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Identifying, measuring and management risks in Russian secondary stock markets

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Abstracts

This paper outlines the changes and challenges of Emerging Russian Stock Market and investment strategy of portfolio management for the period 1996-1998 . It also taste the West models of optimization of portfolio risks and investment decisions for Russia. The major purpose of this article was to enhance the understanding of the participants in securities markets and enhance the performance of its stock and Emerging securities. This article will review the trends in the markets and help focus on the corporate risks and management and a detailed and developed conception of the mechanism of the initial public offerings and public placement of securities the global stock markets such as the U.S., Western Europe and emerging markets. It also outlined the regulatory structure and investor's risk management tools required by western investors. In light of the recent "financial crisis" in Russia and other major markets such as Asia, these tools will be increasing important. During much of the past decade the Russian Securities market has been developing into a number of areas including federal securities (GKO-OFZ), sub-federal (oblast) and municipal issues, corporate securities, Ag Bonds, futures, forward contracts and currency instruments. This article is developing in all those areas .These will be increasing important in light of the new banking environment and securities laws and regulations. In 1997 Russia has joined the league of the few emerging markets that have market capitalization of over $100 Billion. As of June 30, 1997 the capitalization is $104 Billion and has

a YTD of 134 %. The recent “Asian induced” corrections in themarkets have reduced this by 20-40% according to private estimates. Nevertheless, it remains one of the most vibrant emerging securities markets in the world. The training focused on a number of issues related to emerging market securities including privatization, auctions, IPO’s and new
products in the securities markets.

OVERVIEW

By any traditional Western approach and theory, the Russian Investment Portfolios are very complicated. The Russian investment markets are very complex and becoming more integrated into the global economy.

It means that the Russian investment markets are complicated and guided more by world market and international economic processes . Due these , Russian markets today as develop from several different designs. Their development and complexity is increasing as both the intricacy and volume of investment options and information. Further the volume and number of investment options are increasing very rapidly each year.

They present immense challenges for managing risks in Russian financial Markets when compared in traditional investment theory. In these turbulent Russian times, a simple Markowitz models may amount to pooling risk and return for a small group—mostly foreign investors. Harry Markowitz’s watershed contributions in the 1950’s [1] helped identify the collective importance of all the investor’s holdings—the portfolio of investments. In comparison, in Russia today this would force one to focus on the foreign investor’s portfolios since this data is more readily available and develop models that might have little meaning. Russian secondary markets distorting data and the changing of Russian’s reform policy would overshadow the traditional investment theories. Analyses of these risks are changing in favor of a new perspective in financial and economical efficiency for the Russian portfolios. In such cases, the mission to specify the optimal investment decisions mathematics models is much more real. As an alternative way, one can use formal strategies for investor program trading. For example, one approach would be to passively accept the average return of the Russian market by making many diversified investments in a portfolio. Thus, one would have many open positions in a portfolio.

As the Russian fund markets change over the past seven or eight years, there have been several stages. From 1991 to 1996, they provided an anomaly-- high income on practically risk-free instruments. Thus the risk component and quality was not very important to investors. This has changed, as today the qualities of investments are very important for the investment decisions. With the “Asian Financial Crisis” investors are looking for ways to evaluate risk on regional markets including Russia. Additionally in the past in Russia some investors had access to confidential “insider information”. Other investors had full control of single investment or a

group of the market's segments such as petroleum stocks. This meant that a single or few larger investors made the value of analytical decisions practically useless. But there are indications that this situation in Russian Secondary markets may in a nearby future. The Russian secondary market itself is developing very quickly, and becoming increasingly complex.

In psychological terms the foreign investors could have one's witness the changing of Russian's reform policy risks in favor of a new perspectives economical efficiency for their portfolios.
That's why scientists and investors should seriously think about the possibility of using the traditional formal algorithms for the managing risks and controlling the investment portfolio in Russian conditions. This article explores these models and their applicability to the Russian Markets.

THE SERIOUS (STRONG) MODEL OF PORTFOLIO OPTIMIZATION

In order to estimate of the Western Investment theory capabilities, we will first examine Portfolio theory using the Harry M. Markowitz optimization model. One needs to examine this in light of the current economic environment of Russian Stocks and exchanges. The general question to study is—
Can the investor analyze a portfolio and attempt to apply to Russian markets Western models that reduce the risk (or standard deviation) of the portfolio returns ?
to Russian financial market's situation ?
Scientifically we can explore this key question. Let's define the optimal investment portfolio as a portfolio, which has maximum expecting profit in assigned level of risk. As a measure of risk we'll take standard deviation of investment's profitability(expected returns on a portfolio) .
In this case, the goal to optimize the structure of the investment portfolio we'll formulate by that way:

$$\begin{cases} M(r_p) \to \max \\ \sigma(r_p) = \sigma_r \end{cases}$$

Here r_p - portfolio expected return (profitability -an accidental value), $M(r_p)$ - mathematical expected value of portfolio or Expected Return, $\sigma(r_p)$ - standard deviation of portfolios Expected Returns , σ_r - principal risk's level. Besides $r_p = \sum_{i=1}^{n} r_i x_i$, where **i** - number of the portfolio stocks, n - the number of possible stocks in the portfolio, r_i - the probability of the occurrence of the **i**-th stock , x_i - share of invests in stock number i.

The Portfolio's mathematical expectation is

$$M(r_p) = M\left(\sum_{i=1}^{n} r_i x_i\right) = \sum_{i=1}^{n} M(r_i)x_i \qquad \text{(Equation \# 2)}$$

We could write out the dispersion (standard deviation) of portfolio Expected Return

$$D(r_p) = M\left(\left(r_p - M(r_p)\right)^2\right) = M\left(\left(\sum_{i=1}^{n} r_i x_i - \sum_{i=1}^{n} M(r_i)x_i\right)^2\right) = M\left(\left(\sum_{i=1}^{n}\left(r_i - M(r_i)\right)x_i\right)^2\right) =$$

$$= M\left(\sum_{j=1}^{n}\sum_{k=1}^{n}\left(r_j - M(r_j)\right)\left(r_k - M(r_k)\right)x_j x_k\right) = \sum_{j=1}^{n}\sum_{k=1}^{n} M\left(\left(r_j - M(r_j)\right)\left(r_k - M(r_k)\right)x_j x_k\right) =$$

$$= \sum_{j=1}^{n}\sum_{k=1}^{n} x_j x_k\, M\left(\left(r_j - M(r_j)\right)\left(r_k - M(r_k)\right)\right) = \sum_{j=1}^{n}\sum_{k=1}^{n} COV(r_j, r_k)x_j x_k$$

Here $COV(r_j, r_k)$- is a covariance of the profitability of the stocks numbers j and k. In so far as $\sigma(r_p) = \left(D(r_p)\right)^{0,5}$, $COV(r_i, r_i)x_i x_i = D(r_i)x_i^2$, and $COV(r_j, r_k)x_j x_k = COV(r_k, r_j)x_k x_j$, we'll have

$$\sigma(r_p) = \left(\sum_{i=1}^{n} D(r_p)x_i^2 + 2\sum_{j=1}^{n}\sum_{k=j+1}^{n} COV(r_j, r_k)x_j x_k\right)^{0,5} \qquad \text{(Equation \# 3)}$$

So, the goal is to find the optimal structure of the investment portfolio. It could be formulated in such a way:

$$\begin{cases} \sum_{i=1}^{n} M(r_i)x_i \to \max \\ \left(\sum_{i=1}^{n} D(r_i)x_i^2 + 2\sum_{j=1}^{n}\sum_{k=j+1}^{n} COV(r_j, r_k)x_j x_k\right)^{0,5} = \sigma_r \\ x_i \geq 0,\ i = \overline{1,n} \\ \sum_{i=1}^{n} x_i = 1 \end{cases} \qquad \text{(Equation \# 4)}$$

Le's call portfolios, which structure satisfies these criterion's with different meanings σ_r, "upper "portfolios.

The structure of the worst portfolios on that risk level (lets call it " lower "portfolio)is analogous. Principal risk level σ_r could be determined on the any level, which belongs to the multitude-admitted meanings of portfolio risk $E\left(\sigma(r_p)\right)$. The lowest meaning $\sigma(r_p)$ could be determined from the condition:

$$\begin{cases} \left(\sum_{i=1}^{n} D(r_i)x_i^2 + 2\sum_{j=1}^{n}\sum_{k=j+1}^{n} COV(r_j, r_k)x_j x_k\right)^{0,5} \to \min \\ x_i \geq 0,\ i = \overline{1,n} \\ \sum_{i=1}^{n} x_i = 1 \end{cases} \qquad \text{(Equation \# 5)}$$

Because of $COV(r_j, r_k) = \rho(r_j, r_k)\sigma(r_j)\sigma(r_k) \leq \max\left(D(r_i)\right),\ i, j, k = \overline{1,n}$, where $\rho(r_j, r_k)$- twin correlation coefficient, which characterize narrowness of the connection between Expected Return of the financial instruments with numbers j and k,

$\sum_{j=1}^{n}\sum_{k=1}^{n} COV(r_j, r_k)x_j x_k \leq \sum_{j=1}^{n}\sum_{k=1}^{n} \max\left(D(r_i)\right)x_j x_k = \max\left(D(r_i)\right)$. Consequently,

$\max\left(\sigma(r_p)\right) = \max\left(\sigma(r_i)\right)$.

