The development of mutual fund market in Russia

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Abstract

Purpose – The purpose of this paper is to describe development of Russian mutual fund (MF) market, to suggest and apply methodology of statistical analysis of management quality, to evaluate profitability and risks of the market.

Design/methodology/approach – Statistical research applies: descriptive statistics, correlation analysis, regression analysis, cluster analysis, ratings, transition probability, optimal portfolio theory.

Findings – Russian mutual market is growing both in number and in aggregate value of net assets. Profitability and risks of the market are high.

Research limitations/implications – Statistical research was fulfilled on the data for 2004-2006.

Practical implications – The results of the investigation are useful for investors and for managers of the funds.

Originality/value – The paper represents an attempt of statistical investigation of Russian MF market, its profitability and risks, classification and rating of MFs and analysis of rating stability.

Keywords Investment funds, Financial markets, Financial risk, Russia

Paper type Research paper

Introduction

In recent years, mutual funds (MFs) have been rapidly developing in Russia, growing both in number and in the aggregate value of their net assets. This growth is accounted for by the fact that investors are showing constantly growing interest in investing in MF securities, purchasing the equities of different investment funds.

The main objective of the paper is to describe the Russian MF market, to investigate management quality, to evaluate profitability and risks of this market, to analyze correlations between profitability of MFs and stock indices, to estimate stability of profitability rating of different MFs, to construct the optimal portfolio, to classify MFs, to construct ratings on the basis of Sharpe ratio and investigate their stability.

As of 1 January 2007, the number of Russian MFs was 641, compared to 142 as of previously in January 2004, thus, having grown 4.51 times within the past three years. The aggregate value of net assets during the same time-period has grown 5.58 times, the number of stockholders reaching 330 thousand (Investfunds, 2007).

MF classification

A classification of MFs is necessary for better specification of particular MF management strategies and tactics and to make the structure and principles of MFs management clearer to the potential investor. Investment funds in Russia can be classified by their organizational legal form into joint-stock investment funds and unit investment funds. The first are separate legal entities. As for MFs, they are not legal entities but "standalone property complexes" consisting of property placed by promoters under trust management by management company. Joint-stock investment funds have not enjoyed considerable development in Russia (among the reasons, one

can single out additional expenses compared to regular joint-stock companies as well as absence of tax benefits provided for unit investment funds).

According to the Federal Law on Investment Funds, all unit investment funds in Russia are divided into open, interval and closed ones (Consultant, 2007).

Open unit investment funds provide for the right of investment fund owners on any working day to recall all their equity interest or any part of it. Under the trust management of such MFs only monetary assets can be placed.

In interval unit investment funds, equity interest owners have this right only within certain time intervals the duration and periodicity of which is set by the rules of MF trust management. As in the case of open MFs, the trust management promoters can place under trust management only monetary assets (Investfunds, 2007).

In closed unit investment funds, the mechanism is somewhat different. While in open and interval MFs, the number of equity interests is unlimited, in the closed ones, it is strictly defined at the time of setting up the fund and remains unchanged until its expiration date. Equity interest owners in this case have no right whatsoever to recall from the management company any of their equities. Under the trust management of a closed MF, not only monetary assets can be placed but also any property specified in investment declaration. If provided for by the trust management rules, equity interest owners in closed MFs, unlike those in open and interval ones, can be paid proceeds from MF management.

Thus, from the point of view of the possibility of investment funds redemption, the most liquid are the equities of open unit investment funds and the least liquid are those of closed ones. However, the transfer of assets even out of an open unit investment fund can take over two weeks, but there is a market of investment equities secondary circulation which enables to increase their liquidity. The possibility for equity interest owner to exit a MF at any time in the case of non-approval of the fund management quality is one of open MFs' principal advantages. In the case of a closed MF, there is no such possibility, but equity interest owners can render some influence on the policy of fund management through participating in general meetings of equity owners.

In interval unit investment funds, equity owners usually do not participate in property management; limiting the owners' right of recall by the framework of intervals creates an additional risk factor for investing in such MFs (Abramov, 2005).

