morgan Stanley, Fidelity, ČP Invest, ČSOB, IKS KB, ISČS, Barclays, BNP Paribas, Deutsche Bank.

Based on the graph above, it is clear that the best results are shown by the funds based in the United States. The best one of these funds is the mixed fund of the company Fidelity Investments. The fund BNP Paribas has the lowest Treynor ratio, which makes it the worst fund to invest in, when considering the market risk relative to average profit. American funds seemed to be superior in the comparison of all categories. The reason is probably because of their long history, knowledge, and experience in the practice of such business.

## 4 Conclusion

The main purpose of this market survey was to compare bond, stock and mixed funds domiciled in the United States and selected countries of the European Union. Modern portfolio indicators were used as the main scale for comparison purposes. Standard deviation and profitability were used as the supporting indicators.

The period being monitored was during 2007 – 2012 which was impacted by the current financial crisis. However, a longer period is necessary to minimise all the side effects and to help mitigate the disposition of showing better results by fund a fund's management. The importance of this can be demonstrated by the sample used in comparing official results of the Czech ISČS stock fund, published on the web site which showed a profit percentage of 140 % in 2011. However, when we calculate the same fund during a 3 year period, it was much less (60-64 %).

This research demonstrates the superior profitability of stock funds in comparison with other funds, but they also have a higher risk for the investor as well. In addition, the results of this analysis prove that financial consultants in the Czech Republic, usually, only calculate the profit of funds with no respect to

risk and with no consideration, either, to market risk or to individual (fund) risk. We would recommend that any potential well educated investor, to do their own calculation by the ratios and coefficients as demonstrated in this paper. (We agree with Kiyosaki's statement, that investor should be in this time well educated.)

As was mentioned before, the best comparison is made when using of longer time period. A time period chosen in our analysis was not really long

enough. This paper can be a good base for some following research. During this process 6,385 calculations were made. For this reason is strictly recommended to use a new computer method which offers more easy way to the optimisation of strategy of investing while avoiding lot of calculation and mistakes.

#### References:

- [1] Benz Ch., *Morningstar Guide to Mutual Funds/FiveStar Strategies for Success*, J. Wiley & Sons, Inc. 2005
- [2] Gregoriou, G. N. : *The banking crisis book*. Taylor and Francis Group, LLC. 2010
- [3] Escalda A., Vaz L. *Mezinárodní finanční trhy*, Praha: Bankovní institute. 2005
- [4] Dvořáková, Z., Smrčka L. et al. *Finanční vzdělávání pro střední školy*. Praha. C. H. Beck..2011.
- [5] Ingersoll J.E.: *Theory of Financial Decision Making*, Maryland: Rowman & Littlefield Publ. Inc..1997.
- [6] Kiyosaki R.T. : *Unfair Advantage*, Plata Publishing LLC, USA. 2011.
- [7] Kohout P.: *Investiční strategie*. Praha: Grada.. 2005.
- [8] Levy H., Marshall S.: *Kapitálové investice a finanční rozhodování*. Praha: Grada Publishing. 1991.
- [9] Mincher B. : *The Secrets of Money*, Braun Media LLC., USA.2007.
- [10] Neri, F.: An introduction to the special issue on computational techniques for trading systems, time series forecasting, stock market modeling, and financial assets modeling WSEAS Transactions on Systems, 11 (12). 2012.
- [11] Steigauf S. *Fondy /jak vydělávat pomocí fondů*, Grada Publishing . 2003.
- [11] Lack S., : *The Hedge Fund Mirage*, J. Wiley & Sons Inc. 2011.
- [12] O'Neil, W. : *How to make money in stock*, McGraw-Hill. 2002.
- [13] Rejnuš O. *Cenné papíry a burzy*. Brno. CERM. 2009.
- [14] Rose P. S., *Marquis M.H.* Money and capital markets. Singapore. McGraw Hill. 2009.
- [15] Valach J. *Investiční rozhodování a dlouhodobé financování*, Praha: Linde. 2010.
- [16] Veselá J. *Investování na kapitálových trzích*. Praha. ASPI – Walter Kluwer. 2007.
- [17] VALLEY VISTA ENTERPRISES, LLC. (2007 – 2012). *Everything You Need to Know to be Successful at Investing in Mutual Funds* [online]. © 2007-2012 [citation at 2013-11-02]. Retrieved at: <http://www.investing-in-mutual-funds.com/>
- [18] MORNINGSTAR INC. (2012). *Mutual Funds* [online]. © 2012 [citation at 2013-12-02]. Retrieved at: <http://www.morningstar.com/Cover/Funds.aspx>
- [19] Martiník, I. (2012). Sequential Object Petri Nets and the Modeling of Multithreading Object-Oriented Programming Systems. In Pawlewski, P. (Eds.), *Petri Nets – Manufacturing and Computer Science* (195-224). Rijeka, Croatia: InTech. Retrieved at: <http://www.sec.gov/investor/pubs/inwsmf.htm>, [citation at 2013-21-07].
- [20] Hájek, P., Neri, F. (2013) An introduction to the special issue on computational techniques for trading systems, time series forecasting, stock market modeling, financial assets modeling WSEAS Transactions on Business and Economics, 10 (4), pp. 201-292.
- [21] Azzouzi, M., Neri, F. (2013) An introduction to the special issue on advanced control of energy systems (2013) WSEAS Transactions on Power Systems, 8 (3), p. 103.
- [22] Bojkovic, Z., Neri, F. (2013) An introduction to the special issue on