Thus investors have an ability to attract and invest capital without risk at rate r_f. In this case, his Return on Equity is $ROE = r_f x_f + r_p\left(1 - x_f\right)$, where x_f - opened by investors position on the money market (in shares of capital), $1 - x_f$ - volume of investments in risk's securities (in speculative shares of capital), r_p - Expected Return on the portfolio risk's instruments. With the mathematical expectations , properties and dispersion we have

$$M(ROE) = M\left(r_f x_f + r_p\left(1 - x_f\right)\right) = r_f x_f + M\left(r_p\right)\left(1 - x_f\right) =$$

$$= r_f x_f + \left(M\left(r_p\right) - r_f\right)\left(1 - x_f\right) + r_f\left(1 - x_f\right) = r_f + \left(M\left(r_p\right) - r_f\right)\left(1 - x_f\right)$$

$$D(ROE) = D\left(r_f x_f + r_p\left(1 - x_f\right)\right) = D\left(r_p\right)\left(1 - x_f\right)^2 \qquad \text{(Equation \# 6)}$$

$$\sigma(ROE) = \sigma\left(r_p\right)\left(1 - x_f\right)$$

$$1 - x_f = \frac{\sigma(ROE)}{\sigma\left(r_p\right)}$$

Lets express $M(ROE)$ through $\sigma(ROE)$: $M(ROE) = r_f + \left(M\left(r_p\right) - r_f\right)\frac{\sigma(ROE)}{\sigma\left(r_p\right)}$

Remembering , that $\sigma(ROE) = \sigma_r$, we'll see, that in so far as $r_f \equiv const$, $\sigma_r \equiv const$, while $\sigma_r > 0$

$M(ROE) \to \max \Leftrightarrow RVAR_p = \frac{M\left(r_p\right) - r_f}{\sigma\left(r_p\right)} \to \max$, where $RVAR_p$ - portfolio risk price.

In so far as the function $RVAR_p$ doesn't depend on σ_r, an optimal combination of risk is invariant to the risk, which investors already have in their portfolios . The portfolio's risk's instruments for which $RVAR_p = \max\left(RVAR_p\right)$ and which determines an optimal risk structure in investments for any investor, who has an ability to attract and accommodate financial resources

above a risk free rate , we'll call this an " *Tangential* "(or " *concerning*") portfolio[2] .

In the mathematical derivation of this portfolio the expectation 's appeasement, standard deviation and covariance of financial instruments profitability, we could use the historical meanings.

In that case, we could formulate *an algorithm of finding Russian Market's* ***Feasible Sets*** by calculating the returns of and risks of upper of out variety of "upper "and "lower "portfolios:

The steps would be :

1. Constructing a Matrix of" Corrected "risk's for Financial Instrument Prices

$$P(t,i),\ \ t = \overline{1-\tau, T}\ \ ,\ \ i = \overline{1,n}. \qquad \text{(Equation \# 7)}$$

Here **t** - number of observation (the case of price fixation), τ - period's duration, for which would be hold the calculations of the profitability, **T+**τ - quantity of the observations, **i** - number of the financial instrument, n - total quantity of observed financial instruments. The corrected price

P(t,i) is a $\frac{1}{S}$ value of the investor's investments market cost, who has in the moment of time T+τ S stock number **i,** in stock i in the moment of time t. That investor doesn't make any bargains with stocks **i** for the whole analyzed period of time, solely reinvesting of the i income (per cents, dividends) in the same stocks **i**. Such a procedure should provide comparenesses of the price levels and strike off the anomaly return's meanings from the observation, which depends on, for example, such issuer's actions as split and share's consolidation, paying out dividends by shares, increasing ownership capital and accommodating additional shares after summary revaluation of the capital funds. In case of informational absence about such facts, the correction could be not provided.

2. Constructing the Expected Return matrix for the risk's instruments $r(t,i)\ t=\overline{1,T},\ i=\overline{1,n}.$

The calculation of the Means or Expected meanings

$$r(t,i)=\frac{P(t,i)}{P(t-\tau,i)}-1,\ t=\overline{1,T},\ i=\overline{1,n} \qquad \text{(Equation \# 8)}$$

3. Forming of the Expected Return 's vector.

An estimating of expected return of the stock i could be average historical meaning

$$\bar{r}_i=\frac{\sum_{t=1}^{T} r(t,i)}{T}$$

4. Forming of the covariance matrix.

An estimating of covariance of the Expected Return on a market portfolio stocks **j** and **k** - should be selection covariance $COV(r_j,r_k)=\frac{\sum_{t=1}^{T}\left(r(t,j)-\bar{r}_j\right)\left(r(t,k)-\bar{r}_k\right)}{T-1}$ (Equation # 9)

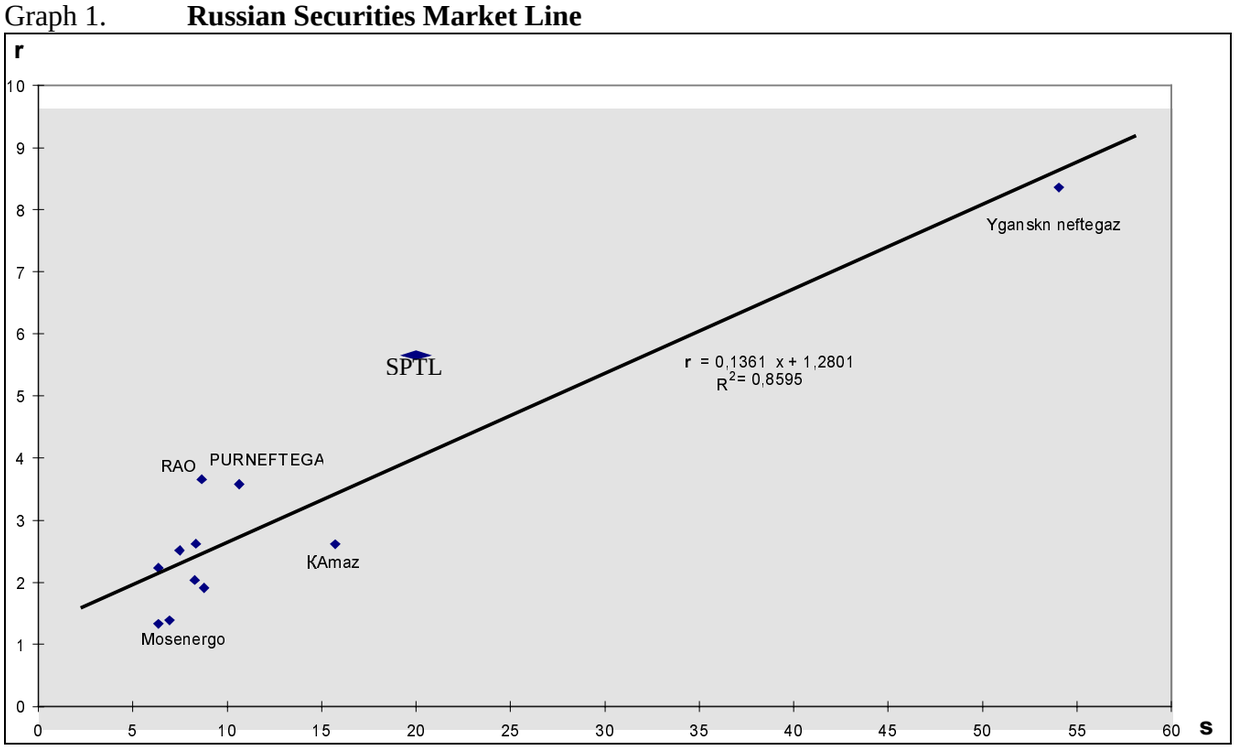
Finding out the structure of the Optimal portfolios and Tangential (Concerns)Portfolios by using the upper shown algorithms.

This algorithm was realized for the case with portfolio from the 12 financial instruments. Among them there are Blue chips- the stocks mostly active trading in Russian trade system single shares of the biggest Russian companies. For them, on the base of quotations of middle-weighted prices per week (the sources- Russian -weekly journal ‘″Expert″ 1997), were built corrected rows of prices for the period from the August 14, 1996 till August the 13, 1997 (totally 52 levels) and weekly returns were also calculated. On the Tab.1 High monthly correlation among Russian Blue chips - EESRP (RAO EES), ESIR (IRKUTSK ENERGO, LUKOIL, RTKM (ROSTELECOM) and other followers over the last 2 years should offer great confidence in the opportunity for all traders to profit with above average gains.