A Classification of MFs by investment policy types
In accordance with the provision "On the Composition and Structure of Joint-Stock Investment Funds Assets and Unit Investment Funds Assets", investment funds in the Russian Federation are divided into the following types:

- monetary market funds;
- bond funds;
- stock funds;
- mixed investments funds;
- direct investments funds (except open and interval MFs);
- funds of especially risky (venture) investments (except joint-stock investment funds and open and interval unit investment funds);
- fund funds;
- real estate funds (except open and interval unit investment funds);

• mortgage funds (except joint-stock investment funds and open and interval unit investment funds); and

• index funds.

Among the purposes pursued by this classification, one can single out transparency of fund assets management strategy, degree of investors' risk and profitability.

Investments in monetary market funds are rather similar to investments in bank deposits, but profitability in monetary market funds is usually higher as they do not have the necessity to reserve part of the assets which on the other hand eliminates all investment guarantees.

Figure 1 shows the distribution of MF net asset value segments by types and kinds.

Methodology
A variety of statistical analyses is applied in this study each showing some insightful characteristic of the Russian MF market. Included among these statistical approaches are (Aczel, 1989):

• descriptive statistics;

• correlation analysis;

• regression analysis;

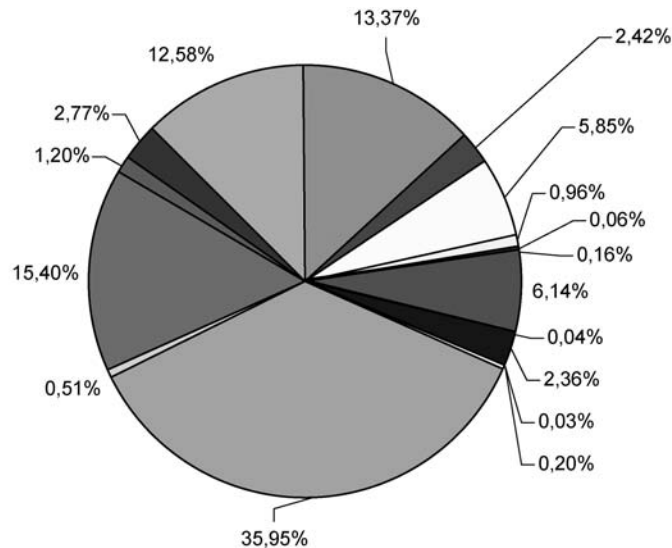| ☐ Open share MFs (13.37%) | ☐ Open bond mutual funds (2.42%) |
☐ Open mixed investments MFs (5.85%)	☐ Open index MFs (0.96%)
☐ Open monetary market MFs (0.06%)	☐ Open fund MFs (0.16%)
☐ Interval share MFs (6.14%)	☐ Interval bond MFs (0.04%)
☐ Interval mixed investments MFs (2.36%)	☐ Interval index MFs (0.03%)
☐ Interval fund MFs (0.20%)	☐ Closed share MFs (35.95%)
☐ Closed mixed investments MFs (0.51%)	☐ Closed real estate MFs (15.40%)
☐ Closed mortgage MFs (1.20%)	☐ Closed venture investments MFs (2.77%)
☐ Closed direct investments MFs (12.58%)	

Figure 1.
Value segments of net assets of different type MFs as of May 2007

- cluster analysis;

- ratings;

- transition probability;

- optimal portfolio theory; and

- statistical tests of hypothesis.

Return and risks

Calculation of interest rates

Daily figures have been collected on the dynamics of investment equities value and net asset value of a number of open MFs of shares, open MFs of bonds, open MFs of mixed investments, open index MFs, open monetary market MFs and open fund of MFs for the period from 2004 to 2006. This work analyses only the profitability of open MFs, therefore, hereafter, the word "open" is not always used. Almost all open MFs which came into existence before 1 January 2006 are analysed.

We first calculate the profitability of investment equities value for 21 working days (which roughly corresponds to a calendar month) from 2004 to 2006. Profitability will be expressed in the form of interest rates per annum.