- advances on interactive multimedia systems  
WSEAS Transactions on Systems, 12 (7), pp. 337-338.
- [23] Pekař, L., Neri, F. (2013) An introduction to the special issue on advanced control methods: Theory and application (2013) WSEAS Transactions on Systems, 12 (6), pp. 301-303.
- [24] Guarnaccia, C., Neri, F. (2013) An introduction to the special issue on recent methods on physical polluting agents and environment modeling and simulation WSEAS Transactions on Systems, 12 (2), pp. 53-54.
- [25] Neri, F. (2012) An introduction to the special issue on computational techniques for trading systems, time series forecasting, stock market modeling, and financial assets modeling WSEAS Transactions on Systems, 11 (12), pp. 659-660.
- [26] Muntean, M., Neri, F. (2012) Foreword to the special issue on collaborative systems WSEAS Transactions on Systems, 11 (11), p. 617.
- [27] Pekař, L., Neri, F. (2012) An introduction to the special issue on time delay systems: Modelling, identification, stability, control and applications WSEAS Transactions on Systems, 11 (10), pp. 539-540.
- [28] Volos, C., Neri, F. (2012) An introduction to the special issue: Recent advances in defense systems: Applications, methodology, technology WSEAS Transactions on Systems, 11 (9), pp. 477-478.

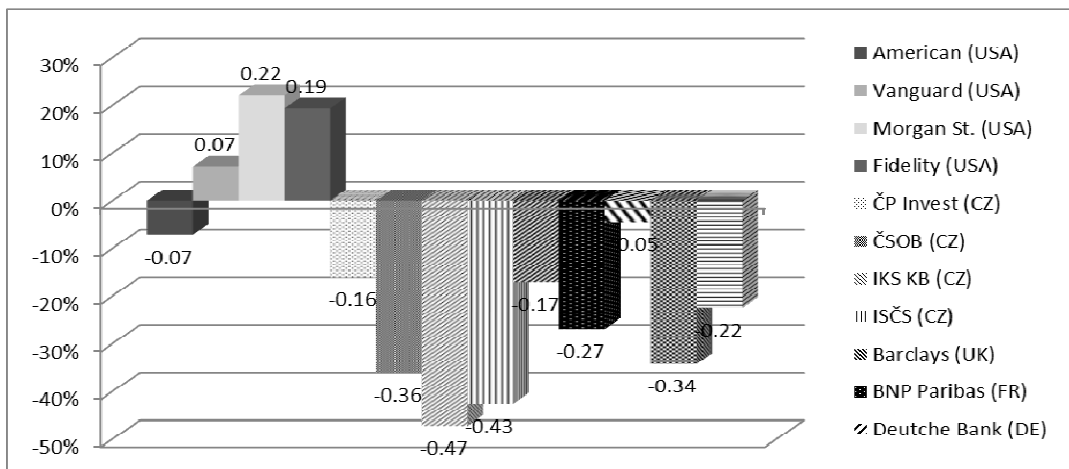


Figure 1. Performance of stock funds in 2007 – 2012.

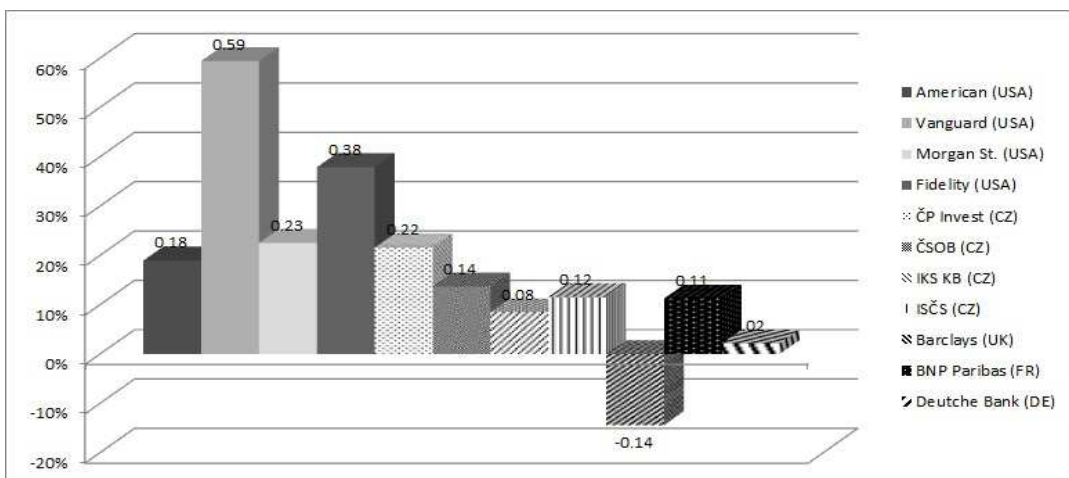


Figure 2. Performance of bond funds in 2007 – 2012.