Tab.1 **CORRELATION MATRIX**

Issuers	Portfolio Expected Return /per week $\bar{r}_i$	Portfolio standard Deviation $\sigma(r_i)$
EESRP(RÀÎ)	3,66	8,67
MSNG (MOSENERGO)	1,33	6,35
ESIR(IRKUTSK ENERGO)	2,51	7,49
LKOH (LUKOIL NK)	2,24	6,36
SNGS (SURGUTNEFTEGAZ)	2,62	8,33
MFGS (MEGIONNEFTEGAZ)	2,03	8,26
NKEL (NORILSKNIKEL)	1,91	8,77
RTKM (ROSTTELUKOM)	1,39	6,95
KMAZ (ÊAMAZ)	2,61	15,71
PFGS (PURNEFTEGAZ)	3,58	10,63
SPTL (S- Petersburg TELEPHON-NET)	5,23	20,90
YFPG (YUGANSKNEFTEGAZ)	8,36	54,04

Graph 1. **Russian Securities Market Line**



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x-axis: Standard Deviation ; y-axis average weekly return for the 52 weekly’s holding period Aug.1996- Aug .1997 .

That graph shows, that linen dependence between the profitability and risk is really exists on the russian corporation stocks market. Herewith, blue chips (“ LUKOIL “«MOSENERGO»,

“RAO “ «SURGUTNEFTEGAZ», «IRKUTSKENERGO») characterizes, practically, by equal meanings of the middle returns on the investments and standard deviation of the expected returns. Actually, among them there are more profitable shares of “ RAO EES”. The stocks of the ”second echelon”, for example YFPG (YUGANSKNEFTEGAZ) , could provide much higher return, but with a greater keel of risk.

Table 2 . The Covariance Matrix Returns Russian equity :

	EESRP	MSNG	ESIR	LKOH	SGNS	MFGS.	NKEL	RTKM	KMAZ	PFGZ	SPTL	YFGA
RAO	73,73	40,79	39,46	38,01	49,40	58,51	46,08	42,26	-1,22	12,44	-2,31	131,17
MSNG		39,54	32,15	34,43	34,25	36,88	33,11	26,50	-3,13	19,06	0,53	136,78
ESIR			54,98	31,62	33,80	41,20	26,48	29,76	-2,90	25,34	-3,62	151,82
LU KOH				39,61	35,73	33,64	38,12	26,00	-0,08	13,23	-5,61	73,96
SGNS					68,10	36,88	37,02	31,64	14,42	3,33	1,43	-0,12
MFGS.						66,93	40,89	39,08	-13,71	22,07	-14,96	210,26
NKEL							75,40	38,58	19,01	19,37	30,95	52,63
RTKM								47,35	-3,53	17,02	-8,28	111,37
KMAZ									242,03	-90,65	196,18	-507,15
PFGZ										110,87	-50,97	360,36
SPTL											428,23	-504,38
YFGA												2863,07

First eight stocks are characterized by a strong mutual correlation. They form a group of the financial instruments, which have equal dynamics. Due this ,as a result, it equal react on outer space signals. All of them are the representatives of the russian secondary market’s “first echelon of corporation’s stocks or “ Blue chips” . Dynamics of the stocks “ KAMAZ ’s and “ SPTL“(S-Petersburg Telephone NET” shares, which characterize really high correlation or standard deviation of Returns , deeply differ from the blue chip’s dynamics, it could be shown by the positive or negative covariance.

From the point of view of reducing the risks of the portfolio, very attractive seems to be the way of inserting a pare of “Megionneftegaz- “KAMAZ”. These stocks have negative covariance of returns during average meanings of the standard deviation.

Very interesting to observe the investment quality of the « PURNEFTEGAZ”(PFGZ) shares. On the Figure 1 . they are shown as a dot, which is located upper than the regression line - it testifies about their high profitability. Besides, the correlation coefficient of the profitability of the« PFGS (PURNEFTEGAZ) shares and stocks, which are in the first eight, rather low, and that shows about the opportunity to accomplish an effective diversification. However, You shouldn’t make any long range plans. There is no quarantine for the crisis PFGS (PURNEFTEGAZ)s stocks market.

The YFPG (YUGANSKNEFTEGAZ)‘s shares are standing alone. Because of an algorithm of the cluster analyze in the statistical program packet «″STATISTICA″»while dividing 12 stocks on 2 equal groups shows , that the « YFPG (YUGANSKNEFTEGAZ’s shares are standing opposite to others(- we should classify them in the another group). In fact, standard deviation and average profitability of these stocks are ”anomaly” high.

Table 3. PORTFOLIO's PARAMETRS

Issuer	Shares of Investments	
	Most -free-risk portfolio	Tangetial portfolio
EESRP(RÀÎ)	0,0000	0,3178
MSNG (MOSENERGO)	0,0574	0,0000
ESIR(IrkutskEnergo)	0,0000	0,0000
LKOH (LUKOIL NK)	0,2780	0,0056
SNGS (Surgutneftegas)	0,0004	0,0152
MFGS (Megionneftegaz)	0,0000	0,0000
NKEL (NORILSKNIKEL)	0,0000	0,0000
RTKM (Rosttelekom)	0,1800	0,0000
KMAZ (Êàìaz)	0,1989	0,1945
PFGS (PURNEFTEGAZ)	0,2853	0,3981
SPTL (S Peterburg telephone-net)	0,0000	0,0642
YFPG (Yuganskneftegaz)	0,0000	0,0046

These results confirm our western theoretical observation of the Russian Secondary market portfolio from Table 1 : there are more total middle risks associated with RAO EES, "Rosttelekom " Among these twelve stocks of Russian Blue chips only LUKOH(LUKOIL NK) - 6,35%and MSNG (MOSENERGO) - 6,35% have minimal standard deviation of Returns.

So , diversification of the portfolio assets provides the high reduction of the investment risk. In that case, minimum possible standard deviation of the Expected Returns is 2,49.

The Tangential portfolio provides profitability of 3,52% on the level of standard deviation - 5,34% .

Comparing the structures of the Tangential and some of the most free-risk's portfolio, we could underline the similar features : there are an essential presence in both of them « PFGS (PURNEFTEGAZ)' s shares »and KAMAZ's shares.

These stocks possess the combination of investment qualities, which are very attractive for the portfolio investor: the independence of the behavior against the market's conditions, the limited risk and acceptable profitability.

From the point of vies of the radical differences between Portfolio's Models we could underline differences :risks-free rate Optimal Model Portfolio has been selected from the most stocks -"Lukoil"s and "Rostelekom"s shares

's stable stocks»from the most free-risk's portfolio in the structure of the concerning portfolio are only on the second place after more profitable «RAO EES Russia" as shares. The Tangential portfolio is less diversificated , than the most free-risk portfolio. Concentration of the Hirfendele - Hishner index -, which could be counted by the formula $HH = \sum_{i=1}^{n} x_i^2$, is 0,30 for the Tangential portfolio, and is 0,23 - for the most free-riskable one.

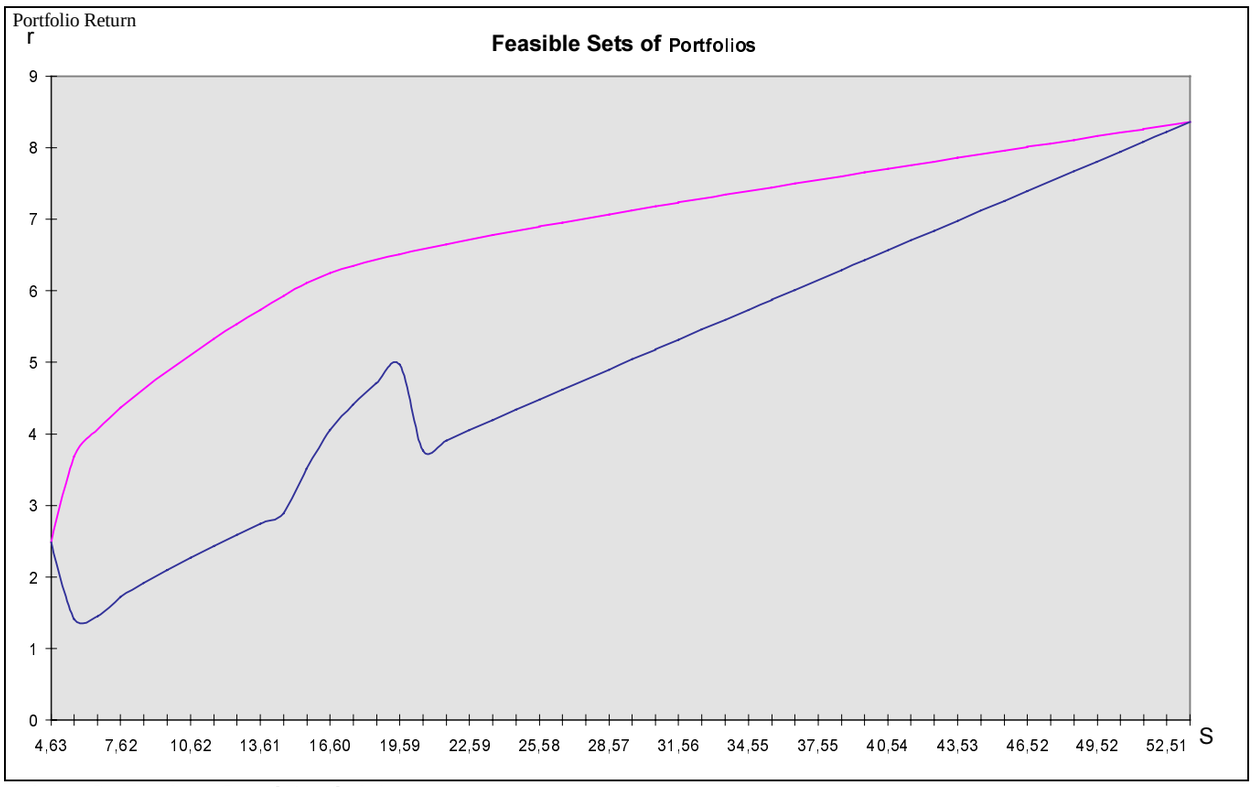


Figure 2 Feasible Set of Portfolio's

When the standard deviation is little, the optimal porfolios mainly consist's of PFGS (PURNEFTEGAZ), RAO EES 's, « SPTL (S- Petersburg TELEPHON-NET) shares. While passing through the point of touch, - LUKOH (LUKOIL)'s and SNGS (SURGUTNEFTEGAZ)'s stocks, which entered the optimal portfolio, yield their places to « YFPG -"YUGANSKNEFTEGAZ's shares.