The calculation formula of monthly rate of return per annum calculated in moving windows of 21 working days is as follows:

$$i = \frac{(p_1 - p_0)}{p_0 \cdot t_0/t} \times 100\%,$$

where p_0 is the value of investment equity at the beginning of the period, p_1 is the value of investment equity at the end of the period 21 working days, $t_0 = 21$ working days, t is the number of working days in a year (252 days).

In Russia, the most popular tock indexes are Russian Trading System (RTS) and Muscow Interbank Currency Exchange (MICEX). Regression analysis has shown a close relation between their monthly profitability ($R^2 = 0.9386$). Therefore, hereafter, for the sake of brevity, we will be giving calculations using either the RTS or the MICEX index.

Some positive correlation between the profitability of MFs and stock market does exist. For example, we provide three diagrams of monthly yields: MICEX and RTS indexes and one of the open MFs of shares – "AVK Fund TEK", shown in Figure 2.

Figure 2 also shows that monthly return vary from -300 to 300 per cent (per annum). Hence, the risks of Russian markets are very high.

Descriptive statistics of MF monthly profitability

Basic descriptive characteristics were calculated for the profitability of MFs under study: means, variances and SDs. These were calculated for the period 2004-2006 and separately for each year. Comparison was carried out of average interest rates by MF types and their volatilities. The general conclusion is that expectations and volatility most often change both from year-to-year and by unit fund types. The ratio of expected profitability to volatility (Sharpe ratio) is exactly the criterion by which investor is usually motivated when choosing a certain MF.

As another measure of risk let, we evaluate the probability of investment equity profitability to be less than the risk-free rate which we adopted at the level of 10 per cent, and <0 per cent (in annual rate for 21 days) for each analyzed MF. We will estimate all probabilities numerically, i.e. by histogram. As an example (Figure 3), we provide an
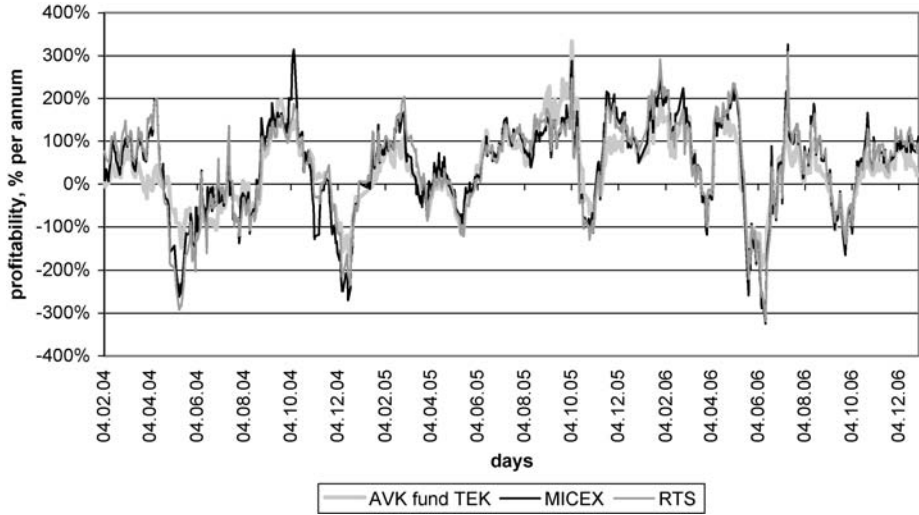