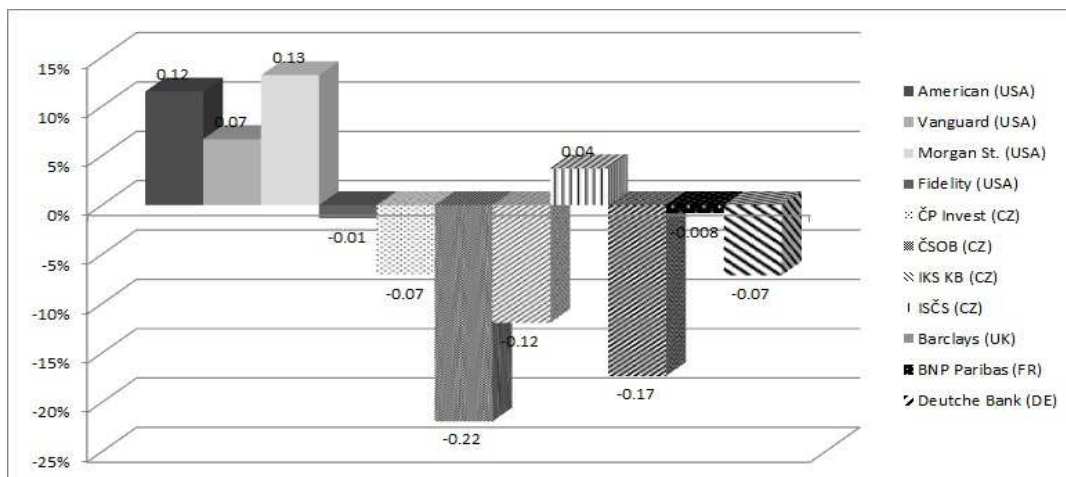


Figure 3. Performance of mixed funds in 2007 – 2012.

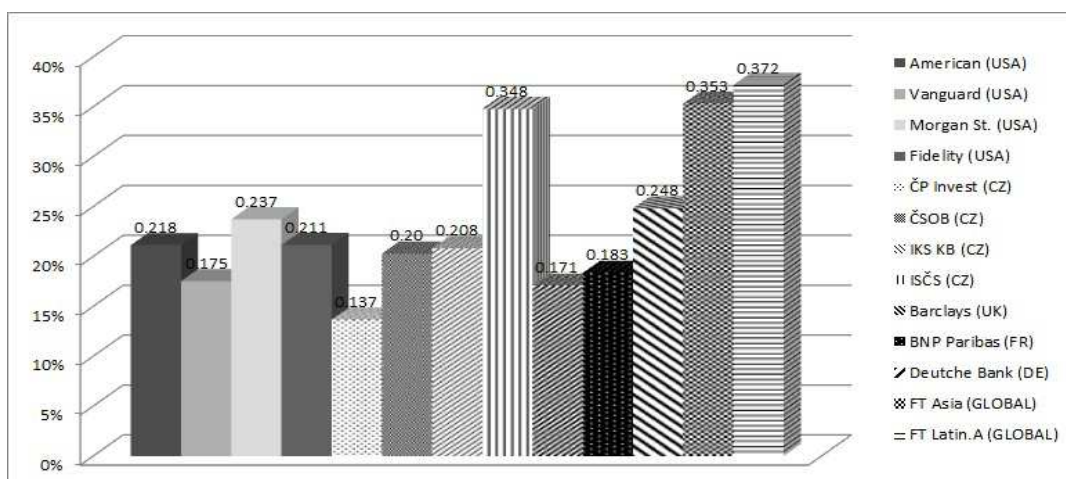


Figure 4. The standard deviation of stock funds in 2007 – 2012.