The most inefficient financial instrument during the analyzed period were" MOSEN-ERGO" shares. They did play a leading role in the structure of the most inefficient portfolios. Special interest appears when You see simultaneously presense KAMAZ's stocks in the composition of the most riskable and free-riskable portfolios. That strange situation could be explained very easily: the influence of the financial instrument on the summary result determines not only by it's individual investment qualities, but also by the characteristics of the connection it's profitability with the profitability's of another stocks in that portfolio. The same stock, inserted in the composition of the different investment portfolios, could increase and decreases their risk, and also influence on the summary optimal criterion.

Market Models for the Russian Secondary market.

The special role in the modern theory of the investment portfolio plays Wiliam Sharpe's Market Portfolio model. His theory carried these of this ideas further by mouthing thst individuals also have the ability to invest in a risk-free asset (e.g. Treasure bills, GKO in Russian case ...)

It is based on the proposition, that stock's Return has a linear relationship connected with the addition temp of the market index. In that case:

$r_i = A_i + \beta_i r_m + \varepsilon_i$, where r_i - stock's i profitability, r_m - addition temp of the market index, A_i, β_i - parameters of the linear regression equation, ε_i - occurrence deviation.

Method of the lowest quads gives us next parameter's meanings of the regression equation:

$\beta_i = \frac{COV(r_i, r_m)}{\sigma^2(r_m)}$, $A_i = \bar{r}_i - \beta_i \bar{r}_m$, where $COV(r_i, r_m)$ - selected covariance of the stock's i profitability and addition temp of the market index, $\sigma^2(r_m)$ - selected dispersion of the addition index's profitability, $\bar{r}_i$ - average meaning of the stock's i profitability, $\bar{r}_m$ - average addition temp of the market index.

Condition of the equality of the 0 private derivative functions the sum of the quads of the accidental deviations provides $\bar{\varepsilon}_i = 0$ u $COV(\varepsilon_i, r_m) = 0$. From the last equality and dispersion's properties there is $\sigma^2(r_i) = \sigma^2(A_i + \beta_i r_m + \varepsilon_i) = \beta_i^2 \sigma^2(r_m) + \sigma^2(\varepsilon_i)$

Modern theory of the investment portfolio's management use that equality as a decomposition of the total risk on systematic and nonsystematic. Herewith, total dispersion $\sigma^2(r_i)$ is a characteristic of the total stock's risk, factor dispersion, stipulated by changing of the independent recession (it is addition temp of the market index) $\beta_i^2 \sigma^2(r_m)$ - level of systematic risk, and remainder dispersion $\sigma^2(\varepsilon_i)$ - measure of the nonsystematic risk.

But for some stocks, that market model wouldn't fit in a real life. The hypothesis about adequacy of the market model needs checking. Let's think, that the model is adequate if the regression coefficient β_i could have statistical meaning.

After defining the characteristics of the market model for the stocks, we could easily define the characteristics of the investment portfolio. In that case,

$$r_p = \sum_{i=1}^{n} r_i x_i = \sum_{i=1}^{n} (A_i + \beta_i r_m + \varepsilon_i) x_i = \sum_{i=1}^{n} A_i x_i + r_m \sum_{i=1}^{n} \beta_i x_i + \sum_{i=1}^{n} \varepsilon_i x_i = A_p + \beta_p r_m + \varepsilon_p$$

Portfolio's risk could be decomposed on systematic and nonsystematic, the same as with a stock's risk. During that operation, we could write nonsystematic portfolio's risk as:

$$\sigma^2(\varepsilon_p) = \sigma^2\left(\sum_{i=1}^{n} \varepsilon_i x_i\right) = \sum_{j=1}^{n} \sum_{k=1}^{n} COV(\varepsilon_j, \varepsilon_k) x_j x_k = \sum_{i=1}^{n} \sigma^2(\varepsilon_i) x_i^2 + 2 \sum_{j=1}^{n} \sum_{k=j+1}^{n} COV(\varepsilon_j, \varepsilon_k) x_j x_k$$

W. Sharp confirms, that profitability's deviations from the regression line are not correlated $COV(\varepsilon_j, \varepsilon_k) = 0 \ \ \forall j \neq k$. In that case, the formula for the remainders dispersion of the portfolio becomes more easier: $\sigma^2(\varepsilon_p) = \sum_{i=1}^{n} \sigma^2(\varepsilon_i) x_i^2$, and risk's decomposition on systematic and nonsystematic ones becomes $\sigma^2(r_p) = \beta_p^2 \sigma^2(r\ ) + \sum_{i=1}^{n} \sigma^2(\varepsilon_i) x_i^2$.

In order to estimate the Investment risks in Russian Market we could suppose, that the hypothesis about correlation's absence of the unexplained by the Market model deviations of the stock's returns is very doubtful.

Really, it explains, that it couldn't be any groups of stocks, which prices and profitability ((expected returns) react in the same way on the same changing of the out-environment factors. If W.Sharp was right, than, for example, abolishing an embargo on oil's export from Iraq will reflect differ on the market prices of the oil company's shares (or they wouldn't reflect anyway), and the increasing of the world consumption of copper, while decreasing of the reserves on London's stock of non-ferrous, won't lead to the rise in the exchange rate of the metal enterprise's shares.

For the 12 shares of Russian companies was held an assessment of the parameters of the market model, relatively to the two different market indexes. First one was based as average basis temp of growth of the corrected prices of all analyzed financial instruments.

Second index determined by calculating a weighted average rate of basic growth temp of the corrected prices. As a criteria of optimal market model, we used maximum of the determination coefficients sum. As a result of the calculations, which based on the mathematical model of the optimal index on the left side, we obtained the structure of the standard portfolio (on the right side):

TAB .4 STANDARD PORTFOLIO

$$
\begin{cases}
I2(t) = \sum_{i=1}^{n} f_i \dfrac{P(t,i)}{P(1-\tau,i)} \\
f_i > 0,\ i = \overline{1,n} \\
\sum_{i=1}^{n} f_i = 1 \\
r(t,i) = \dfrac{P(t,i)}{P(t-\tau,i)} - 1,\ t = \overline{1,T},\ i = \overline{1,n} \\
r(t,I2) = \dfrac{I2(t,i)}{I2(t-\tau,i)} - 1,\ t = \overline{1,T},\ i = \overline{1,n} \\
\sum_{i=1}^{n} \left[corr\left(r_i, r_{I2}\right) \right]^2 \rightarrow \max
\end{cases}
$$

Issuer	f_i
EESRP (RAO)	0,0886
MSNG (MOSENERGO)	0,1882
ESIR (IRKUTSKENERGO)	0,1031
LUKOH(LUKOIL)	0,1928
SNGS (Surgotneftegaz)	0,0000
MFGS (Megionneftegaz)	0,1394
NKEL (Norilsknikel)	0,0827
RTKM (Rostelecom)	0,1628
KMAZ (Kamaz)	0,0000
PFGZ(Purneftegaz)	0,0243
SPTL (S-Petersburg Telnet)	0,0000
YFPG (Ygansknefteqaz)	0,0182

If we'll use the first market index, the parameters for the Optimal **Market** models for the researchable stocks would be:

Tab. 4 PARAMETR'S OPTIMAL PORTFOLIO

	$\overline{r_i}$	β_i	A_i	s_β	s_A	R^2	s_r	$t_{набл}$
RAO	3,6560	1,1628	0,9095	0,1724	0,9726	0,4815	6,3077	6,7455
MSNG	1,3317	0,8309	-0,6309	0,1290	0,7279	0,4584	4,7211	6,4400
ESIR	2,5121	0,8732	0,4497	0,1649	0,9301	0,3641	6,0323	5,2966
LKOH	2,2362	0,8430	0,2450	0,1276	0,7200	0,4710	4,6699	6,6057
SGNS	2,6174	1,1023	0,0138	0,1678	0,9465	0,4684	6,1384	6,5710
MFGS.	2,0339	0,9575	-0,2278	0,1825	1,0298	0,3597	6,6788	5,2462
NKEL	1,9109	1,2379	-1,0130	0,1653	0,9328	0,5336	6,0497	7,4874
RTKM	1,3859	0,8336	-0,5830	0,1504	0,8487	0,3853	5,5045	5,5414
KMAZ	2,6111	1,0755	0,0708	0,4056	2,2885	0,1255	14,8424	2,6515
PFGZ	3,5808	0,4232	2,5811	0,2873	1,6208	0,0424	10,5119	1,4732
SPTL	5,2338	2,0462	0,4009	0,4974	2,8065	0,2567	18,2018	4,1134
YFGA	8,3585	-0,5400	9,6339	1,4898	8,4058	0,0027	54,5157	-0,3625

First of all, let's check hypothesis about the role of the β-coeficient.