Figure 2.
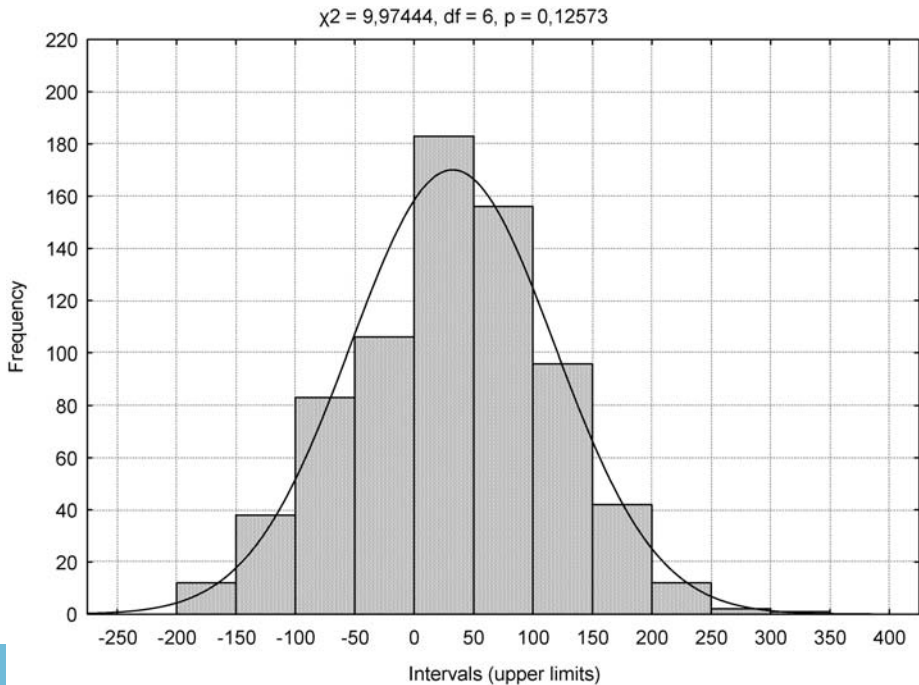Monthly profitability of stock indexes and of the MF "AVK Fund TEK"

Figure 3.
Empirical distribution of monthly profitability in the annual rate by the example of "AVK Fund TEK" MF

empirical distribution of monthly profitability in the form of an annual rate for "AVK Fund TEK" MF for the period 2004-2006.

For this MF, the possibility of profitability to be <10 per cent = 0.3748 and <0 per cent it is 0.3269. As we can see, the risk of low and even negative profitability is considerably high. Figure 3 also shows an adjusted normal distribution curve. It should be noted, however, that not all studied MFs have normal profitability distribution.

Table I provides values for characteristics averaged by MF types.

Expectations of the probability of profitability to be <0 per cent for the groups of shares MFs, index MFs and mixed investments MFs have no significant differences, while between each of these MFs and bond MFs and monetary market MFs this difference is significant at $\alpha = 0,05$. This result can be accounted for by the fact that different MF types are oriented at different investors (i.e. at different profitability and risk levels). The probabilities of profitability being <10 per cent are also different.

Profitability correlation analysis
Let us calculate the matrix of paired correlation coefficients of MFs investment equities profitability, stock market profitability (MICEX, RTS and Rux-Cbonds indices), profitability of investments in gold and silver was completed and resulted in a 188×188 matrix. For brevity's sake, we will only include the overall results. We found that 98.44 per cent of the correlation coefficients between profitability of different open index MFs exceed 0.75, which shows a strong positive correlation. All correlations between monthly profitability of different fund MFs against each other are high and positives, 96.30 per cent of correlation coefficients between the earning powers of index MFs and fund MFs are over 0.75. In general, it can be concluded that high positive correlation is especially characteristic between profitability of investment equities of open shares MFs and the profitability of investment equities of open index MFs, between the profitability of open shares MFs and stock indices (MICEX and RTS). Besides, the profitability of all investment equities of open index MFs are closely correlated with profitability of stock indices MICEX and RTS at which they are inherently oriented.

Low positive correlation within the range 0-0.3 was found between the profitability of investment equities of monetary market against each other and profitability of investments in gold, profitability of securities of mixed investments MFs, index MFs, shares and bonds MFs, profitability of MICEX and RTS indices. Low correlation was found between the profitability of RUX-Cbonds and investment equities of index MFs and fund of MFs.