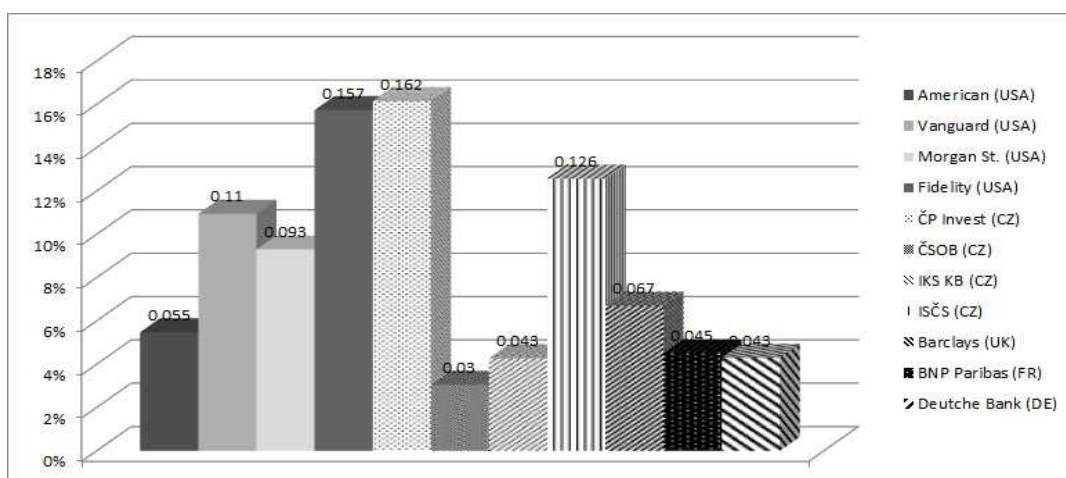


Figure 5. The standard deviation of bond funds in 2007 – 2012.

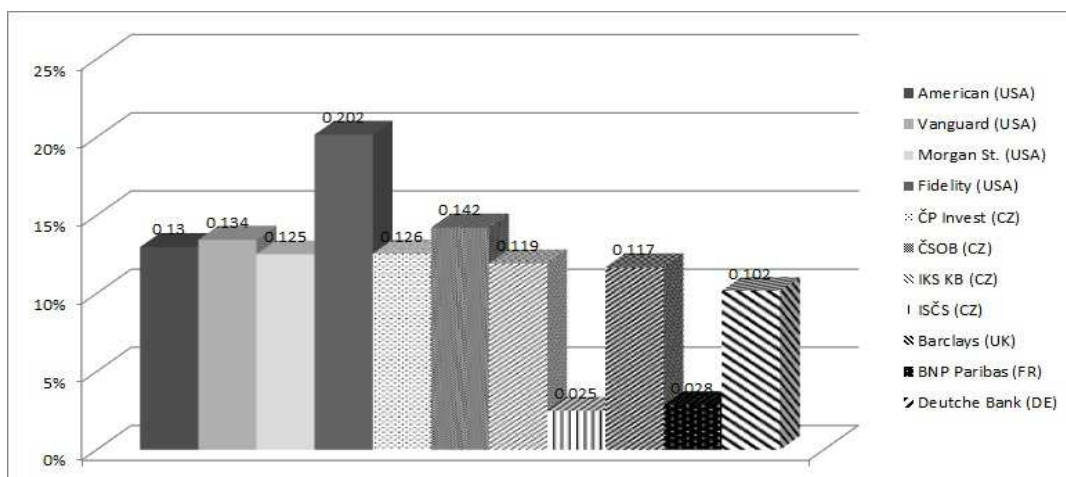


Figure 6. The standard deviation of mixed funds in 2007 – 2012.

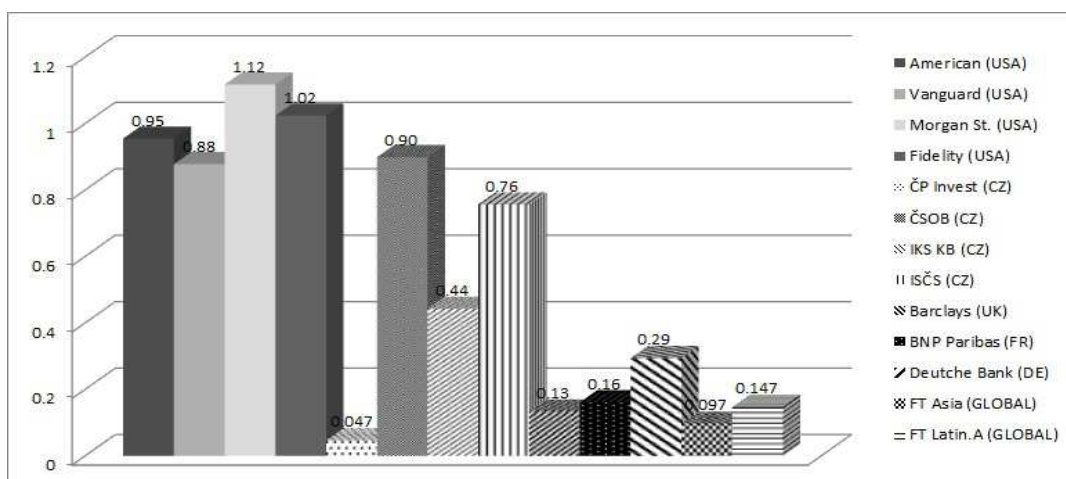


Figure 7. The coefficient beta of stock funds in 2007 – 2012.