By the traditional used in economic researches role level α=0,05, critical meaning of the t-criterion is 2,0096. So, the regression coefficient in the cases with " PURNEFTEGAZ » and «Yugansknefteqaz »couldn't play statistical role, and market model - really truthful.

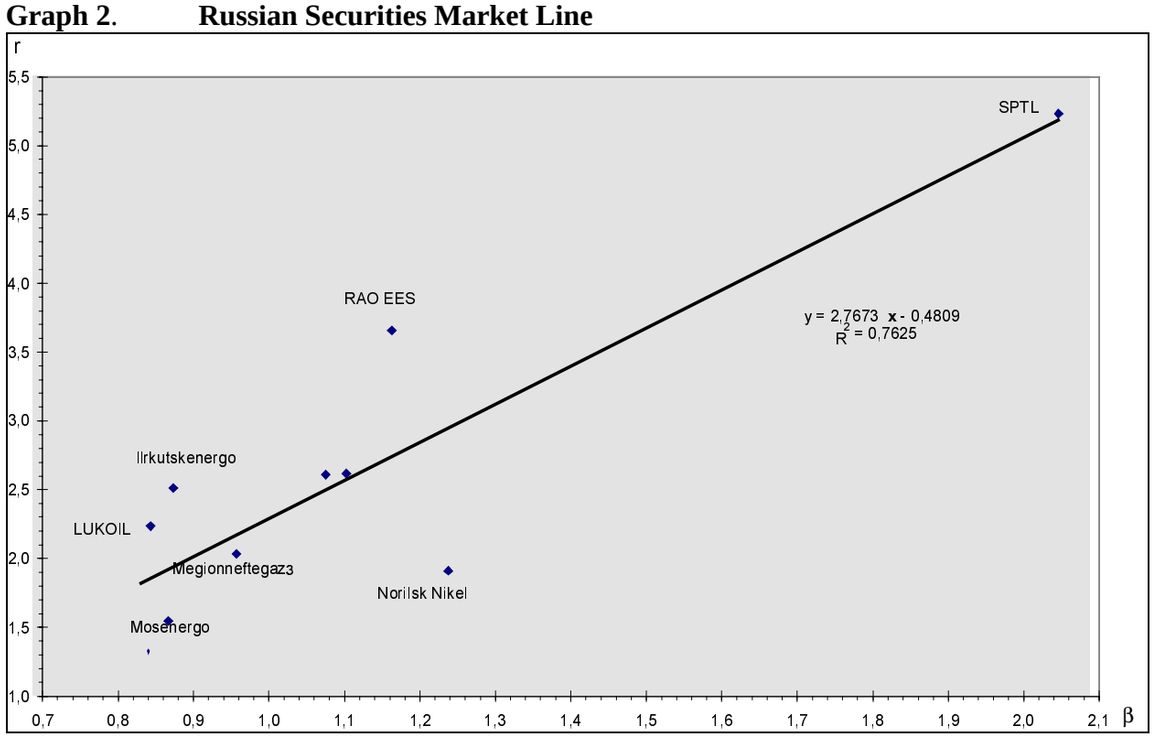
The characteristics of the regression dependence for other 10 stocks are rather interesting. The most aggressive are S-Petersburgs Telnet " shares - their β-coefficient is 2,0462, moreover even after subtraction of the standard mistake, β is still rather big: 1,5488.

As summary, for the portfolio's manager it is very reasonable to increase the portion of SPTL (S-Petersburg Telnet')shares in his portfolio while awaiting for the growth of the fund market. If there are forming any prerequisites (remises) for the round turn from the " BULL trend " due these stocks would be sell immediately.

Among the Russian Blew Ships one of the aggressive stocks are - NKEL(Norilsky Nikel))'s shares . Conservative financial instruments, which are less dependent on the influence of the market situation's changes and political conjunctures , are " Mosenergo", "LUKOIL " and«Rostelekom's shares. What about the others stocks, it is rather difficult to explain the situation about them because the deviation of the beta-coefficient from the 1, 0 - for them is no more than the standard mistake.

This Market Portfolio model better explains the Return's changing of the RAO , Mosenergo, LUKOIL's, ROSTELECOM's, , SURGUTNEFTEGAZ 's shares. Never the less, the forecast for movement of Returns of these stocks, have been based on the regression model, which is *extremely unexactitude: prognosis's standard mistake is more than twice bigger than middle profitability's meaning.* Determination coefficient is very low in SPTL (S-Petersburg Telnet)'s and, especially, KAMAZ's stocks.

Graph 2. **Russian Securities Market Line**



The most attractive in correlation between profitability and systematic risk (it's exponent is β-coefficient) are « RAO EES"'s shares, and the less attractive - 's stocks. Theoretically, lineal character of the dependence between β-coefficient and profitability is improved, but the deviations from the regression line are rather essential.

The Correlation residues matrix, which are not explained by the regression equation, could be shown in such a way:

	EESRP	MSNG	ESIR	LKOH	SGNS	MFGS.	NKEL	RTKM	KMAZ	PFGZ	SPTL	YFGA
EESRP	1,0000	0,5392	0,3501	0,4337	0,4232	0,7235	0,2262	0,5040	-0,3785	-0,0076	-0,5872	0,4469
MSNG		1,0000	0,4788	0,7570	0,3663	0,5277	0,2227	0,3332	-0,3950	0,2061	-0,5342	0,6008
ESIR			1,0000	0,4542	0,2398	0,4973	-0,0542	0,3338	-0,3203	0,2566	-0,5737	0,5197
LUKOIL				1,0000	0,4114	0,4154	0,3950	0,3056	-0,3587	0,0819	-0,6232	0,3512
SGNS					1,0000	0,2327	0,0336	0,2314	-0,1908	-0,1438	-0,5383	0,0482
MFGS						1,0000	0,2516	0,5132	-0,4278	0,1695	-0,5685	0,6399
NKEL							1,0000	0,3591	-0,1848	0,0919	-0,3360	0,2215
RTKM								1,0000	-0,3448	0,1396	-0,5512	0,4273
KMAZ									1,0000	-0,6844	0,5332	-0,6327
PFGZ										1,0000	-0,4009	0,6654
SPTL											1,0000	-0,4986
YFGA												1,0000

It's obvious, that *William Sharp's proposition doesn't working and fulfill: the deviations of the stock's profitability, which weren't explained by the regression model. For the most stocks, coefficient of the remainder's correlation is positive.* Here, it's useful to look at the KAMAZ's and SPTL's shares. It seems to be, *that the special factors are influencing* on *these stock's market.* It mean's, that including its (into the portfolio could decrease total risk.

The **Second Market Portfolio Model** based on the increasing 's temps of the second index, have been characterizing by the following parameters :

Table 5. **Second Market Portfolio Model**

	$\overline{r_i}$	β_i	A	s_β	s	R^2	s_r	$t_{табл}$
EES RAO	3,6560	1,2333	1,0720	0,0956	0,6185	0,7725	4,1785	12,8975
MOSENERGO	1,3317	0,9231	-0,6023	0,0645	0,4174	0,8068	2,8198	14,3045
IRKUTSENERGO	2,5121	0,9648	0,4906	0,1047	0,6774	0,6339	4,5770	9,2113
LUKOIL	2,2362	0,8965	0,3579	0,0720	0,4660	0,7596	3,1481	12,4433
SURGUTNEFTEGAZ	2,6174	0,9401	0,6476	0,1381	0,8935	0,4859	6,0364	6,8056
MEGIONNEFTEGAZ	2,0339	1,1698	-0,4172	0,0925	0,5981	0,7656	4,0410	12,6503
NORILSKIY NIKEL	1,9109	1,0405	-0,2691	0,1378	0,8916	0,5376	6,0237	7,5478
ROSTELEKOM	1,3859	0,9110	-0,5228	0,0942	0,6093	0,6561	4,1167	9,6697
KAMAZ	2,6111	-0,2664	3,1692	0,3612	2,3362	0,0110	15,7841	-0,7375
PURNEFTEGAZ	3,5808	0,6405	2,2388	0,2282	1,4757	0,1385	9,9703	2,8072
SPTL	5,2338	-0,2783	5,8170	0,4815	3,1142	0,0068	21,0402	-0,5781
YUGANSKNEFTEEGAZ	8,3585	3,9546	0,0728	1,1142	7,2062	0,2045	48,6876	3,5493

In this case the relationship between the temp s of movement of Market' Index and the and asset's returns of portfolio is not such significant for the two shares , excepting the stocks of «PURNEFTEGAZ» and «YUGANSKNEFTEGAZ» , there are only stocks of « KAMAZ» and «SPTL (S-Petersburg's Telnet) .

