Synthesis of Inter-Industrial Balance and Production Function as an Instrument of Regional Sustainable Development

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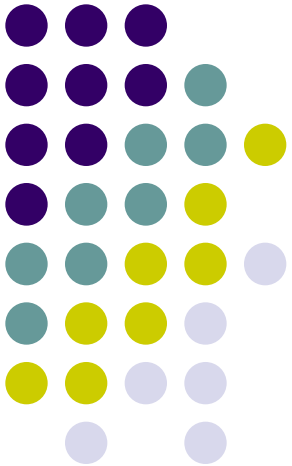
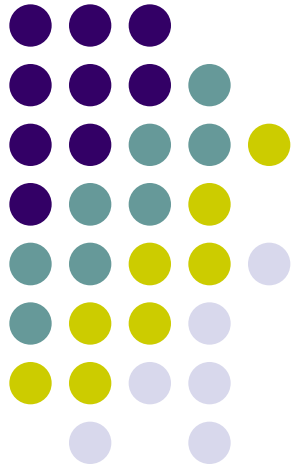
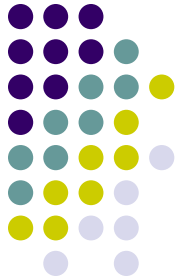


Profit, Riskness and Reliability – Three-Dimensional Base for Investment Decisions Management



Multi-criteria Valuation of Investment Possibilities

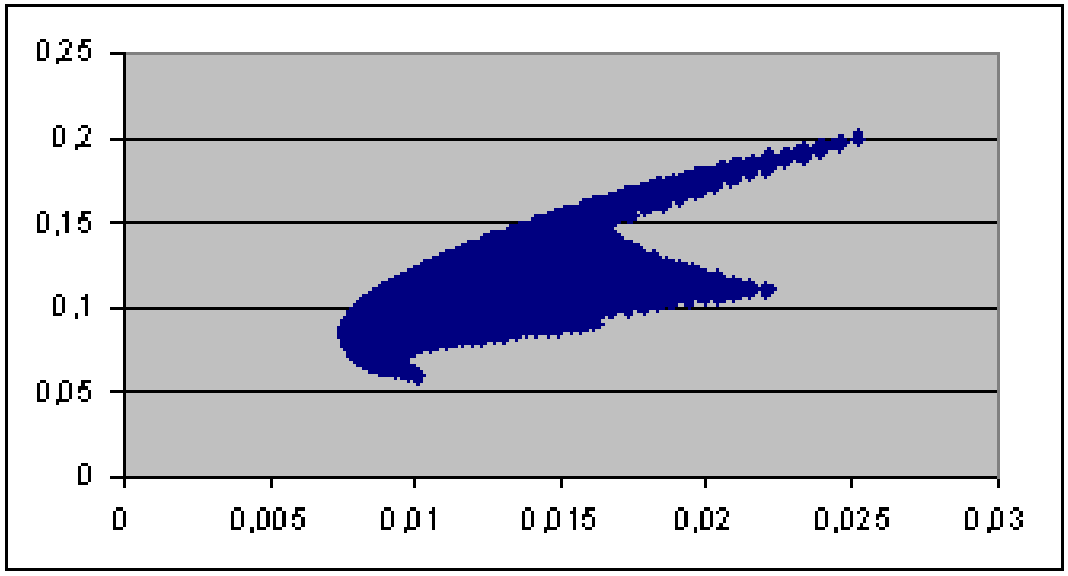


- Even though in perception of investment decisions possible outcomes a high pragmatism is present, here a need for possibilities' multicriteria valuation is formed, if the possibilities are measured in investment return.
- Here are the main attributes of non-unique conception of return possibility:
  - The size of return possibility;
  - The guarantee of possibility;
  - The extent of loss related to random realization of possibility.

- It is common to think that for quantitative description of investment possibilities it is always possible to invoke a certain probability distribution $P\{\xi<x\}$ of these possibilities, which makes assumptions also for quantitative description of the attributes mentioned above.

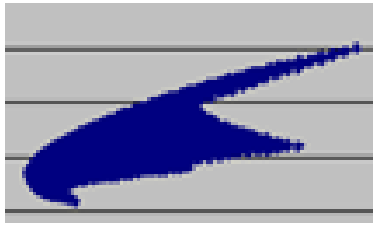
H. Markowitz Portfolio

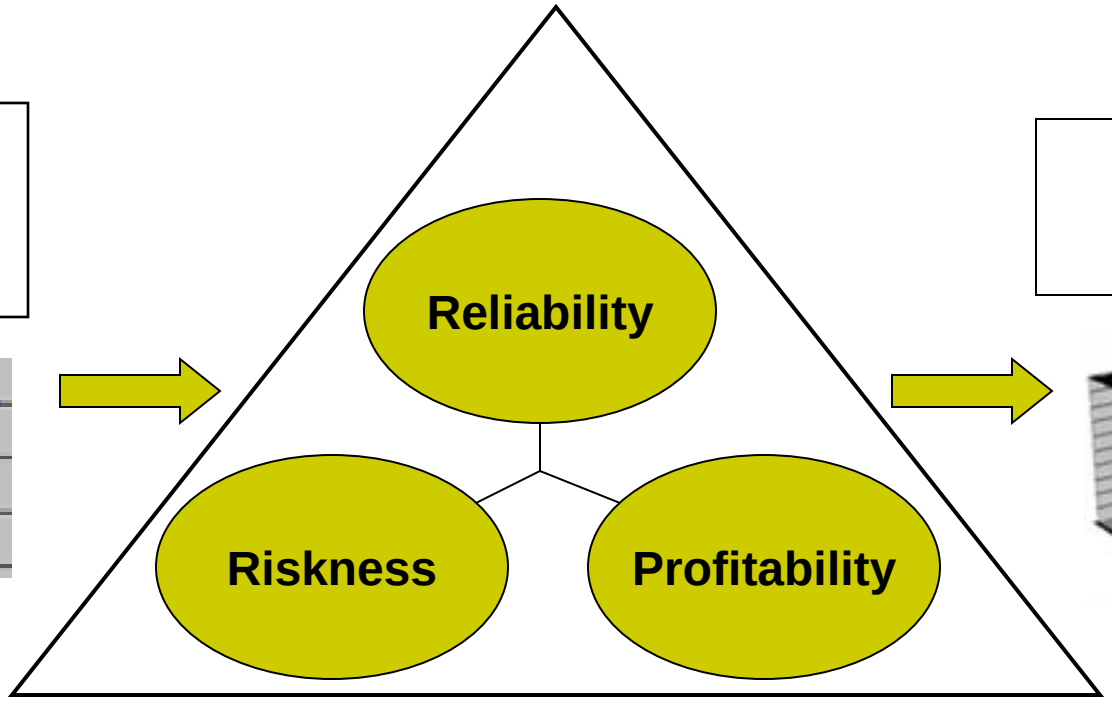
- Our selected investment decisions management means is investment portfolio, decision search logics of which in case of modern portfolio is presented below.