MFs	Number of MFs	Average monthly return, % per annum	Profitability SD	Probability of profitability to be <10 per cent	Probability of profitability to be <0 per cent
Shares	57	37.95	79.06	0.33	0.29
Bonds	48	10.76	15.10	0.56	0.14
Mixed investments	64	25.42	50.81	0.37	0.28
Index	8	55.04	94.17	0.28	0.26
Monetary market	3	4.35	4.11	0.94	0.10
Fund	3	23.18	43.57	0.36	0.28
Total	183	26.39	51.25	0.41	0.24

Table I.
Averaged statistical
characteristics of MFs

The percentage of negative correlations is also interesting. The highest is the percentage of negative correlations between the profitability of monetary market MFs investment equities and the profitability of investments in commodities (gold and silver). Around 11 per cent of correlations between the profitability of securities of index MFs and monetary market MFs are negative.

Strong negative correlations (correlation index $r < -0.5$) occur only between the profitability of investment equities of some bond MFs (0.27 per cent). Similar correlation analysis of monthly profitability was carried out separately for the years 2004, 2005 and 2006. This enabled to make a conclusion of steadiness of correlation coefficients between the profitability of different MF types.

Evaluation of β-coefficients for investment equities profitability

We estimated simple regressions between time series of MF profitability and market profitability calculated according to stock indices: RTS and MICEX. Out of these MFs, several bond funds had non-significant β-coefficients. It should be pointed out that all obtained β-coefficients are <1, which means that the funds are "defensive".

The study revealed one more interesting dependence. Figure 4 shows points corresponding to MFs with different markings for different types. The character of dependence is apparently linear.

We now regress the MF β-coefficient dependence on MICEX index from its SD of 21-day profitability. For this analysis, we will use data from 2004 to 2006.

The regression equation is as follows:

$$\hat{y} = -0.0638(-7.10) + 0.0089(58.92) \cdot x,$$

where $\hat{y}$ is the evaluation of β-coefficient on MICEX index and x is the evaluation of SD of MF 21-day profitability. In brackets, t-values are given for the coefficients.
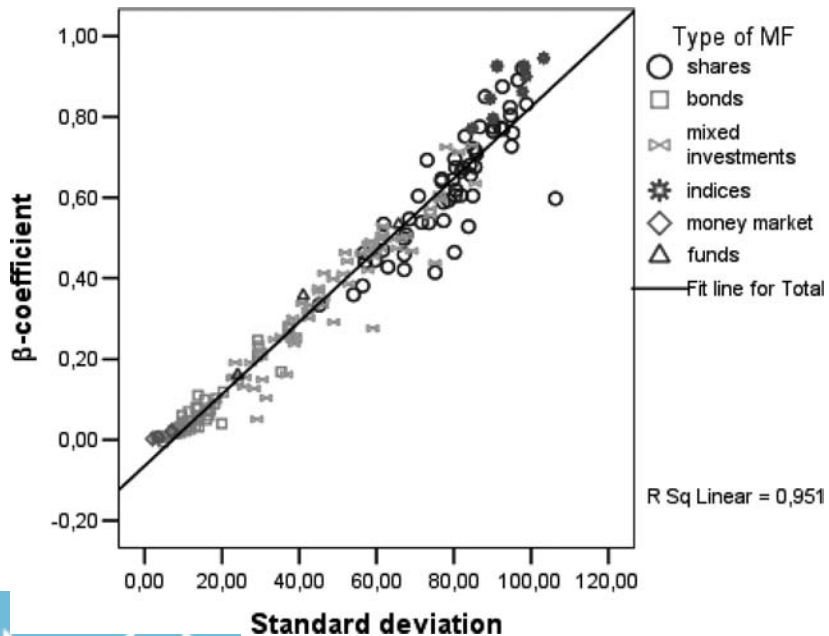

Figure 4.
Dependence of β-coefficients on MICEX index from volatility σ

The equation and the coefficients are significant at $\alpha = 0.05$; $R^2 = 0.9510$; $F(1.179) = 3472.4$. This result implies that the higher the volatility the more sensitive is MFs investment equity profitability to stock market fluctuations. The obtained equation in fact shows the linear relation between two risk indices: β and σ.

From Figure 4, it is clear that MFs are grouped by types. Tests at significance levels of 0.05 showed that for different MF types average values of β-coefficients are different. Index MFs are the most sensitive to stock market fluctuations, whereas bond MFs are the least sensitive out of all considered fund types.