Generally the mining of the parameters of regression equations have been too much increased due to : increasing of t - of statistics, decreasing of the meaning of the standard mistakes

That's interesting, that meaning of β- coefficient of stocks «S-Petersburg Telephone Net» and «Yuganskneftegaz » assets are significantly different for the two different Market Models of Portfolios : β of SPTL (S-Peterburgs Telephone net), which equal to 2,046 in the First Portfolio Model ; in the Tangential (Concerns) Potfolio - β of SPTL - is negative and equal to (-0,2783); β of «Yuganskneftegaz» has been changed from(-0,5400) to 3,9546. This paradox we can easily explain : the coefficient of the determination is a minute in the first and second cases. So, it shows , that even small Index 's modification should actuate (lead) to adjustment of the parameters of Portfolio Models .

	β(I1)	β(I2)
RAO ÅES	1,1628	1,2333
ÌOSENERGO	0,8309	0,9231
IURKUTSKENERGO	0,8732	0,9648
LUKOIL	0,8430	0,8965
SURGUTNEFTEGAZ	1,1023	0,9401
MEGIONNEFTEGAZ	0,9575	1,1698
NORILSKIY NIKEL	1,2379	1,0405
ROSTTELEKOM	0,8336	0,9110

For the regression Models which have some significant statistical meaning , the βeta directly depends of the selections Market's Index The important point of W .Sharp of Portfolios Theories - about Market Portfolio is that *for individuals holding diversified portfolios of assets , the appropriate measure of risks* βeta *is how the return on an individual asset moves relative to the returns for the market portfolio* . According to Western Theories the βeta coefficients the measure of asset's volatility in relation to the risking of the market portfolio as a whole.

Coefficient βeta could play role of -the best measure of investment quality of assets only in the case if the different selection variants of Market Portfolio's Models which could have the similar collections of financial instruments

In this case we could exactly suppose, that the RAO "ÅES» stocks are very aggressive with the high level of systematic risks (β_1- 1,16 ; -1,23) , comparing the LUKOIL stocks- are more stability financial instruments and very attractive for the conservative investors .

Submitted by Elton, Gruberg and Padberg simple algorithm of determination of the structure of Tangential Portfolio have been based on the using of parameters Market Portfolio Model. Due this alghoritms the collections of Input's parameters have include the coefficients β_i, the remain dispersion $\sigma^2(\varepsilon_i)$, the standard deviation of the Market Index - σ_m^2, and risk free rate - r_f, and also Expected of Returns of financial instruments $\bar{r}$ .and their correlation

This methodological approach we can implement only for the assets which , β coefficient have been recognized such as important statistic element. In the cases with Russian stocks there is the necessity the exception from the selection process the stocks of PURNEFTRGAZ and YGANSKNEFTEGAZ for the First Market Portfolio Model .

and exception of the stocks of KAMAZ and SPTL -« S Petersburg Telephone Net " for the Second Market Portfolio Model » .

Given algorithm have been used for the finding of the two assessments of structure of tangential portfolio on the base of the First and Second Indexes . The difference between of indexes

was very significant. While the using of optimization index have been permitted to give the best assessment of real structure of Tangential portfolio . As a result it was determinate buy generally , the occurrence's domination of «Purneftegaz» and «RAO EES» 's shares.

The comparing of the differences of parameter of Tangential Portfolio and it's two assessments is more convenience to lead buy using the next table system :

STOCKS INDICATORS	TANGENTIAL PORTFOLIO	ASSESMENT 1	ASSEMENT 2
x(RAO EES)	0,3178	0,4292	0,3251
x(ÌOSENERGO)	0,0000	0,0000	0,0000
x(IRKUTSKENERGO)	0,0000	0,2353	0,0000
x(LUKOIL)	0,0056	0,2532	0,0000
x(SURGUTNEFTEGAZ)	0,0152	0,0427	0,0365
x(MEGIONNEFTEGAZ)	0,0000	0,0000	0,0000
x(NORILSKI NIKEL)	0,0000	0,0000	0,0000
x(ROSTELEKOM)	0,0000	0,0000	0,0000
x(KAMAZ)	0,1945	0,0135	0,0000
x(PURNEFTEGAZ)	0,3981	0,0000	0,6384
x(SPTL)	0,0642	0,0260	0,0000
x(YGANSKNEFTEGAZ)	0,0046	0,0000	0,0000
RETURNS	3,5219	3,0095	3,5701
Risks	5,3362	6,5357	7,7173
RVAR	0,6596	0,4602	0,4623

The using a E.Elton- M.Gruber-Padbergs's method have been allow to leave on the level of returns at the real Tangential portfolio (with greater or smaller degree of accuracy depending on used index). However Standard deviation of optimum portfolio in this case obviously unattainable. This is because the market portfolio's model excludes a possibility of account of un-homogeneous reactions of the prices of different financial instruments on one and same entering from the external environment's signals. At the same time the serious way to optimization, which have been used at the in-put the covariance's matrix . Also, this way allows to construct the portfolios , which are the most protected from the influence of disadvantage changing of the most different factors of external environment. If W. Sharps hypothesis on the absence of correlation of the remainders has been corresponded in reality, simplified optimization algorithm will have acted much more effectively. But as far as this may not so, for the following reason we could have satisfaction only the smaller price's risk . This

is in contrast with really optimum price of taking risk (0,4602 and 0,4623 against 0,6596), or use much more labor-consuming and demanding to technical parameters PC, but greatly more exact optimization algorithm.

The analysis has shown that the Russian Financial Market represents a classical example of " Fresh Market" which has developed and grew up to maturity during

Even while academia is debating the relevance of beta , Optimal Portfolios Models, and CAPM in pricing securities in Western markets, we have taken up the briefly research here, and the results are a bit surprising. But first, the usual disclaimers.

It is widely known that to make the Markowitz's Portfolios Theories a number of critical assumptions must be made about the characteristics of the Western optimal capital market, including efficiency, convergent investor expectations and goals, adequate and accurate flows of information, etc. Obviously, one need not be a veteran of Russian capital markets to recognize that these assumptions amount to little more than wishful thinking here. Even in Western capital markets, these homogenous assumptions strain the ability of the model to reflect economic reality.

Bearing that in mind, we went ahead anyway and calculated betas for the most liquid Russian stocks, which have an Russian Trading System (RTS)trading history for at least one year.

The methodology used monthly returns and volatility figures, and the market was defined as the RTS Index. Generally, a longer period, at least three years, should be used, but we opted to limit the data to the more recent Russian Stocks Market history, because of the better transparency and firm pricing rules in the system

Analysis of the most liquid portfolio's instruments of the Russian stocks market has been shown that the portfolio's managing risks via Western Model Portfolio's mechanism is inefficient. It does not reflect the most basic underlying market elements, capturing characteristics

Due to the differences between Western and Russian Market capital of Russian Market Portfolio's Theories could not be implemented for the investors by generally. The portfolios Models could be implemented only on the short term period stability of the russian policy system . The developing of Russian trade system and other market's financial segments now have been formed and still did not reach a stage which adequate to Sharp's Portfolio models.

In fact ,that is the crux of the problem - management of investor's risks on the free-riks segments of Russian financial market .

Now is more problematical a finding new approaches to mechanisms of portfolio management on the GKO market.

The new intentions of the Russian policy-makers to revert of the financial market on the new stage. It dictates the necessity of the developing an introduction a formal managerial systems of estimating and identifying of investment potential on the different segments of Russian financial market .

PART II NEURAL GKO- PORTFOLIO'S MODEL

The Neural network - is an uncial instrument of the non -lineal interpolation .

Using the Neural Programs market we should investigate and construct the strong relations of market variables elements. The evolution process of different strong and resistant systems which includes the different quantity of the similar micro-objects, has been coordinated by the universal economic rules , should be investigated by Neural Net technologies.

In fact , that the most serious complex with specific functional dependencies for the neural investigations represents the Russian GKO -OFZ Market .

GKO-OFZ market which is a further crux of the problems evidenced at the begining 2000-2001 years .

But managing GKO portfolio's via Neural Network Technologies we should estimate the market volatile and if it will possible to build neural structure for the investor's portfolios

Due this , we could try to formulate some common methodical approaches for the neural test and forecast of the dynamics of object's properties and the movement of rate GKO-OFZ Market yields .

The government debt market - GKO-OFZ is the most suitable for the investigation such properties . Each GKO issues is a system's object , described by the range of properties , in which - the " price " and the " yield to maturity" have represent more important portfolio's elements. By changing each other , GKO issues repeat at the same life cycle- from the distribution on the auction until terms to maturity. Dynamic of the prices have subordinate some of the common regularities. Due this , it possible to maintain that the smooth function approximated the relationship between of the call price and the term of conversion, the first of conversion -time derivative of prices - is positive , second - negative.

Besides of this , there exist the specific relationships between of the current prices- call and futures prices-call. The most significant role in GKO-portfolio management have play a weekly - seasonal cycle of government GKO-Bond's Market: Monday, Tuesday , Thursday , Friday , in which the deference between the absolute growth rates of call-prices is statistical important. The neural network test help to strong starting and store al relationships by development all historical observations.

While the specific regularities of the dynamic raw in one of the same GKO issues, the other kind of relationships there are exist .This relationships have determinate the parity of correlation between the meaning of properties of the different similar objects.