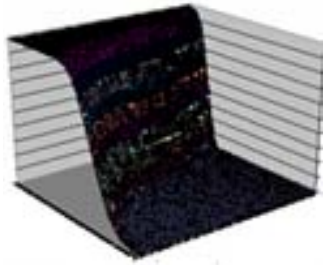
Transition to adequate portfolio

Modern (Markowitz) portfolio

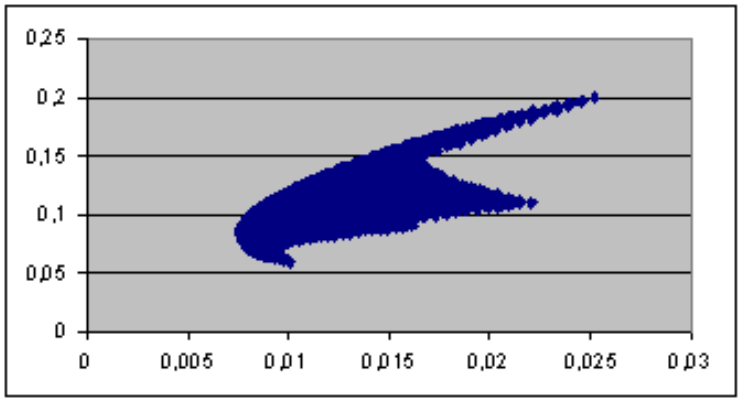




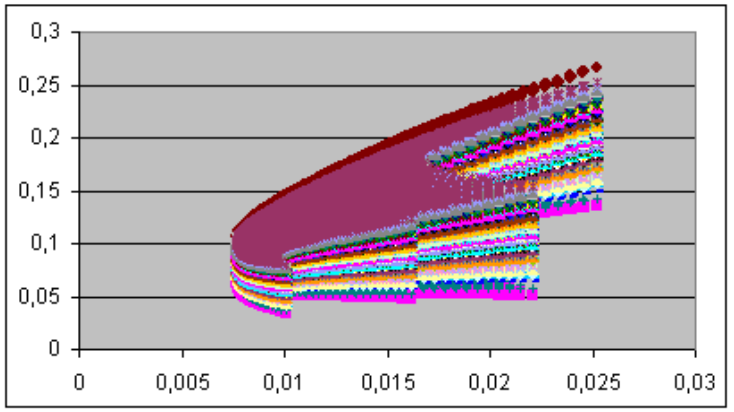
Adequate portfolio



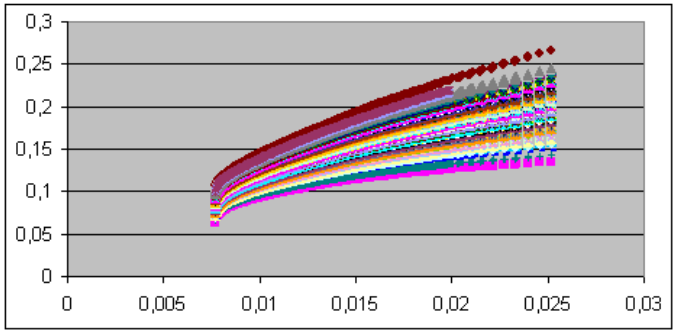
Formation of adequate portfolio



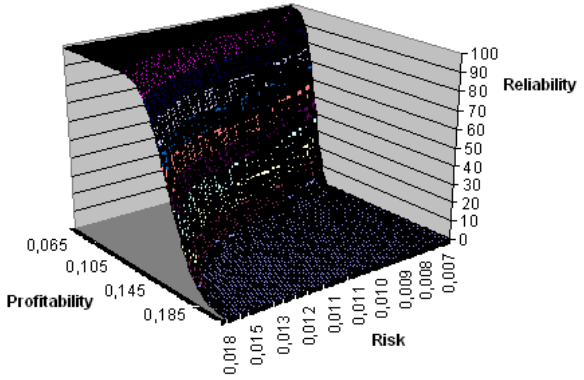
Markowitz or “mean-standard deviation” set of portfolios



Bunch of “quintiles – standard deviation” portfolios

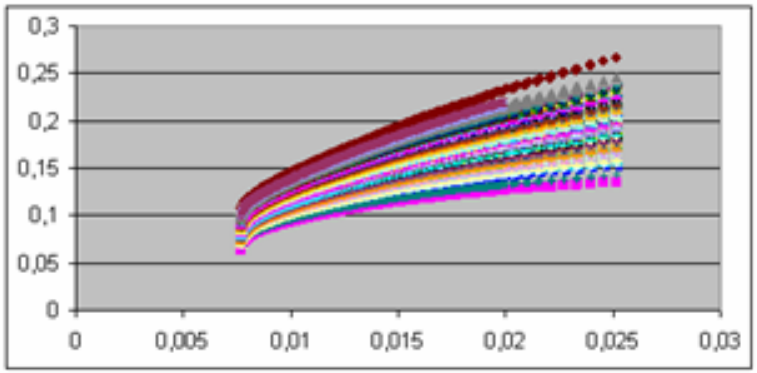


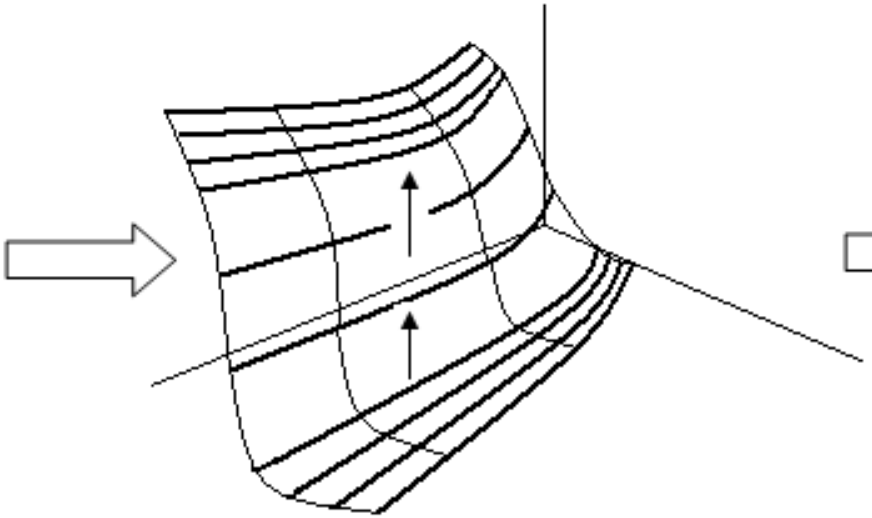
The confidence zone of adequate portfolio