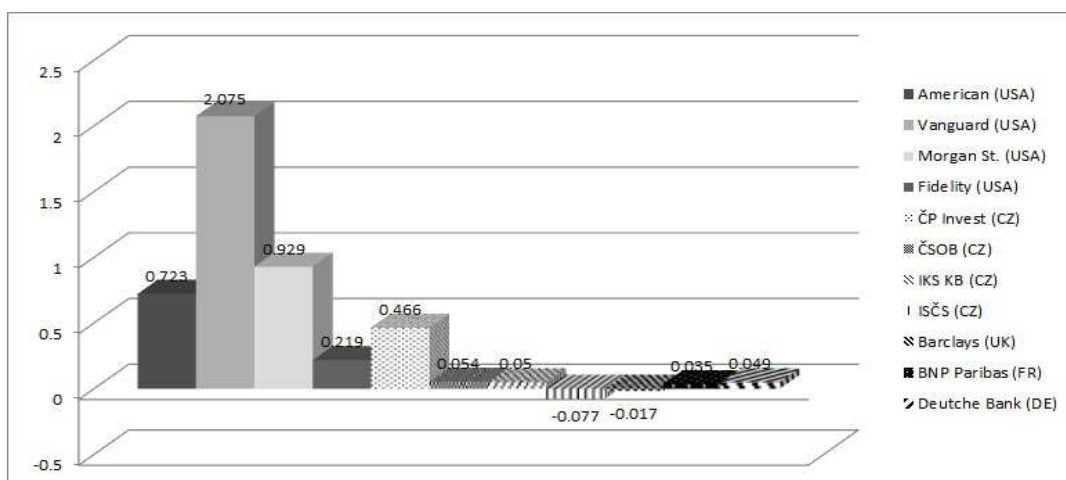


Figure 8. The beta coefficient of bond funds in 2007 – 2012.

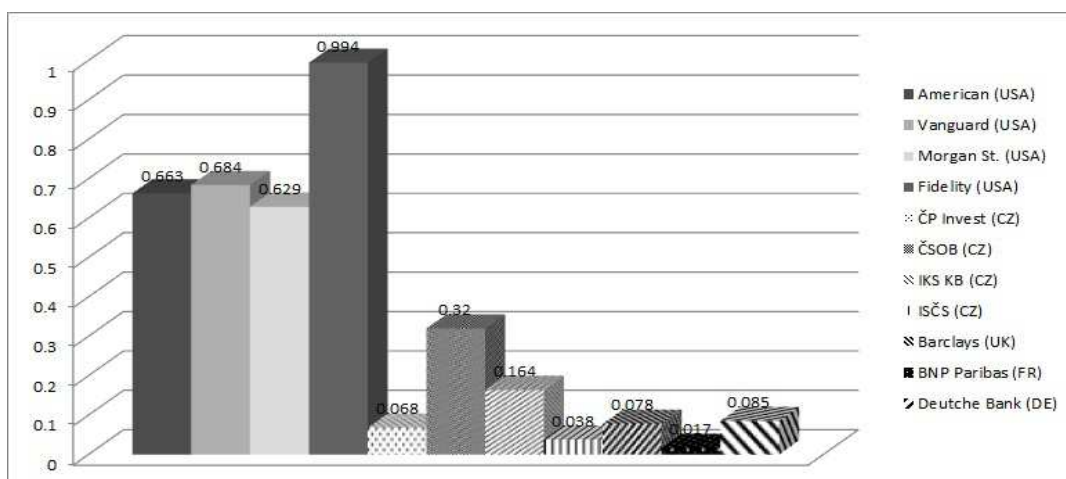


Figure 9. The beta coefficient of mixed funds in 2007 – 2012.

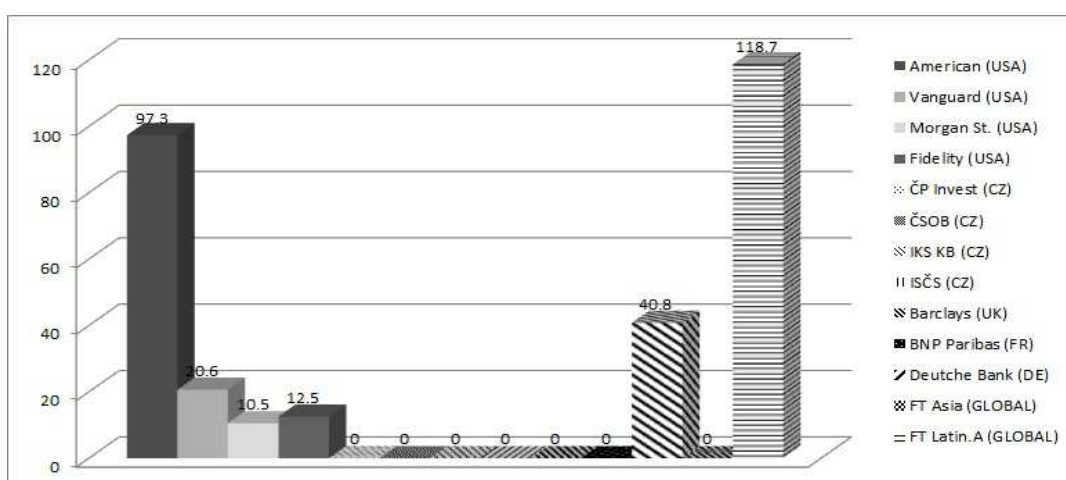


Figure 10. The coefficient of variation of stock funds in 2007 – 2012.