At the GKO-OFZ market it appear in smooth of the Yield curve ,that is impossibilities of the existence significant deviations of the yield's and précis's parameters of the neighboring GKO -issues .

Besides , there exist some regulators , that determinate the reactions of the system and their incoming subjects on the outside impacts . Most of the outside impacts are difficult formalizes for the GKO-OFZ market cases . This situation has blocks the forecast of the changing of parameters of objects .

However some of them should possible take into account , in particular, it is a volume of financial means reserved in trade system , internal cash flaw streams , forgoing cash dividend streams and volatile of financial market . Regrettably , the information about internal market's turbulence was not transparentive and accessible for the our investigation.

Due the aforesaid methodological approaches to the common investigations of dynamics and the forecast of the movement 's complexes systems ,such as a specific GKO-OFZ market we should try formulate some key general principals for the Neural Test for the GKO-OFZ Portfolio.

The network's performance is measured using GKO-OFZ market's different data sets .

Serving as input elements of neuron's pattern for the designing Neural network have been taken the following variables:

1. Four Boolean variables - for the encoding of the days of week(Monday, Tuesday, Thursday, Friday). Using one variable for the fixing the meaning of given sign is not

expediently by reason of qualitative heterogeneity of impulse's system towards the transition from the one commercial day to the next.

2. Price of closing and term before maturity are - most important parameters of GKO issue

3 Gain of GKO closing - price in contrast with preceding tenders and for a trade week. Practicability of use the gestation lags -1 and -4 is confirmed not only by general considerations (these gains are the best, that reflect a marked tendency in a recently tender's situation .

Also ,it is confirmed , as well as presence of corresponding maximums of the private automatic correlation function of closing price .

4. Differences of closing price and closing- prices of two neighboring on a date of maturity issues. It is defining the potential of closing -price growth analyzed issue on the base from breaking smoothness' form Yield - curve .

As an output pattern was accepted a value of absolute gain of GKO closing - price at the following sale. Using a first difference of range of closing -prices it is required for the eliminating a significant auto correlation, that obstructing as a process of tutoring and interpreting the output values.

Training of the Neural - GKO-Portfolio's Model have been developed on the base of PC- Pentium-200 Brain Maker 3.10 of the California Scientific Software Co.

Training and testing sets have been formed on the base of dynamic ranges of closing - prices on à period of March 3 , 1998 ã. of GKO-issues from June 26 1997 ã. till March3,1998 ã. Besides this, the information about these issues , which maturity have been between of these

This approach has been stipulated by two factors: aspiration to build the best representative training set and scarcity of information.

As A Result significant part of observing which were presented in the course of training have described a behavior of issues with a large term before maturity. Intermediate term before maturity of used data testing to facts was rendered equal 208 days, but behavior of short-term GKO (terms to maturity was less than 90 days) have described only 10,5% observations. Also , it is necessary to note that significant part of t training facts was come for a period of financial convulsions, when market was characterized by low meaning of absolute gains of closing prices and their high volatile

Optimum condition of trained network was achieved in 1,5 hours after the beginning of neural- net learning. The following further learning under the variation of educating parameters have lead only to worsening a quality models : mistake on the educated set was shortened, extremely small, but a number of the «bad» forecasts for the test set have been increased. At the same time the tax have been not taken into account .

Built model was used for forecasting of the absolute growth GKO closing -prices on the result of trade session from March 6 till 26 march 1998 - given for these days when educating training were not presented. On the base of received test-forecasts has been tested of hypothetical methodology of neural -portfolio strategy . All GKO transactions have been led by taken into account of the closing -price , it's commission and tax , have not been used.

Neural Model Portfolio's instruments have been re- selected due to the results of each trade session

Every time the new Portfolio's selection has included the three of the most attractive GKO instruments in accordance with the received forecasts of the growths of GKO - prices rate follows trade session .In case , when in accordance of neural forecasts have been anticipated decreasing the closing prices of the whole GKO instruments , financial means have been eliminated from the Portfolio (given portfolio has included 100% pure money)

The used Neural network - methodology has provided the effective GKO gain-

124.27% per year (a comparative simple GKO market's yield - 82.68%/per year).
Market Index , accounted as a multiplication of average -arithmetic rate
of growth on the all accessible dynamic rows , during the period
of the portfolio's management has been provided only 35.04% effective yield /per year
or 30.30%/ per year by the equation of the simple rate of bond's evaluation
For the estimation of quality of Neural Portfolio Model it possible to use
of the aggregate of double-measuring f statistical regression analyze . In given case ,
by considering the forecast as a functional factor and the actual growth of the GKO closing- prices as a result.

The criteria of the quality of the prediction it possible account the level of importunes of regressions with the condition of positive correlation coefficient.

In essence , if these conditions fulfilled , thus neural net predicts the GKO-closing prices with exactness to homogeneous lineal interpolation

That meant , it should adequately determinate of the relative potential of the growth Portfolio's instruments .

Let's assume, that quality of the prediction is" good" under 1% level of meaning of regression coefficient and normal under 10% -level of the regression coefficient meaning
Due these , for the term of the 3 trade session have been received a good predictions, for the 5 - normal predictions and for the 3 - bed , it confirms the good quality of the Prediction's Model . That interesting that , all three series of the bed forecasts has been given by Neural net for the falling down Market . In this case , Neural net was very sensitive .
It so effective and truly has determinate the trend of the movement of price index
One of the error was easy described by the turbulence of weekly trading cycle
due to the disorder of Russian market calendar by the March 8- t.he Celebration of the .International Women Day in Russia .

Tab 5 .The Estimating of the Forecast's Quality GKO-OFZ PORTFOLIO

Trade	Basis growth		Chain growth		Forecast and fact relationship parameters					forecast	system
date	portfolio	index	portfolio	index	r	b	a	p(b)	p(a)	quality	error
5 Mar 98	100,00%	100,00%	-	-	-	-	-	-	-	-	-
6 Mar 98	100,30%	100,03%	100,30%	100,03%	0,340	0,289	0,083	0,066	0,180	normal	no
10 Mar 98	100,30%	99,99%	100,00%	99,97%	-0,203	-0,263	-0,308	0,265	0,220	bad	-
12 Mar 98	101,23%	100,85%	100,92%	100,86%	0,311	0,707	0,698	0,083	0,000	normal	yes
13 Mar 98	101,94%	101,08%	100,71%	100,22%	0,859	0,715	0,503	0,000	0,000	good	yes
16 Mar 98	101,94%	100,81%	100,00%	99,73%	0,343	0,474	0,227	0,059	0,361	normal	no
17 Mar 98	101,89%	100,66%	99,95%	99,85%	-0,186	-0,040	-0,174	0,308	0,003	bad	-
19 Mar 98	102,61%	101,09%	100,71%	100,43%	0,310	1,183	0,292	0,084	0,002	normal	yes
20 Mar 98	103,29%	101,37%	100,67%	100,28%	0,548	0,372	0,401	0,001	0,000	good	yes
23 Mar 98	103,29%	100,99%	100,00%	99,62%	0,066	0,130	-0,209	0,729	0,556	bad	-
24 Mar 98	103,85%	101,15%	100,54%	100,16%	0,517	2,685	0,605	0,011	0,003	good	yes
26 Mar 98	104,76%	101,74%	100,87%	100,59%	0,356	0,649	0,494	0,104	0,000	normal	yes
Average for all forecasts			100,42%	100,16%	0,296	0,627	0,237	0,155	0,120	-	-
For normal and good			100,58%	100,30%	0,378	0,782	0,348	0,080	0,061	-	yes
Regression for all forecasts			-	-	0,337	0,528	0,585	0,000	0,000	good	yes
Effective yield			124,27%	35,04%							
Simple yield			82,68%	30,30%							

TEST-1. MGU ESIT // Neural Test of the portfolio for the GKO -OFZ YIELD

In six cases from the eight an normal series prognoses was has been assumed the systematic error . The mean of error is well defined for the underestimation of rates of the growth of volume market operations .This fact underlined by the positive dimension of the liberty segment (term). This cased by specific of the training set formed on the information base data's falling down market and last Russian crisis