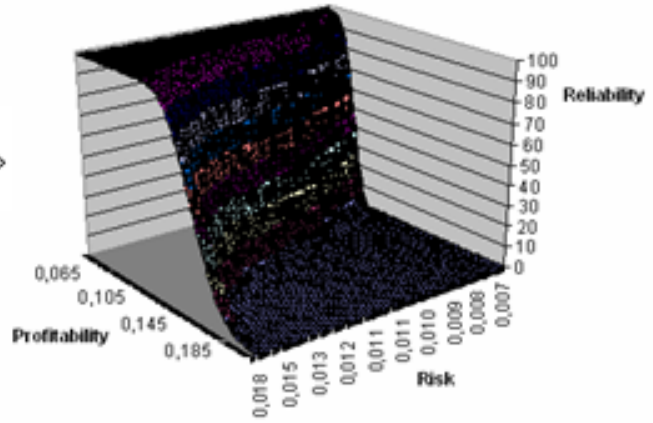


Three-dimensional view of the investment portfolio

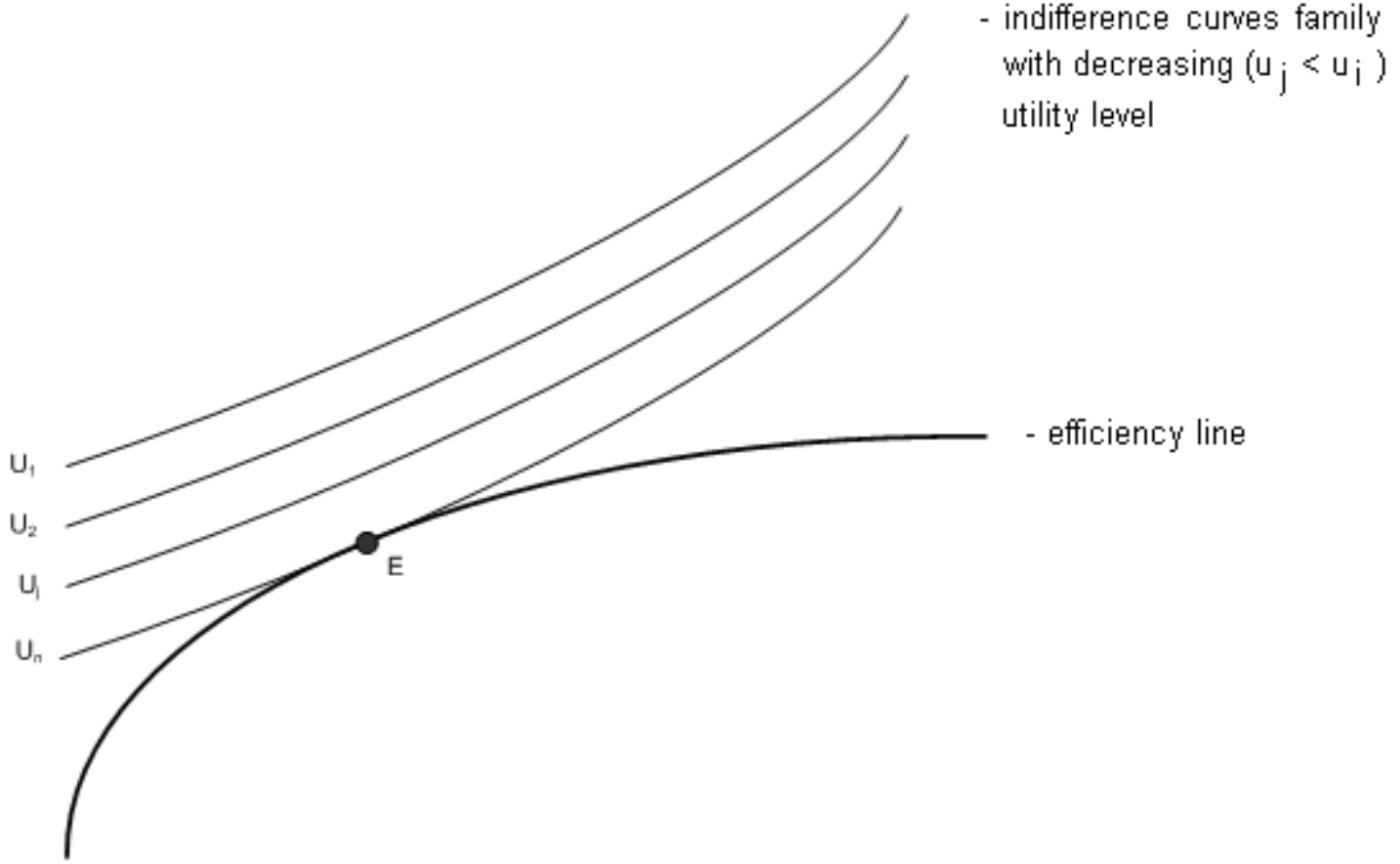
Formation of three-dimensional view



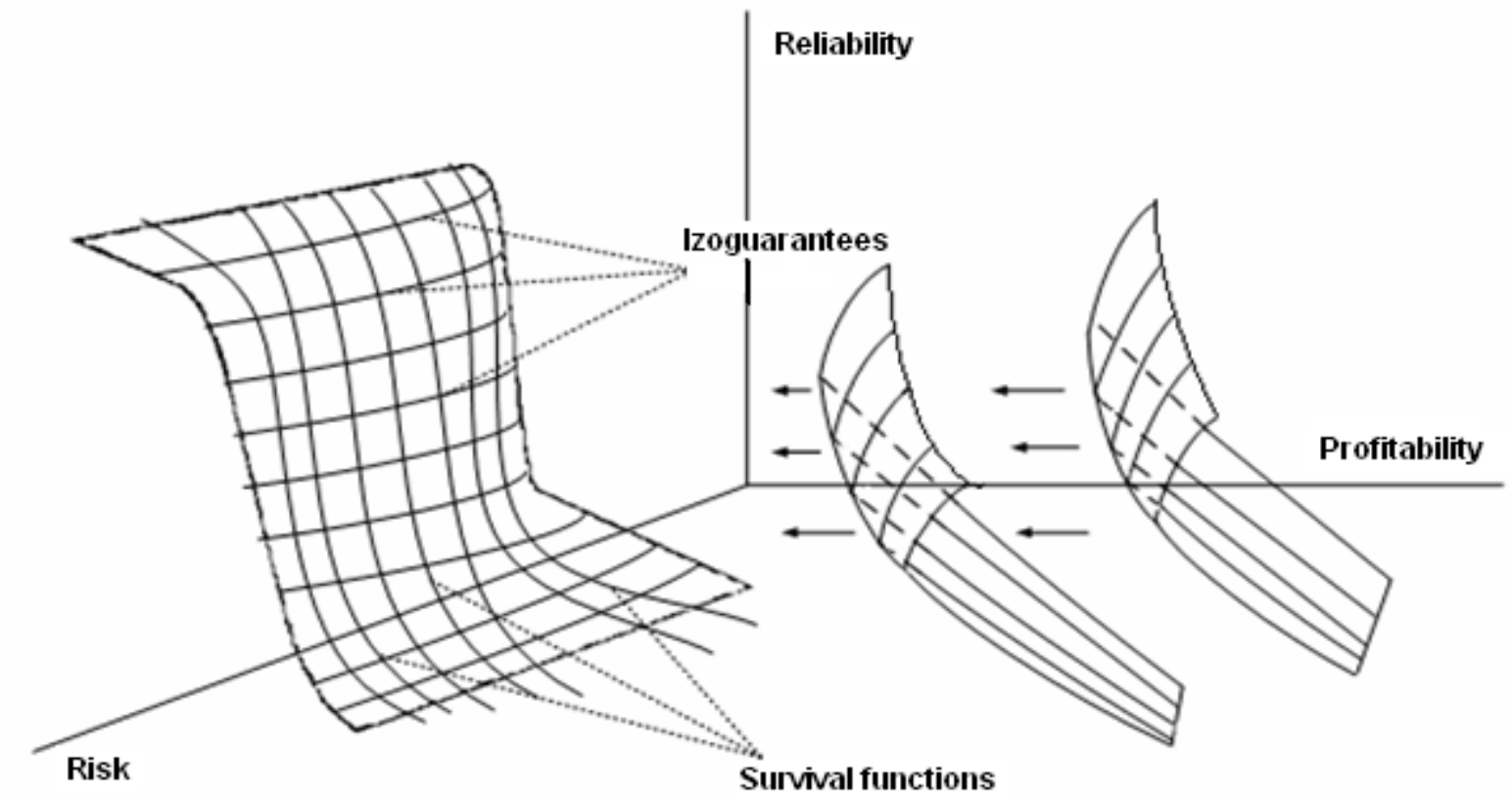




The intersection of indifference curve family and efficiency line



Possibilities set of invested portfolios and utility function of return, placed on profitability, risk and reliability system of axes



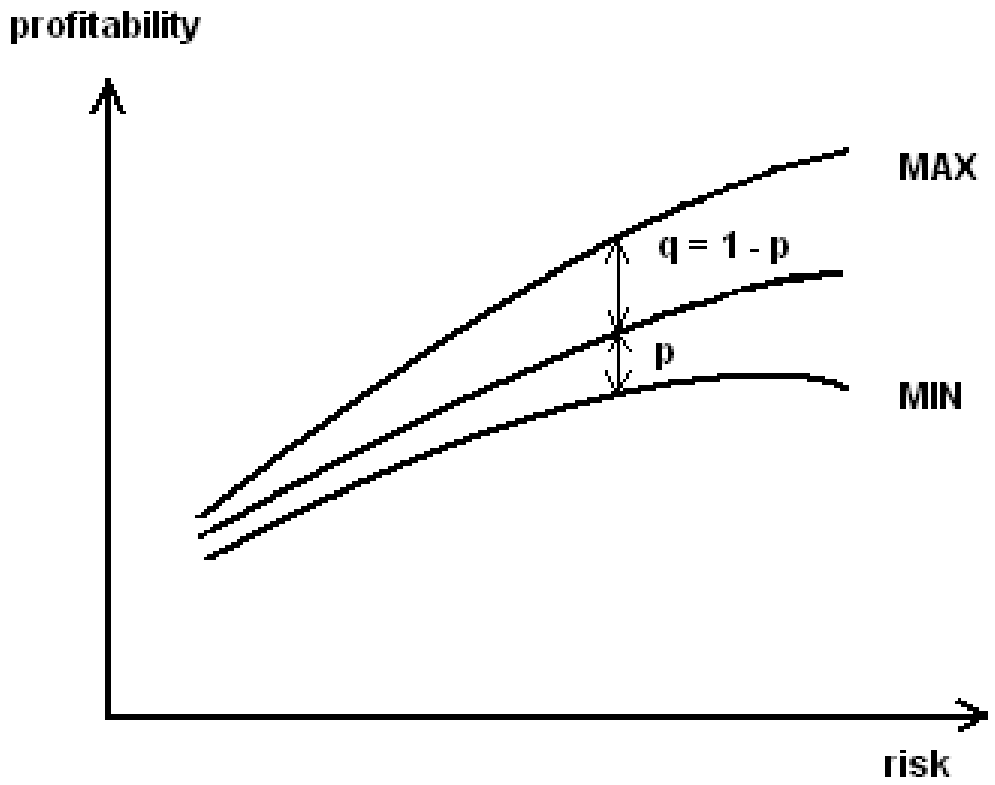
The concept of isoguarantee

- Isoguarantee of investment portfolio is a curve in “portfolio risk – portfolio profitability possibilities” surface, connecting possibility values of the same guarantee under changing risk level.
- In probability theory and mathematical statistics terminology, isoguarantee should indicate a line, connecting q-level quintiles

$$\xi_q^s : \left(P\left\{ \xi^s \geq \xi_q^s \right\} = q \right)$$

of the set of values ξ^s, when portfolio riskness (s – standard deviation) is changing (increasing).

The anatomy of isoguarantee



Conclusions and suggestions

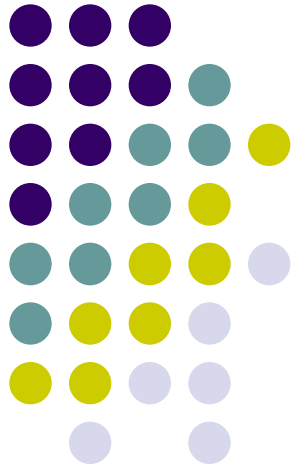
- Utility, riskness and reliability are three main attributes that ought to be used integrally when investment decision is under preparation.
- Adequate investment portfolio seems to be theoretically sound and practically effective instrument for investment decision making in global capital and exchange markets.
- Thus, in order to have an operative mean of such decision, that is necessary for the application of adequate portfolio for decision making, it falls to use imitative technologies, which are almost the only mean of information supply for the quick decision management process

P.S.

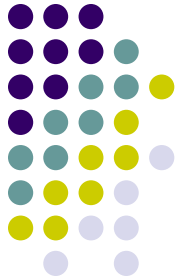
- New means and methods:
  - Isoguarantees;
  - Three-dimensional utility function;
  - Efficiency zone;
  - Expert systems;
  - Imitative technologies.

- Fields of application:
  - Portfolio decisions;
  - Integrated assets and liabilities management decisions;
  - Portfolio management;
  - Formation and management of portfolios of strategies.