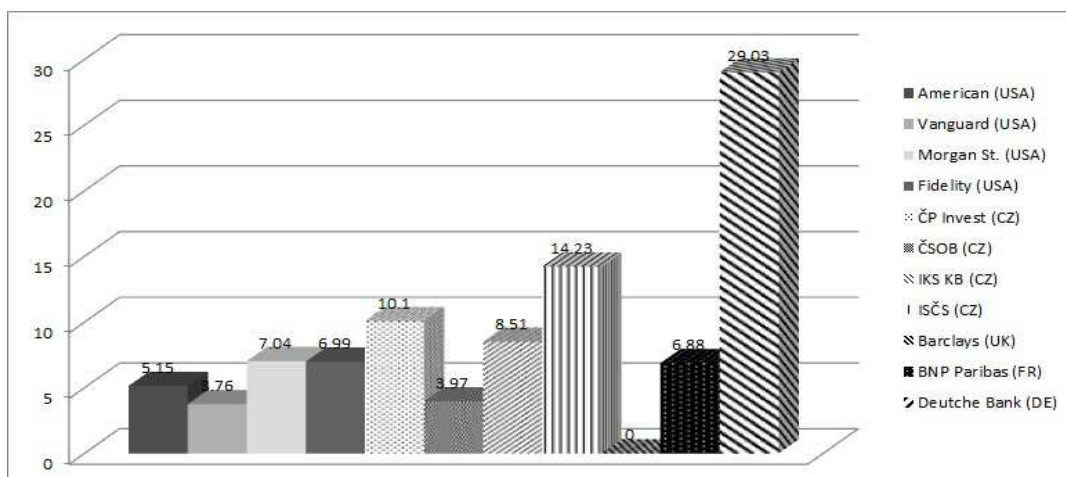


Figure 11. The coefficient of variation of bond funds in 2007 – 2012.

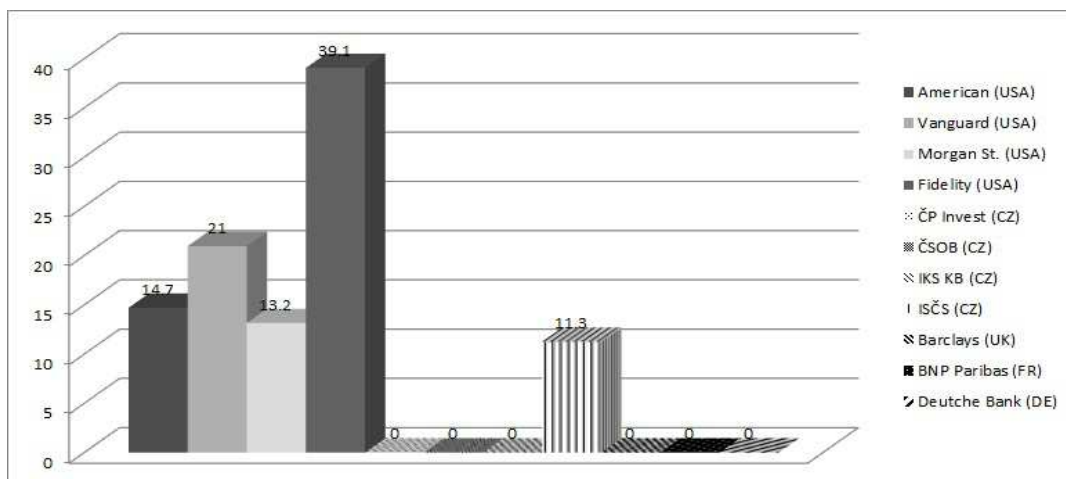


Figure 12. The coefficient of variation of mixed funds in 2007 – 2012.