A general conclusion from comparing descriptive statistics can be made that the division of unit investment funds into different types is reasonable as all the indices studied in the work significantly differ depending on the fund type for the exception of negative profitability probability which all investment funds try to avoid.

Cluster analysis and MF classification

Figure 5 shows how MFs are grouped by types. Let us carry out cluster analysis of MFs investment equities in the axes of expectation evaluation, SD and the possibility of 21-day profitability being <10 per cent. We clearly see that the number of monetary market, fund and index MFs is small compared to the number of other types of MFs. It is most likely they will not be singled out into separate clusters. We will be carrying out the calculation on the basis of initial data for 2004-2006 using Euclidean distance squared as a closeness measure and Ward method for combining clusters. Before proceeding with cluster analysis, we normalized index values. Three clusters which are shown in Figure 5.

The first cluster is composed of share MFs, index MFs and half of mixed investments MFs. The cluster is characterized by high profitability and high risk. The second cluster represents a mixture of bond MFs and mixed investments MFs and is half-way between the first and the third ones. The third cluster is characterized by low
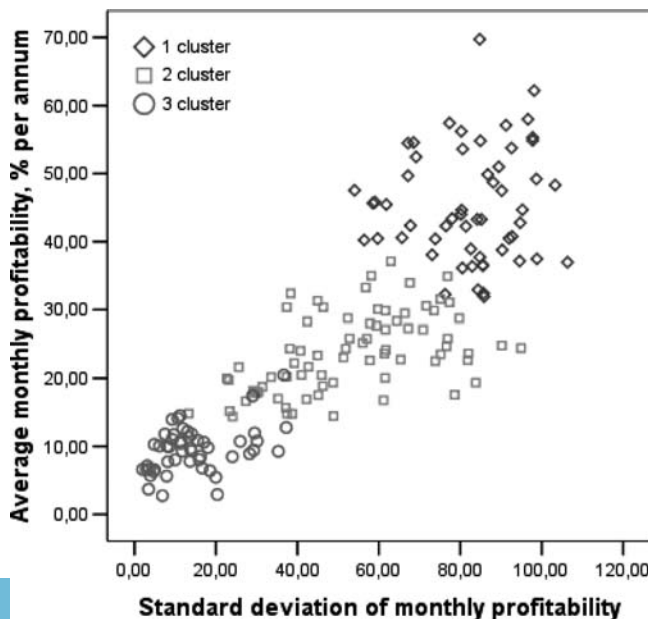

Figure 5.
Clusters of MFs

profitability and low risk and is composed basically of bond and monetary market MFs.

Ratings and their stability
Probability of transition from one quartile interval to others
To complete a MF placement stability analysis in the corresponding quartile interval, we determine profitability separately for 2004, 2005 and 2006, using the following example expression.

$$2004 : \frac{p_{31.12.2004} - p_{31.12.2003}}{p_{31.12.2003}} \times 100\%,$$

where p is net asset value;

We divide the totality of MFs by profitability quartiles and evaluate the transition probabilities.

(1) Probabilities of MF transition from one quartile profitability interval to others in 2004-2005 are shown in Table II.

Table III can be characterized as four discreet distributions. Each of them was compared with even distribution using as criterion χ^2. The hypothesis of a similarity of empiric distribution with equal distribution in each case was rejected at the significance level of 0.05.

(2) Probabilities of MF transition from one quartile profitability interval to others in 2005-2006 are shown in Table III. Empirical probabilities of transition from one profitability interval quartile into another were compared with even distribution. All hypotheses of a similarity of two distributions were rejected. Let us note, however, that the revealed criterion values are substantially higher than at transition from quartile interval in 2004 in the corresponding interval in 2005. While in 2004-2005, the probability of a MF staying in the same quartile

| | | Transition probabilities | | | | |
| | | | Quartile interval in 2005 | | | |
	p	1	2	3	4	
Quartile interval in 2004	1	0.05	0.26	0.42	0.26	1.00
	2	0.42	0.37	0.11	0.11	1.00
	3	0.42	0.11	0.32	0.16	1.00
	4	0.11	0.26	0.16	0.47	1.00