Double Trump Model for Currency Market

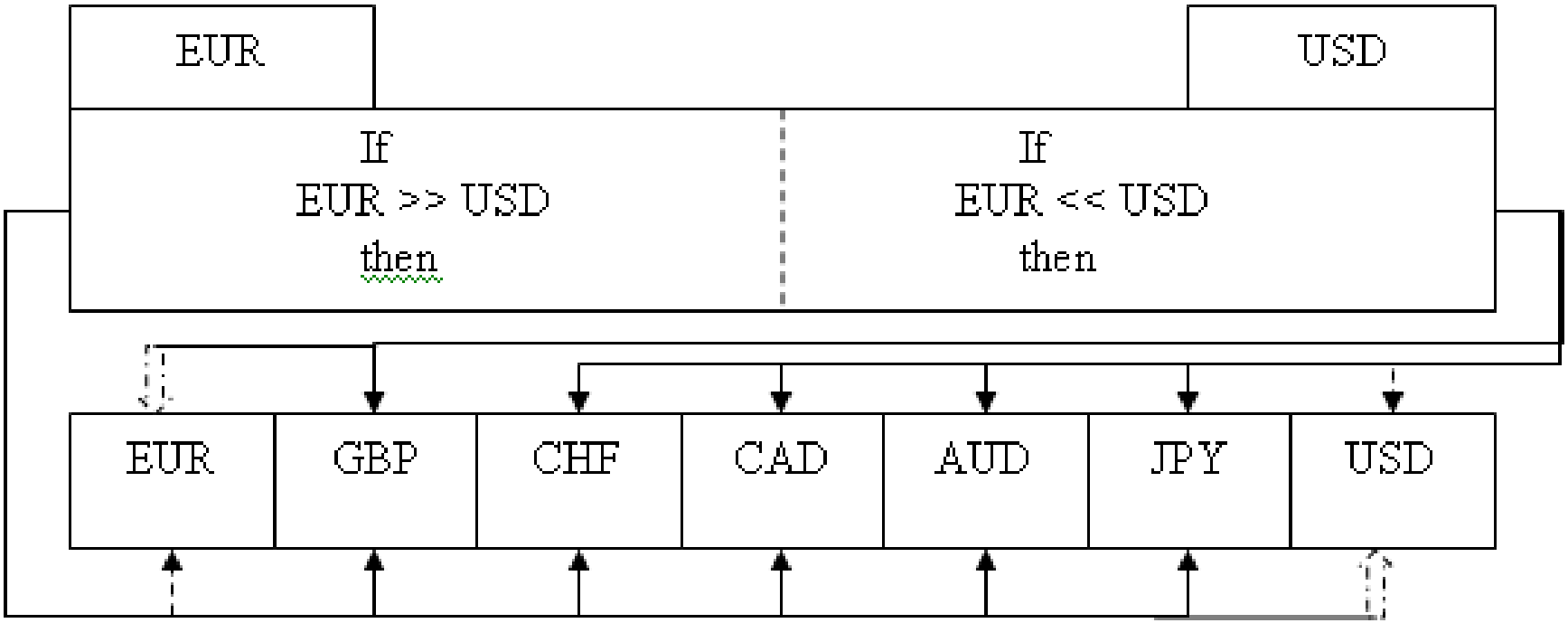


The main goal

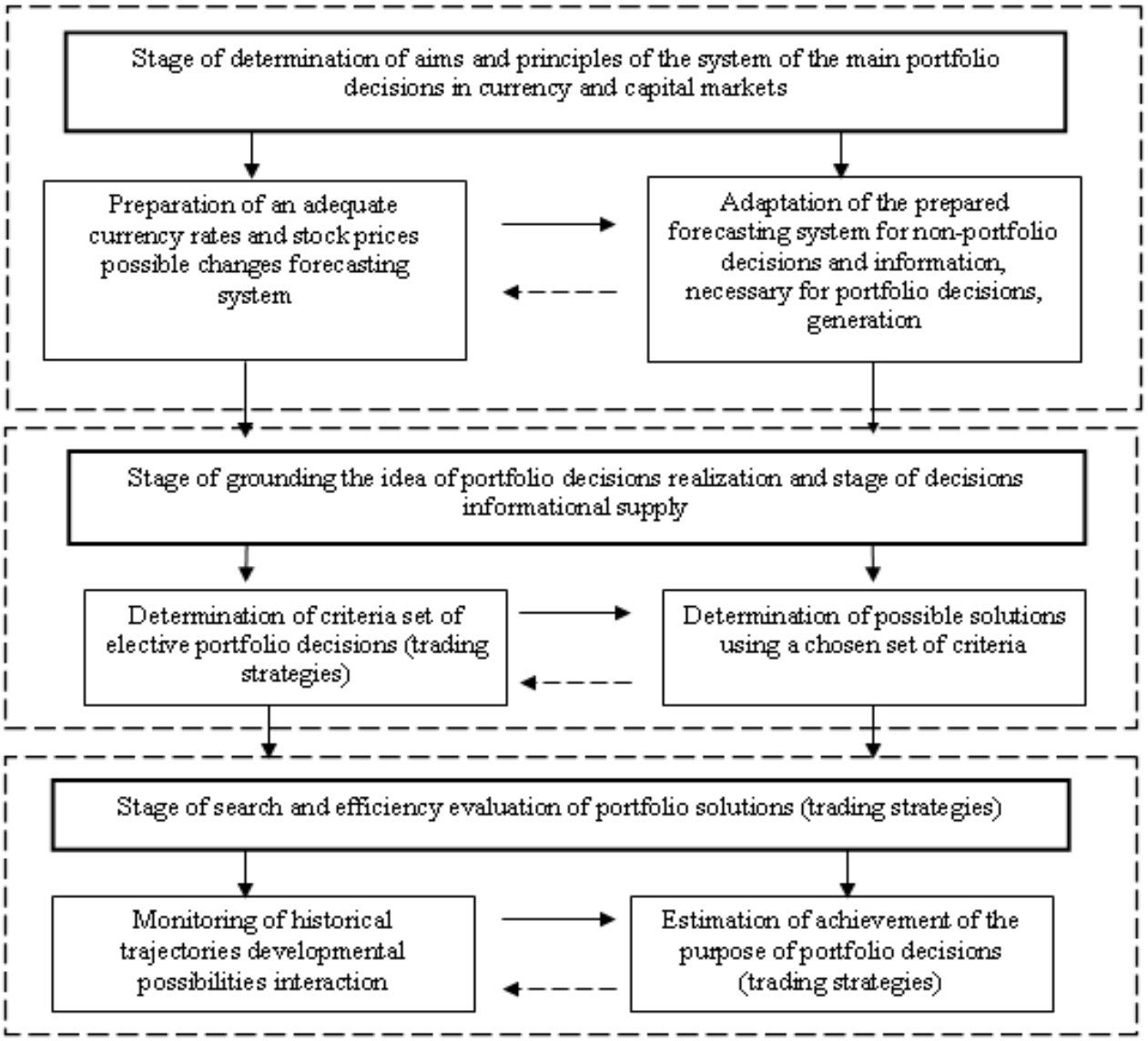


- To reveal the content of the so-called “double trump” decision management model in the global currency and stock exchange markets and to present the possibilities and results of its practical application.
- This model is developed on the basis of the earlier proposed model of adequate investment decision evaluation portfolio.
- The investigation was carried out using real FOREX and capital markets data for the period from 2007.01.01 – 2009.04.07.

Double trump portfolio decision management in currency market model



Scheme of portfolio solutions (trading strategies) and taken actions



Pseudo-scenario of investment portfolio management in FOREX market

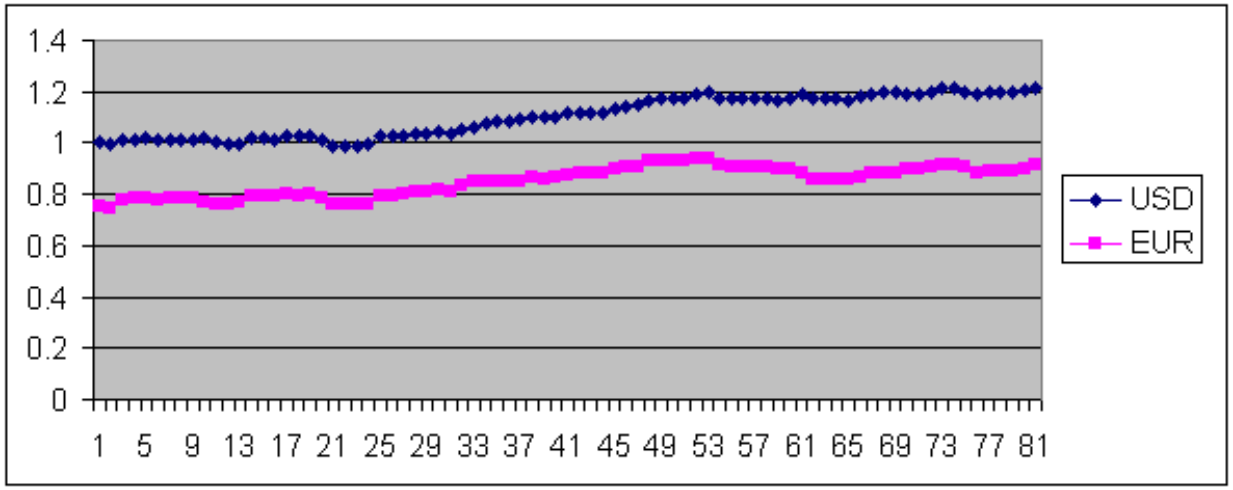
- Change of invested capital in USD and in EUR