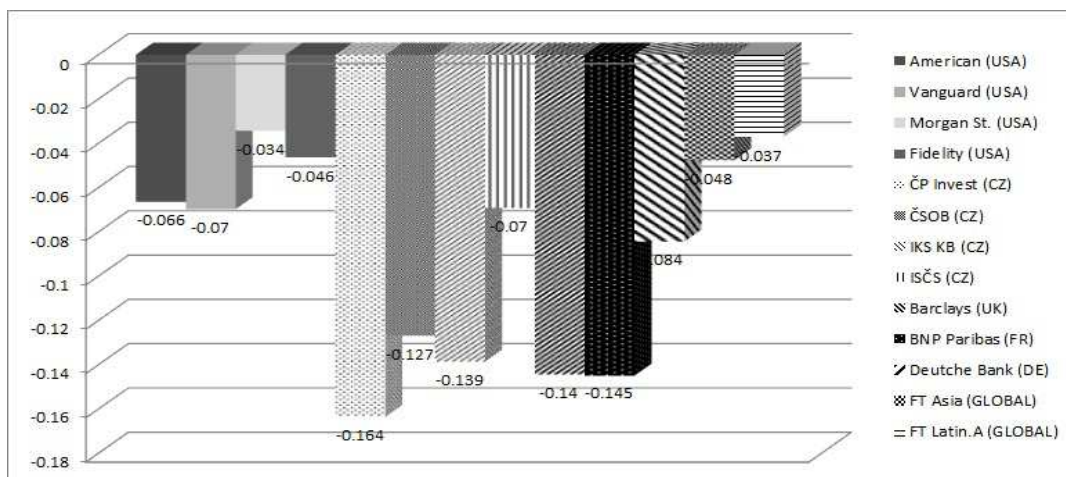




Figure 13. Sharpe ratio of all stock funds in 2007 – 2012.

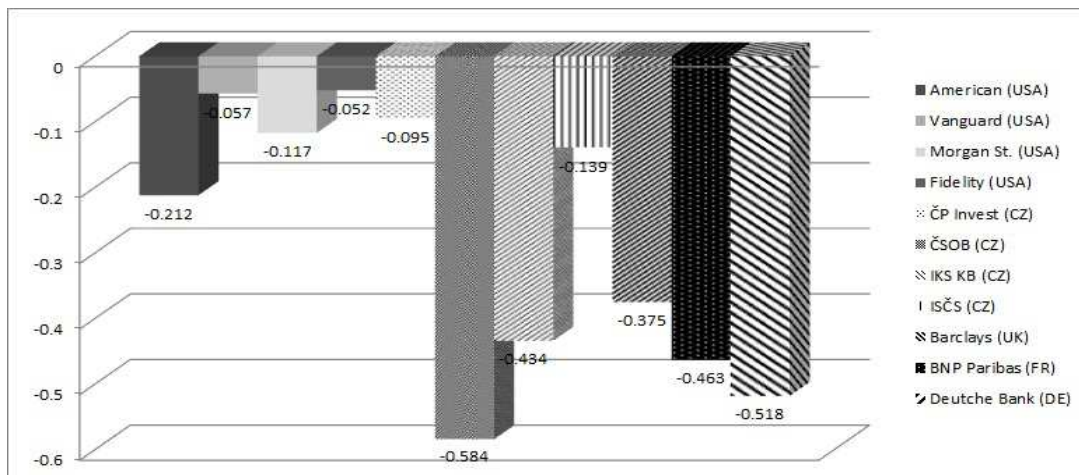


Figure 14. The Sharpe ratio of bond funds in the period 2007 – 2012.

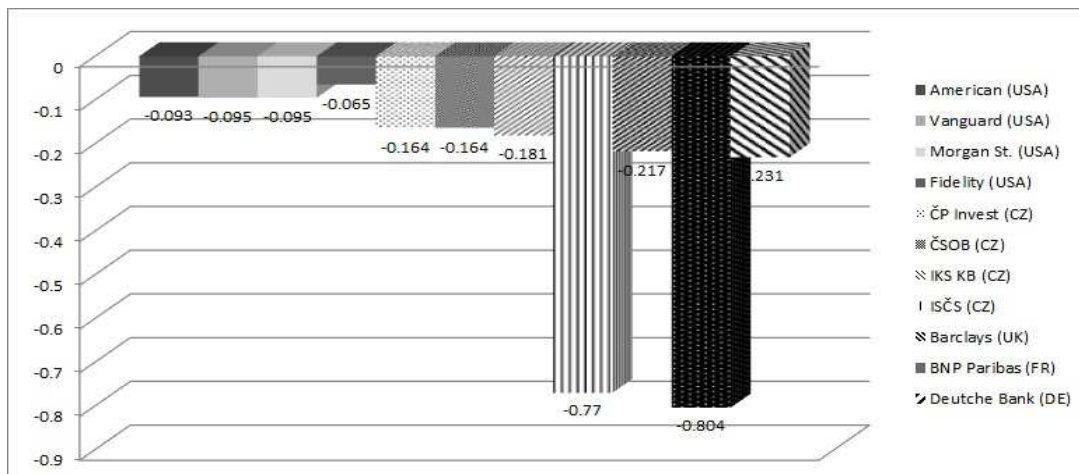


Figure 15. The Sharpe ratio of mixed funds in 2007 – 2012.