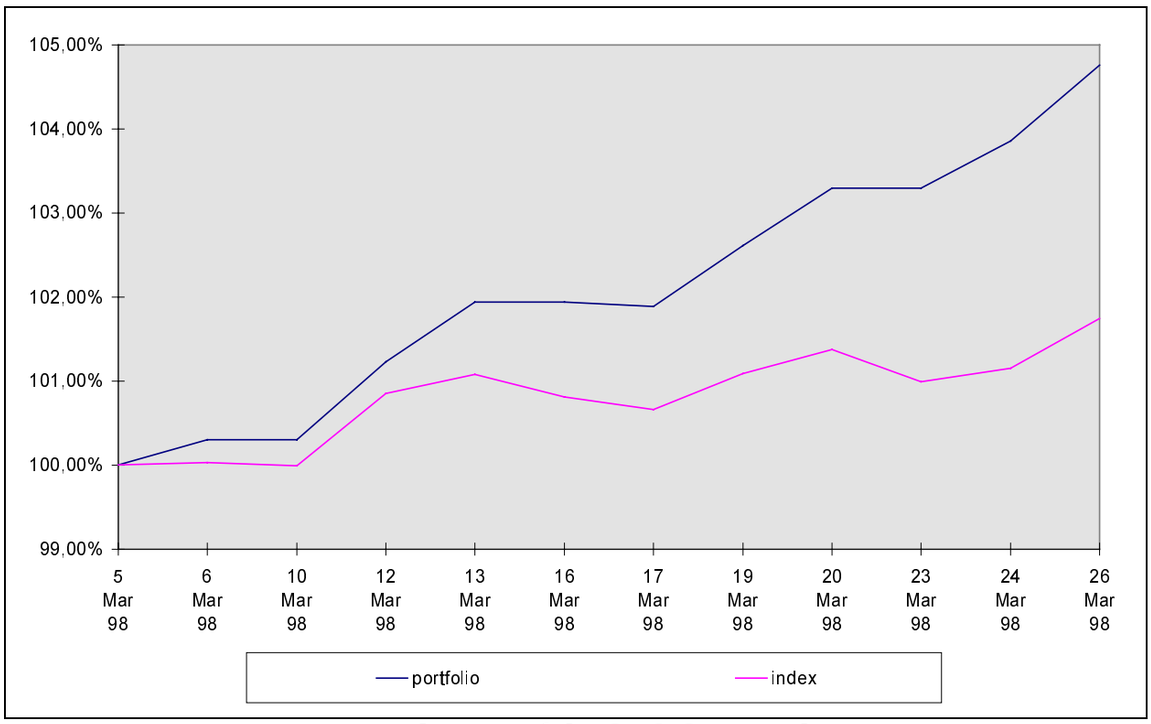


Fig. 4 **The Test of the GKO OFZ Market**

There is no doubt that , in practice , market management should be a little different.

Some part of the extra- profit should has been lost due to the objective different reasons : such as market turbulence and transaction's expenditures and impossibility of trading on a closing -rate .Despite of this, Neural testing results have been confirmed the perspective of the future using neural network for the forecast of GKO -pricing rates .

Practicable reserves of improvement of reliability of the forecasts have been included in the follows :

- accounting of signals outside environment , in particularly, of the changing of parameter's of neighboring market's segments (such as FOREX , RTS , International Bank Stocks Exhange) ;
- accurate selection of technical indicators , used the information about the trading volume more corrective construction of the training neural -set matrix constructed , based on the produced information about all turnover of GKO issues
- Training and testing of neural net under different variants of architecture and parameter's of GKO segments market , also the using for the prediction of average means of output the several neural models ;
- using the neural net for the forecasting of market indicators of different level of evaluation . For example , for the prediction indexes of segments GKO-market and the closing price rate for the each exacting issue .Under this "exit - net" of high level has been directed at the input "entrance-net" of low level (in particularly , the prediction of Index of segment)

Tab 5 .The Estimating of the Forecasts's Quality

Trade	Basis growth		Chain growth		Forecast and fact relationship parameters					forecast	system
date	portfolio	index	portfolio	index	r	b	a	p(b)	p(a)	quality	error
5 Mar 98	100,00%	100,00%	-	-	-	-	-	-	-	-	-
6 Mar 98	100,30%	100,03%	100,30%	100,03%	0,340	0,289	0,083	0,066	0,180	normal	no
10 Mar 98	100,30%	99,99%	100,00%	99,97%	-0,203	-0,263	-0,308	0,265	0,220	bad	-
12 Mar 98	101,23%	100,85%	100,92%	100,86%	0,311	0,707	0,698	0,083	0,000	normal	yes
13 Mar 98	101,94%	101,08%	100,71%	100,22%	0,859	0,715	0,503	0,000	0,000	good	yes
16 Mar 98	101,94%	100,81%	100,00%	99,73%	0,343	0,474	0,227	0,059	0,361	normal	no
17 Mar 98	101,89%	100,66%	99,95%	99,85%	-0,186	-0,040	-0,174	0,308	0,003	bad	-
19 Mar 98	102,61%	101,09%	100,71%	100,43%	0,310	1,183	0,292	0,084	0,002	normal	yes
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Effective yield			124,27%	35,04%							
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MGU ESIT // Neural Test of the portfolio for the GKO -OFZ YIELD

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Another specific of using observation under training of neural Portfolio's model *is high volatility of the market* . It has been reflected in the less mean of regression coefficient è -amplitude of the forecasts has been more exceed the actual changes . While this volatile of the regression line of proportion with the unit tangent of corner of incline , could be caused. Also , it's could not be considered as a bed pattern of Neural net Portfolio's Model . Moreover , the correction 's algorithms of systematic mistakes could be estimated by a-priory

Underlining the analysis of management risks of the investors Portfolios at the Russian Secondary Market we could notify follows :

First, during spring rally managing buy testing of the neural portfolio's model, the growth of Index rate does not been more than Neural Portfolio's rate of return during short tracks period .

CONCLUSION

In an effort to prevent investor's interests for the future managing of Portfolio's risks we in briefly , described the key elements of Western Portfolio's Theories which have been implemented for the Russian Secondary Market.

The Modern Russian Stock market first of all its secondary markets in Moscow and St.Petersburg have not fully matured to be able to be compared to classical model and techniques.

Several conclusions are clear:

First . Models of the prices forecasting of financial instruments needs to be more fully developed.

.Second, a model of checking the investment risks must be refined. Third, better approaches to develop of more complete data must be investigated via neural computing techniques . Fourth , other financial mathematical techniques such as " fuzzy logic " must be further explored.

Arguing to the benefit of the practical implementation of the Neural Net Portfolio's Models we could outline the futures complexes of methodological investigations which should includes the follows **Research Modules:**

1 Module of price forecasting of financial instruments

2.Module of checking the investment risks

3. Module to generations of controlling vectors (revision and decryption recommended by Target transactions deals) in conditions "financial friction"

1 Module of price forecasting of financial instruments

In the course of modern financial instrument development must be used the most efficient modern methods of "data mining " from accumulated information arrays .

The most perspective of the Neural Net

Investment Decision Portfolio Net is based on advanced neural network technology that allows highly accurate predictions based on past experience. overcomes limitations common to conventional neural technologies with innovations that improve generalization, accuracy and reduce system training time. This ability to generalize is fundamental to successful data mining, particularly for the case of wide vector and sparse data problems common in database applications. Whereas other technologies will "over-train" to specific examples

Decision Net will discount examples at the possible expense of local accuracy for a better global solution. The result is a model with excellent predictive behavior and accuracy across the entire target data set.

Neural nets are best used for predicting a future outcome based on prior learned experience

II Module of Controlling Investment Risks

Neural Model of risks -testing is based on advanced neural network technology that allows highly accurate predictions based on past risk's -experience. Neural Module overcomes limitations common to conventional neural technologies with innovations that improve generalization, accuracy and reproducibility , and reduce system training time.

This ability to generalize is fundamental to successful data mining, particularly for the case of wide vector and sparse data problems common in database applications. Whereas other technologies will "over-train" to specific examples, Neural Test of Portfolio risks will discount examples at the possible expense of local accuracy for a better global solution. The result is a model with excellent predictive behavior and accuracy across the entire target data set.

Neural nets are best used for predicting a future outcome based on prior learned experience.

Potential neural net model applications are:

• **Risk analysis** - which prospective customers are a good credit risk?

• **Retail analysis** - what product is this customer likely to purchase?

- **Decision CL**

Clustering systems are best used for finding groups of items that are similar. The groups can be fixed in advanced (supervised clustering) or determined by the system (unsupervised clustering). Most traditional clustering systems use simple measures of difference such as Manhattan or Euclidean distance. Decision CL allows more sophisticated functions, including using Neural-Risks Model to predict whether two items are the same.

Potential clustering applications are:

• Direct mailing - find groups that exhibit a similar pattern of response

• Risk analysis - find groups that exhibit a similar pattern of payment history

Also it necessary to be oriented on the most of the effective methodologies of risks management which developed by Russian financial analysts - of Russian Central Bank, Alfa bank . In prticularly , the methodology of the Alpha Bank of percentages (%) risks GKO managing

- **Generation Module of the managing vectors - the research and decoding of the** Target transactions in the conditions financial friction at the Secondary Market

The Generation Module of the managing vectors should be estimate the financial friction due to the strong fiscal loses, such as (fiscal transactions with the changing of Tax legislation and changing mechanism of regulation market

The Generation of the Module should have been oriented on the specific of the Russian financial Market and Russian still semi- regulated structure of financial market.

Most of important methodological approach to Generation Module - is mathematical support of the flexible parameters of financial and fiscal instruments .

which will help to realize different financial schemes such as offshor's portfolio management with different legislation's conditions and different dialers .

On the other hand , this Module help to adopted to different changes of institutional structure of Russian financial market which have general impacts on the transactions investors.

Such formal portfolio management system does not pretend on the hypothetical Model of financial "perpetual mobile". Actually it have some theoretical and practical restrictions too .

Modern Russian Financial Market have been extremely evaluated and have been reach the economical maturity .These has been permitted to use the formal Western theoretical algorithm for themanaging of portfolio risks and to proceed the future fundamental research new systems **of** managing of the portfolio risks in Russian and Global financial Markets

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