Time period: 2008.12.07 – 2009.04.07

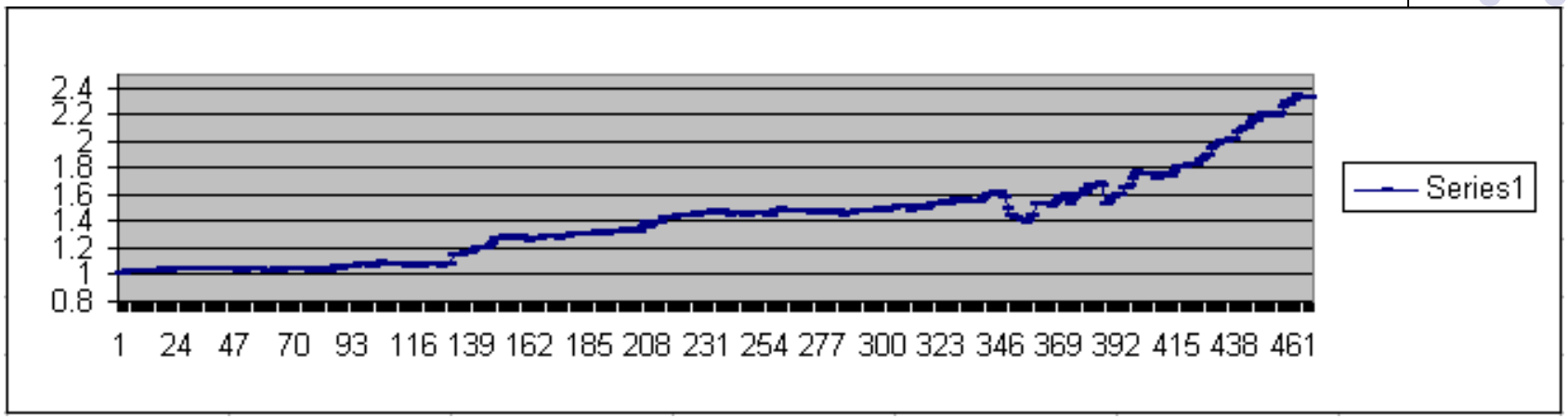
Trump pair of currencies: USD and EUR

Objective: to maximize the value of invested USD

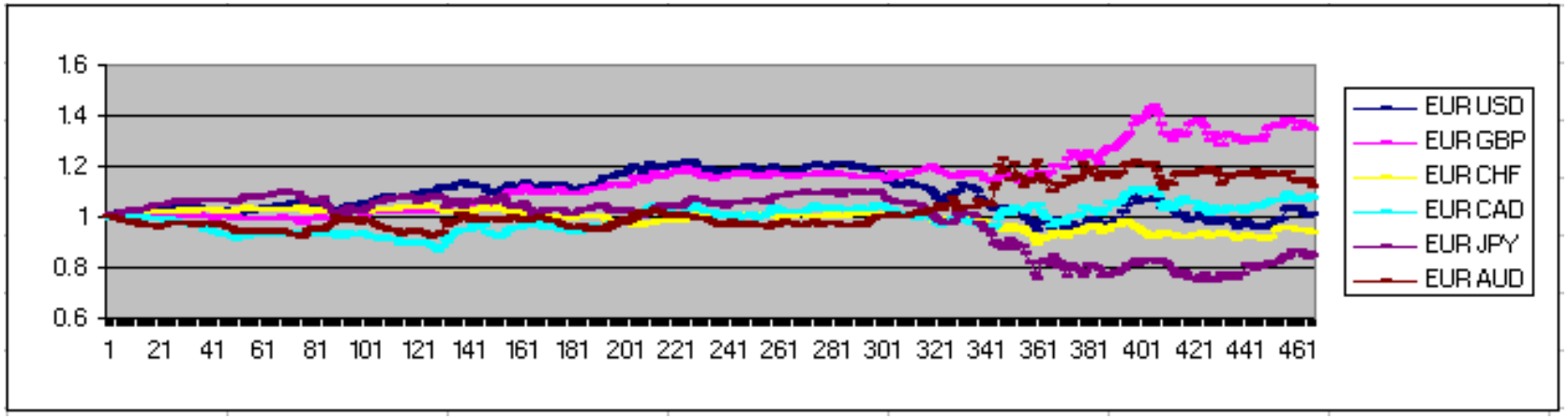
Currencies for diversification: EUR, GBP, CHF, CAD, AUD and JPY



Pseudo-scenario of investment portfolio management in FOREX market
Time period: 2007.01.02 iki 2009.05.09. EUR USD