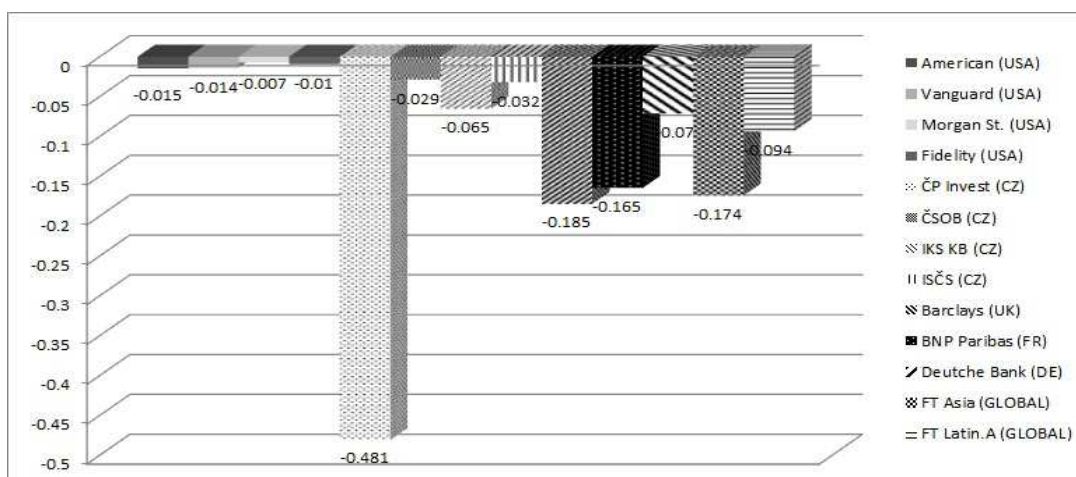


Figure 16. The Treynor ratio of stock funds in the period 2007 – 2012.

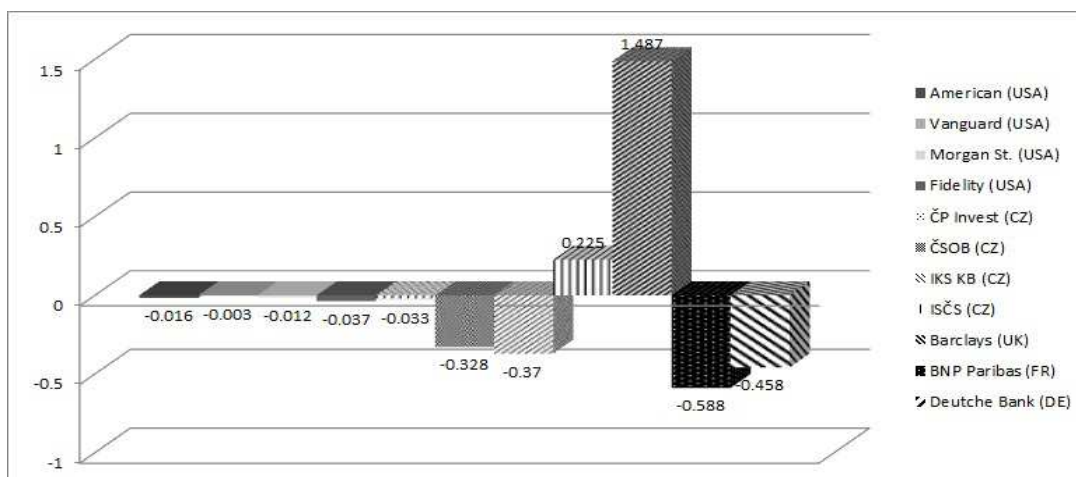


Figure 17. The Treynor ratio of bond funds in 2007 - 2011.

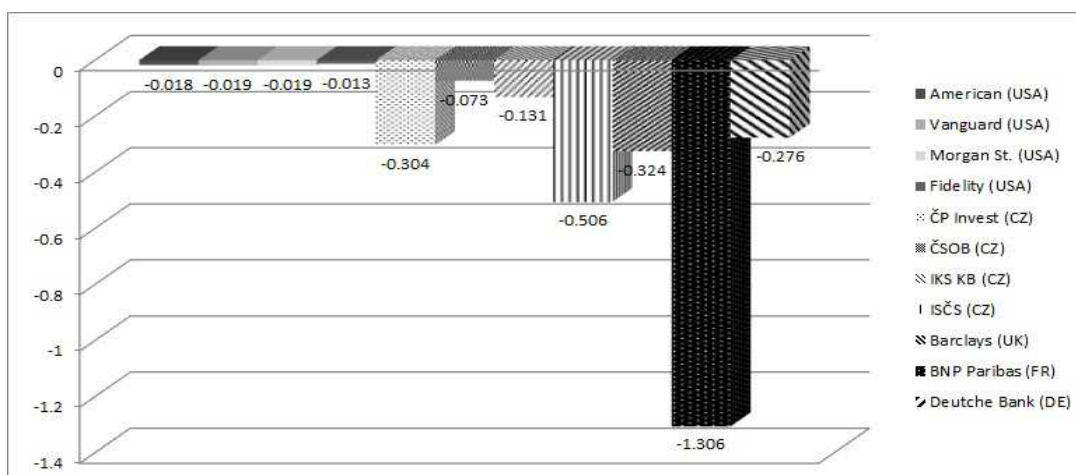


Figure 18. The Treynor ratio of mixed funds in the period 2007 - 2012.