Table II.
Transition probabilities from 2004 quarters to correspond quarters in 2005

| | | Transition probabilities | | | | |
| | | | Quartile interval in 2006 | | | |
	p	1	2	3	4	
Quartile interval in 2005	1	0.91	0.06	0.03	0.00	1.00
	2	0.09	0.54	0.30	0.07	1.00
	3	0.00	0.32	0.29	0.39	1.00
	4	0.00	0.09	0.38	0.54	1.00

Table III.
Transition probabilities from 2005 quarters to correspond quarters in 2006

interval was low, in 2005-2006 such stability was already manifest: 29-91 per cent of MFs, depending on the initial quartile interval, stayed within the same interval. This is a proof of forming a more or less stable pattern of MF management. Unfortunately, the highest percentage of MFs "anchored" in the first quartile interval with the lowest profitability. However, in the fourth quartile interval which is the most gainful, the formation of a more or less stable group of leaders is also observed.

MF ratings
MFs ratings by the Sharpe ratio (ratio of additional profitability compared to risk-free rate or risk premium to risk) were constructed separately for 2005 and 2006. We further analyzed the stability of MFs ratings in 2006 compared to 2005 with the help of Spearman ρ coefficient. The coefficient is significant at $\alpha = 0.05$, with a $\rho = 0.450$, which demonstrates the existence of a weak correlation between ratings for two years and sufficient flexibility of ratings.

Optimal portfolio formation
The structure of the optimal portfolio
The basis of portfolio optimization theory was put forward by Markovitz in 1959. As a rule, when optimizing the portfolio one is guided by two factors, expectations of securities profitability and their volatility. As a criterion either the adherent point of indifference curve and efficient portfolio line or maximizes the ratio between profitability and risk is chosen (Sharp *et al.*, 1995). We will choose the latter.

We determine the optimum portfolio of investment equities on the basis of data just for 2006 while imposing the condition of non-negativity of MFs weights in the portfolio. Gold and silver are also included in list of assets. At present, annual rates on ruble deposit "Sberbank of Russia Deposit" in Sberbank are fluctuating depending on the sum and term of deposit from 4.25 to 10.5 per cent per annum (sbrf, 2007). In formation of an optimal portfolio, we will use 10 per cent rate as a risk-free one.

Figure 6 shows all studied investment equities, gold, silver, risk-free asset and the optimal portfolio (square) which represents the adherent point of efficient portfolio line
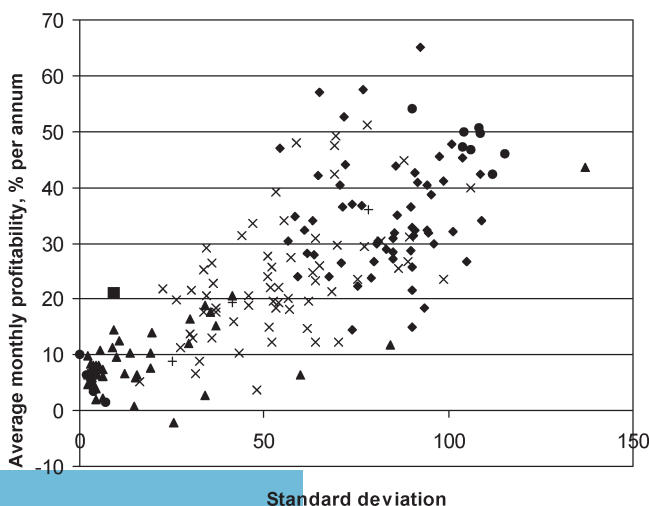

Figure 6.
Optimal portfolio
formation based on
the data for 2006

with the tangent drawn from the point corresponding to risk-free asset. An optimal portfolio will be any portfolio on the straight line going through this point and the risk-free rate (increase of profitability to risk will be maximum), the composition of this portfolio will be made of risk-free asset and a set of optimal portfolio securities.