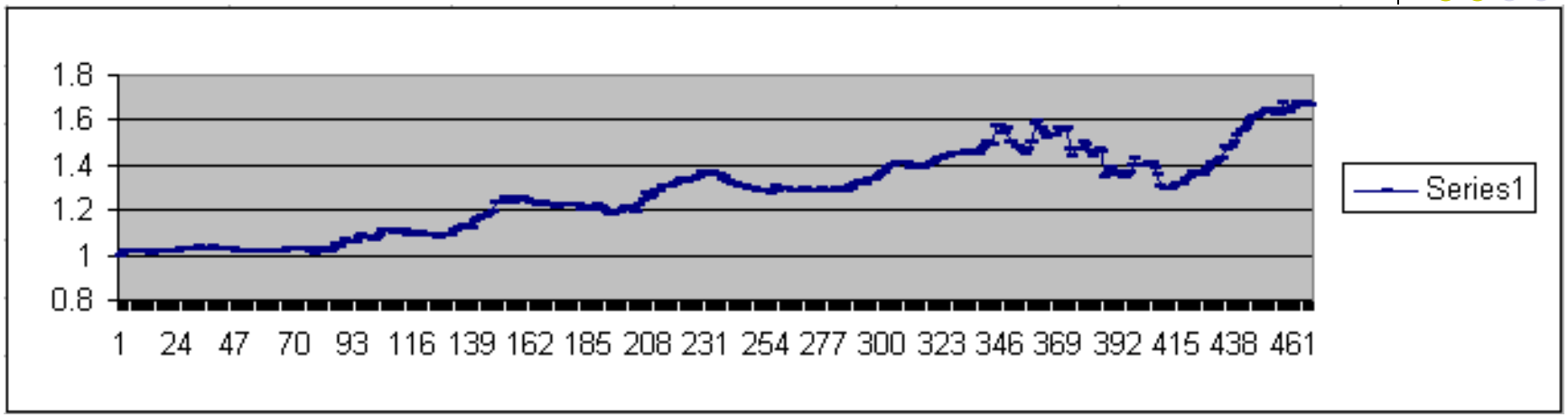


Growth of invested capital

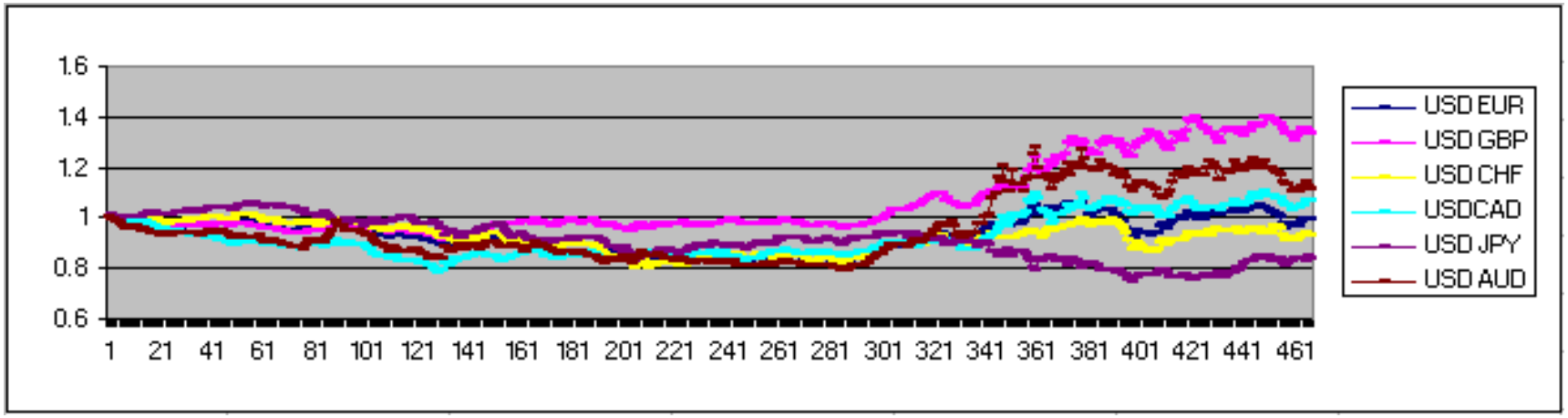


Growth of currency rates

USD EUR

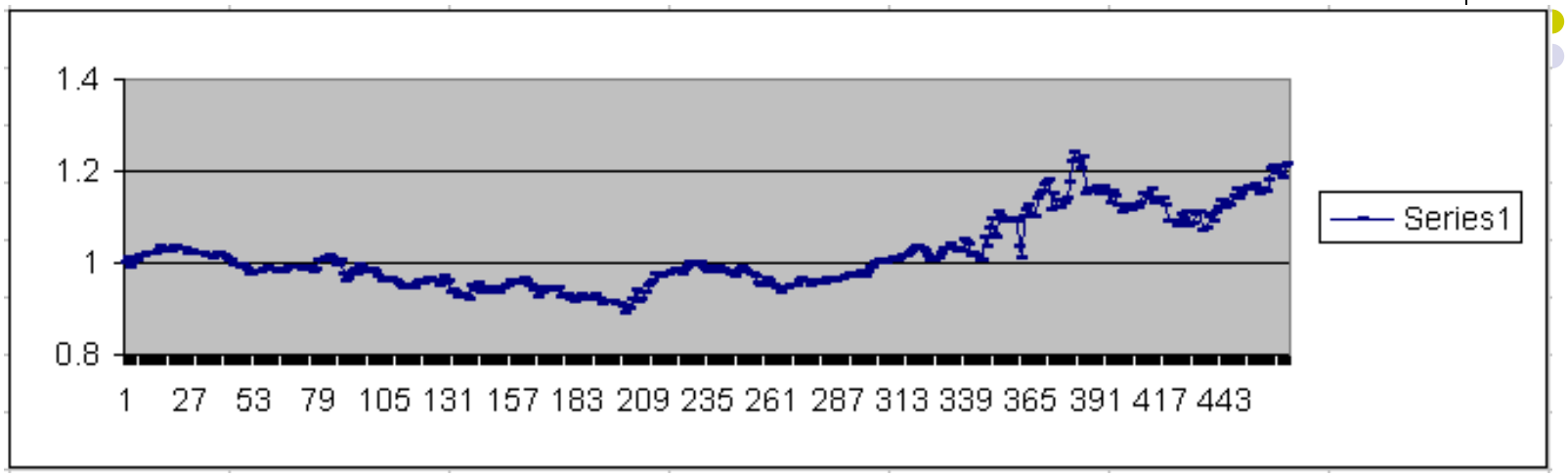


Growth of invested capital

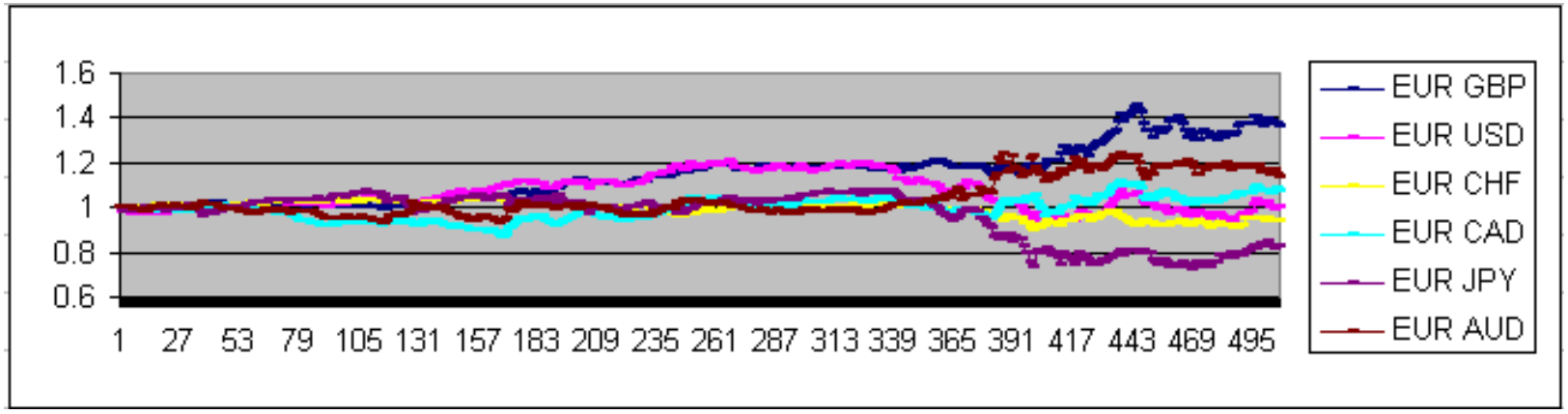


Growth of currency rates

EUR GBP

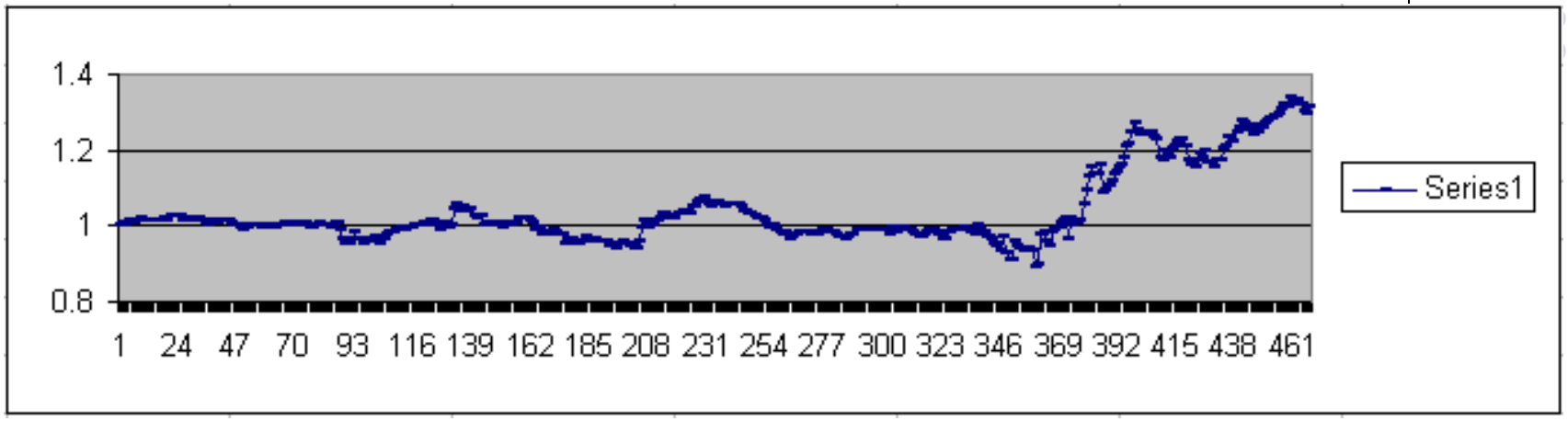


Growth of invested capital

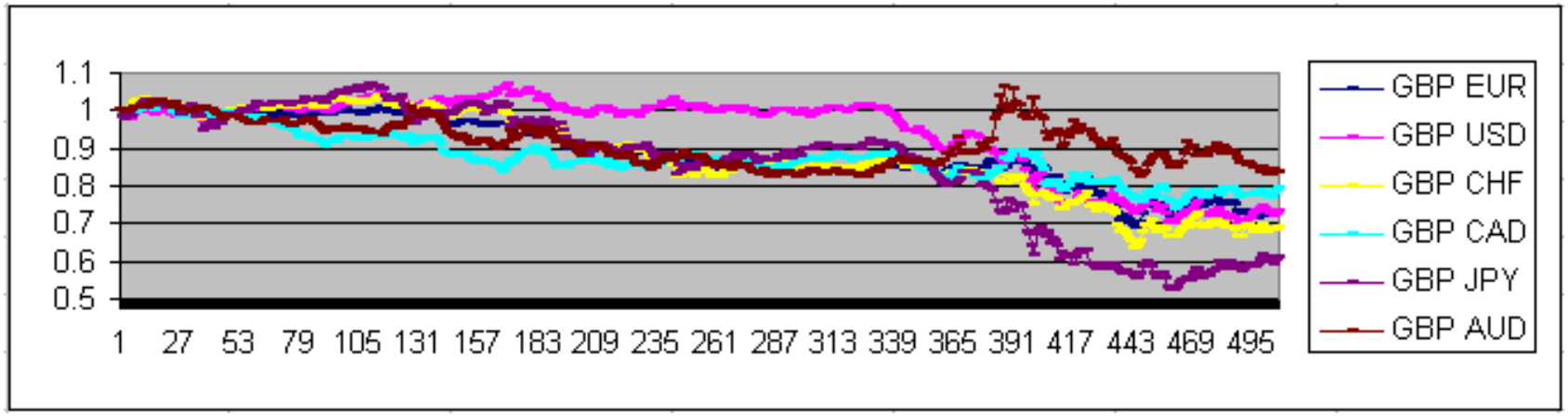


Growth of currency rates

GBP EUR

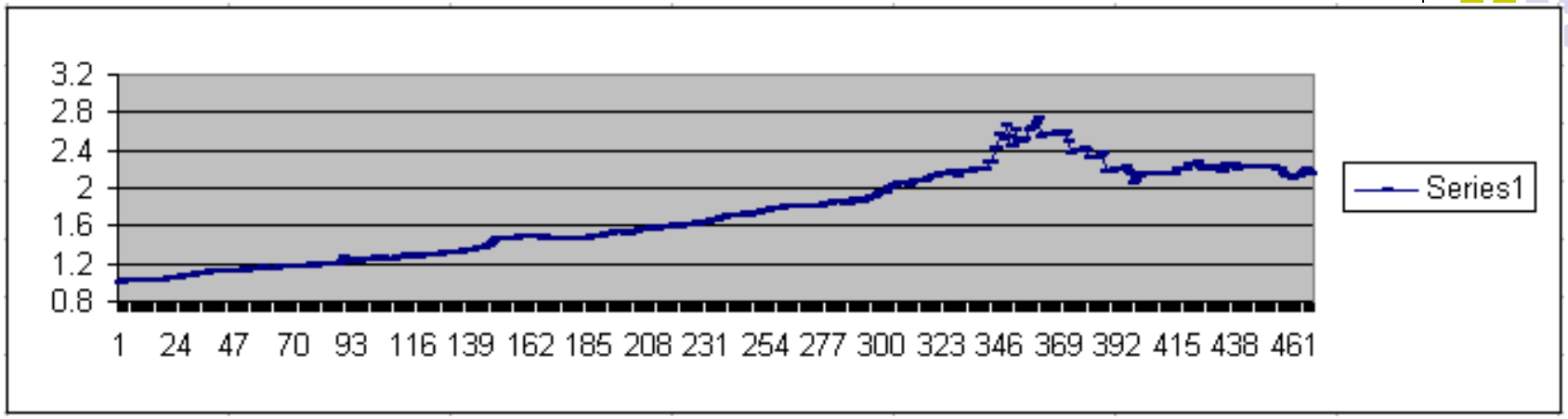


Growth of invested capital

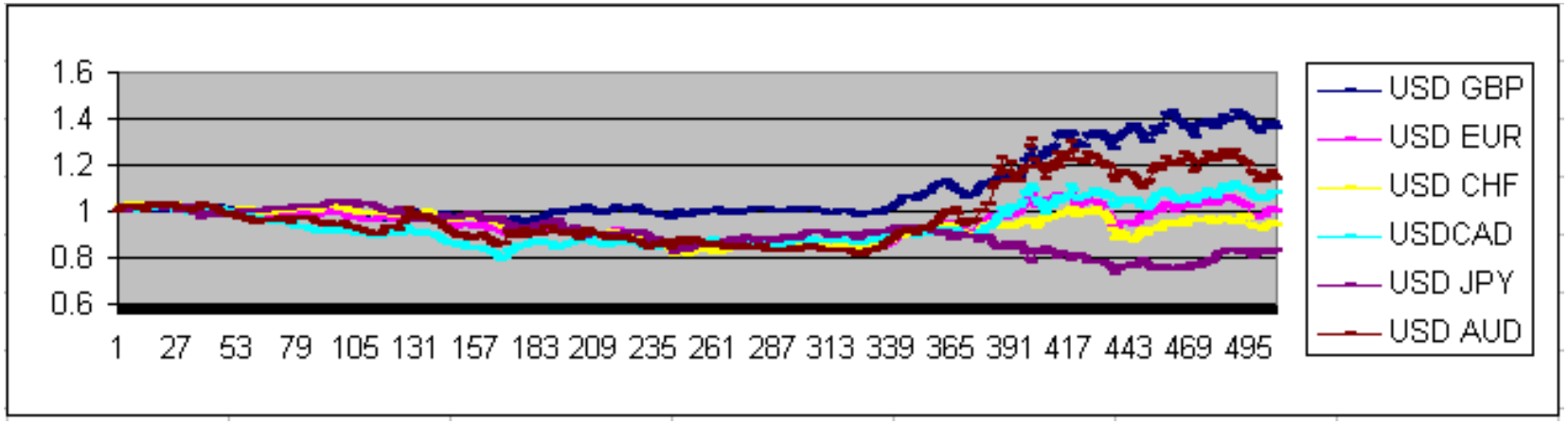


Growth of currency rates

USD GBP

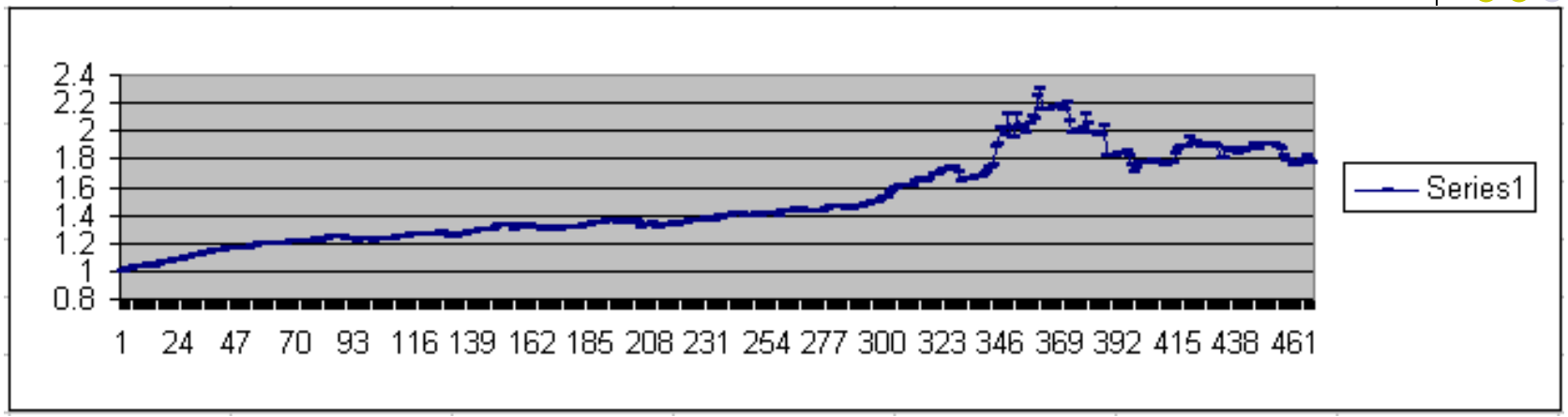


Growth of invested capital

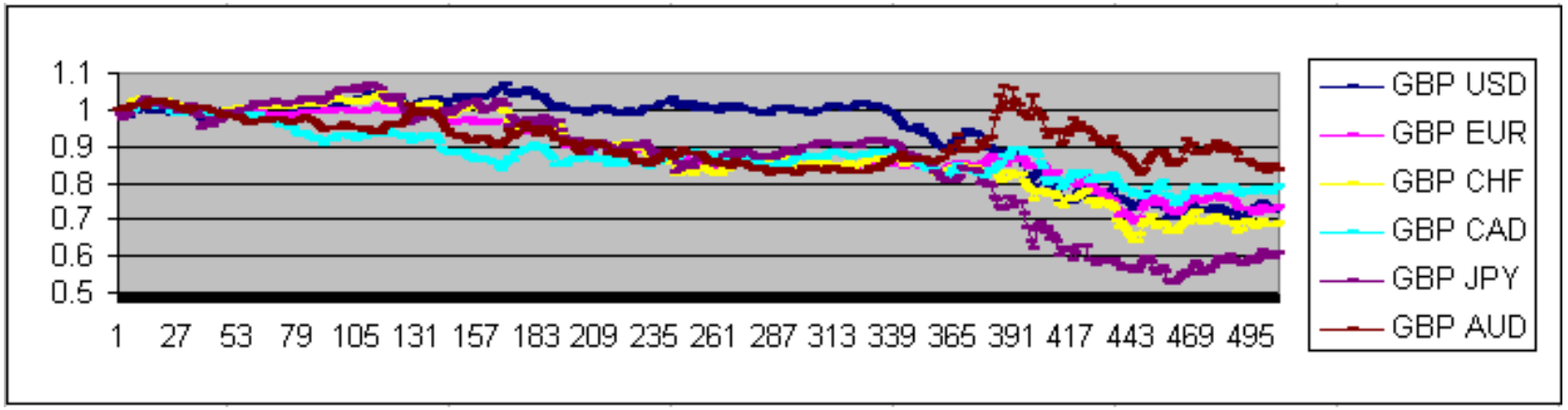


Growth of currency rates

GBP USD

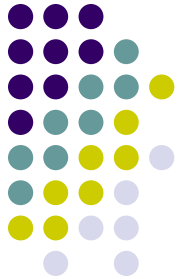


Growth of invested capital



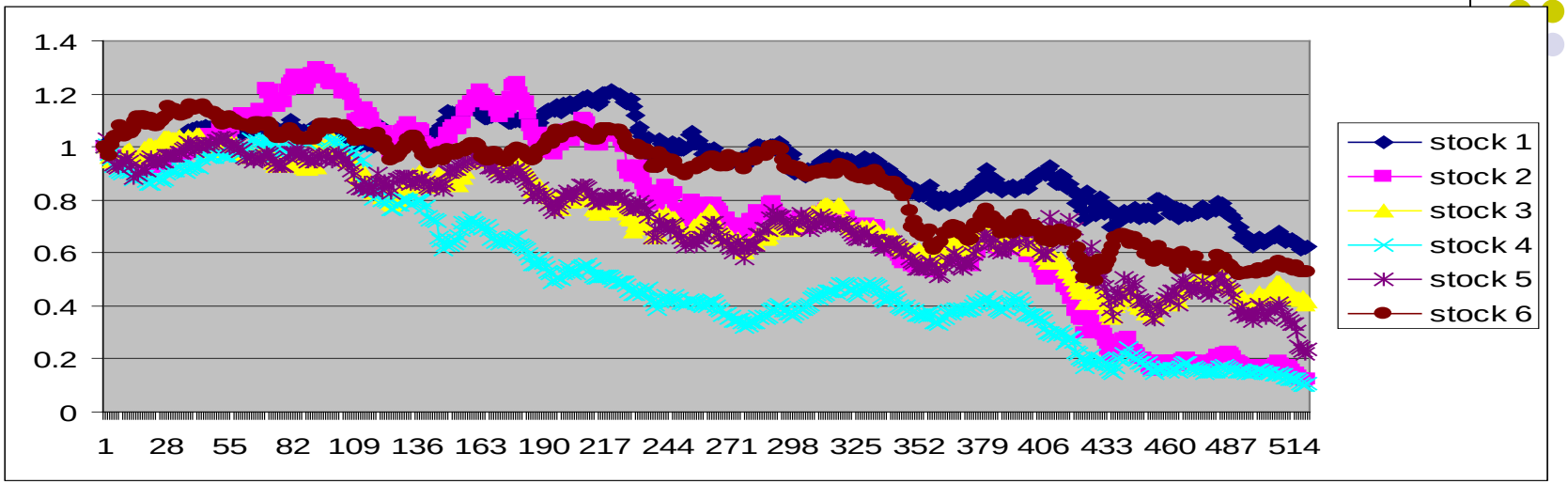
Growth of currency rates

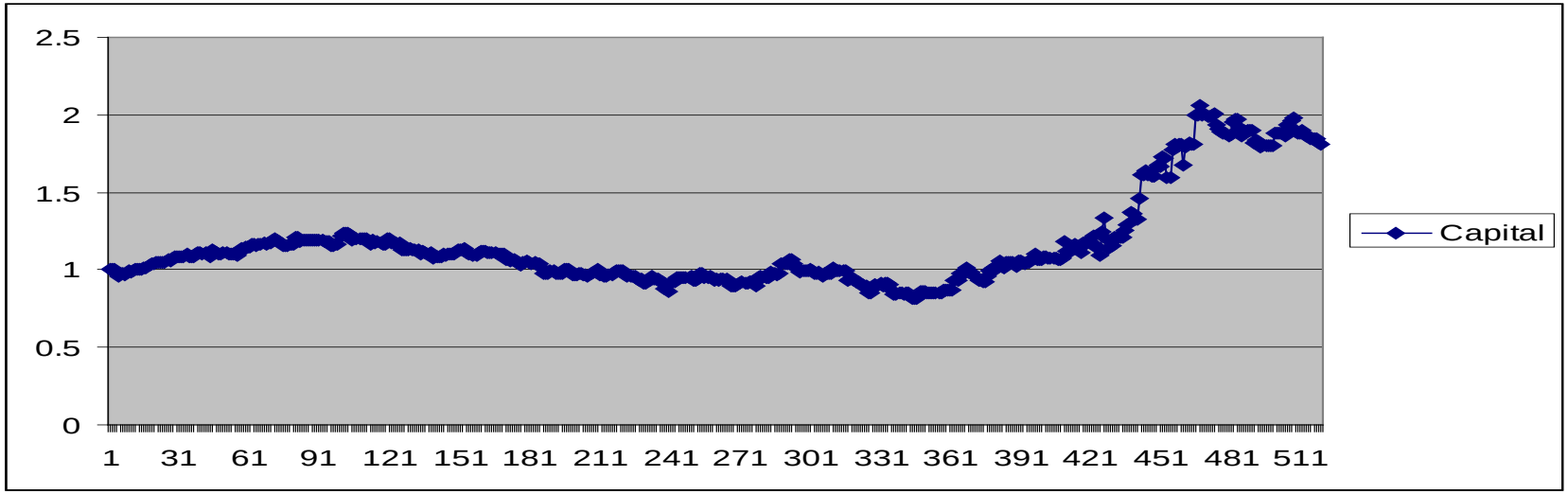
Evidence from Capital Markets



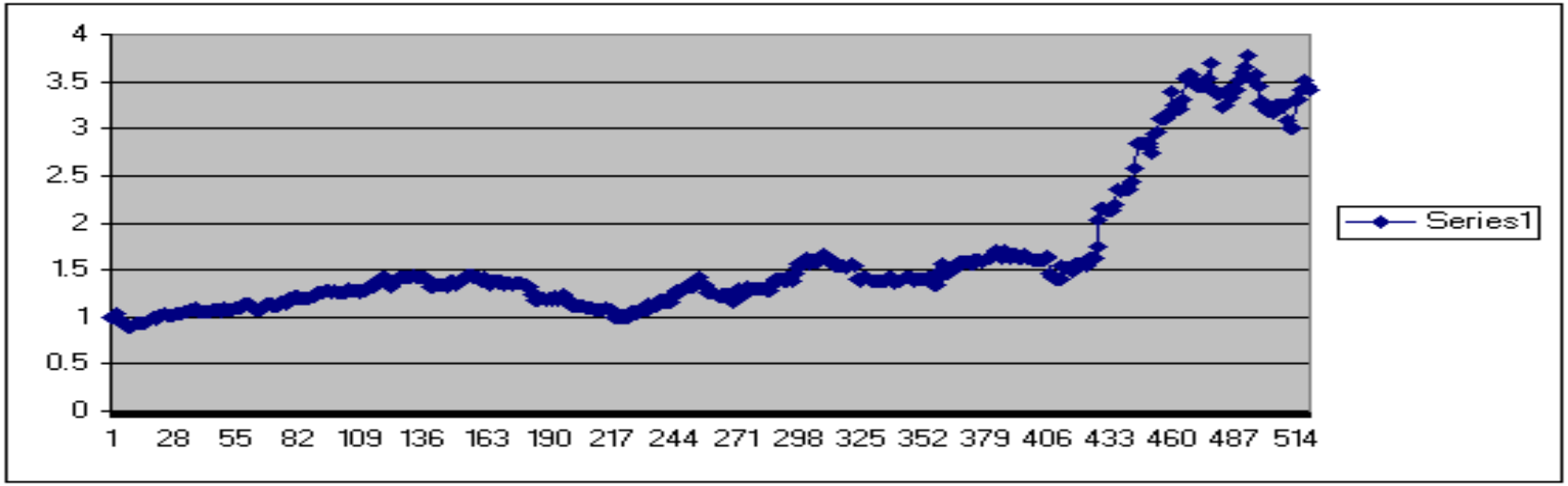
- This model is analogically used in capital market.