Evaluation of expectation of optimal portfolio monthly profitability ($\hat{E}(R)$) gave 20.9533 per cent per annum. Volatility evaluation (SD) is up to 9.2967 per cent.

The portfolio includes 14 investment equities, basically bond MFs (71.47 per cent) and silver. The distribution of 21-day profitability of optimal portfolio is normal at significance level 0.05.

An interesting finding is the rather high share of bond MFs notwithstanding their low profitability. This is an indication of their stabilizing role in the portfolio due to their low volatility.

In the composition of a portfolio evaluated based on data for the past three years, the evaluation of expectation of optimal portfolio monthly profitability ($\hat{E}(R)$) made 21.9206 per cent per annum. The volatility evaluation (SD) is up to 10.5545 per cent. The portfolio includes 16 investment equities and also basically bond MFs (72.90 per cent).

Value at risk

Under the hypothesis of a normal distribution, we calculate the monthly Value at risk (VaR) (Rogov, 2001; Porokh and Lobanov, 2001), which is characterized by the extent of optimal portfolio maximum possible damage within a month with the pre-set probability of 95 per cent based on data for 2006.

$$\text{VaR} = 1.645\hat{\sigma} = 1.645 \cdot 9.2967 = 15.2931\%.$$

This result means that optimal portfolio profitability with probability 0.95 will not be <20.9533 − 15.2931 per cent = 5.6602 per cent per annum for the interval of 21 working days.

Conclusion

The rapid growth of Russian MF market observed during the past three years can be explained by investors' increased interest in it. In 2006, three interval share funds managed to double the capital of their sharers. We completed a number of statistical evaluations of the Russian MF market and arrived at a number of findings. Including the following:

- in the Russian MF market, four types of funds dominate: closed share MFs (35.95 per cent of net assets), closed real estate MFs (15.40 per cent), open share MFs (13.37 per cent) and closed direct investments MFs (12.58 per cent);
- monthly return of MFs vary from −300 to 300 per cent per annum;
- the dynamics of the profitability of shares MFs corresponds to the movements of profitability of RTS index, bonds MFs show a considerably lower variation of profitability compared to stock index.
- strong positive correlation was found between profitability of investment equities of open shares MFs and the profitability of investment equities of open index MFs, between the profitability of open shares MFs and stock indices (MICEX and RTS);

- basic descriptive characteristics were calculated for the profitability of MFs: mean values, SDs, the probability of investment equity rate of return to be less than the risk-free rate, which we adopted at the level of 10 per cent per annum, and <0 per cent;

- coefficients β were estimated. It was found that β for all MFs were <1 and coefficients β were approximately linearly related with volatilities (σ);

- statistical analysis of stability of profitability rating was provided. The probability to stay in the same quartile interval of profitability in 2006 was higher than in 2005 varying from 29 in third-quartile interval to 91 per cent in the first one. It indicates that the market becomes more mature; and

- ratings of MFs were constructed on the basis of Sharpe ratio for 2005 and 2006 years. The Rank coefficient Spearman rho was calculated to be $\rho = 0.450$, which demonstrates the existence of weak correlation between ratings for two years and sufficient flexibility of ratings.

We also found that the optimal portfolio was composed on the basis of MFs, silver and gold. The portfolio includes 14 investment equities, basically bond MFs (71.47 per cent) and silver. The high share of bond MFs can be explained by their low volatility. Optimal portfolio monthly profitability was 20.95 per cent per annum. VaR analysis showed that optimal portfolio profitability was expected not to be <5.66 per cent per annum for the interval of 21 working days with probability 0.95. Cluster analysis of MFs was also fulfilled. All MFs were divided into three clusters with clear interpretation.

Our calculations demonstrate that the best thing is not to give preference to one single fund or even fund type, but to diversify investments by investing a part of the capital in shares and a part in bonds. Bond funds are becoming attractive to investors during the periods of market decline. When choosing the fund by the Sharpe ratio, it makes sense to look at the preceding period as we have noted certain relative stability of ratings, though leaders constantly change and the high risk stays.

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Further reading

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