- Here the role of the first trump is performed by the selected stocks, and the role of the second trump – by the currency of the country in the stocks of which we invest.
- If forecasting system indicates future possibility to select a profitable portfolio structure – then the appropriate structure is selected.
- If forecasting system indicates about the absence of profitable possibilities – then we retain certain amount of cash.

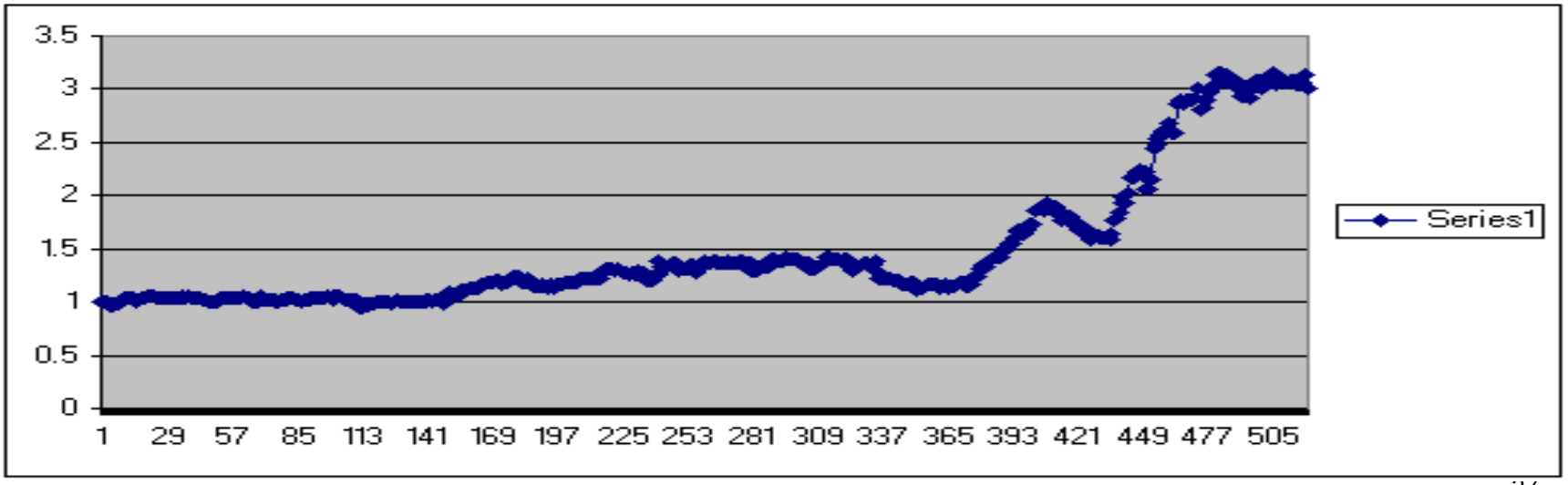
Change of stock prices in portfolio and change of invested capital (France)

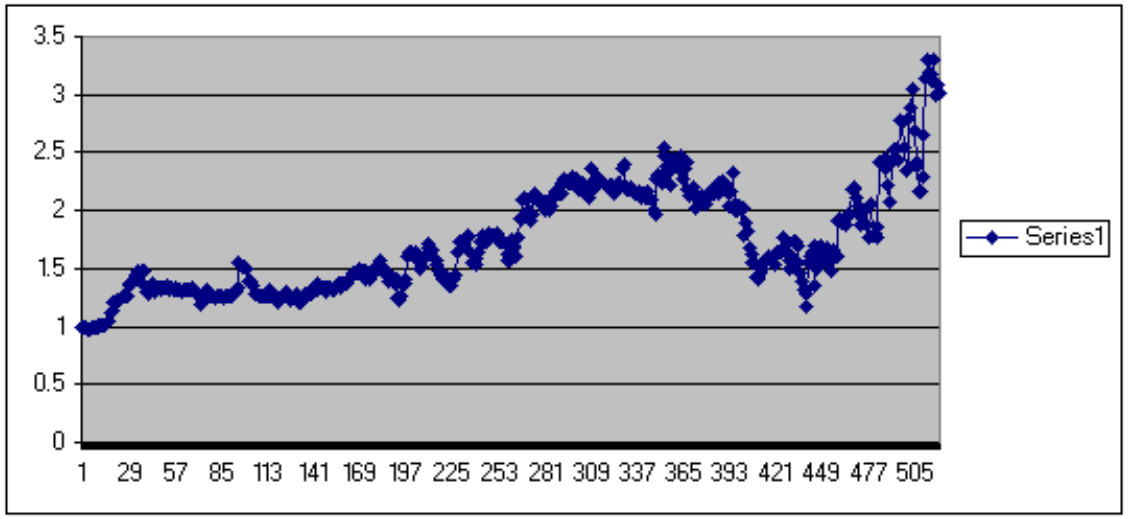




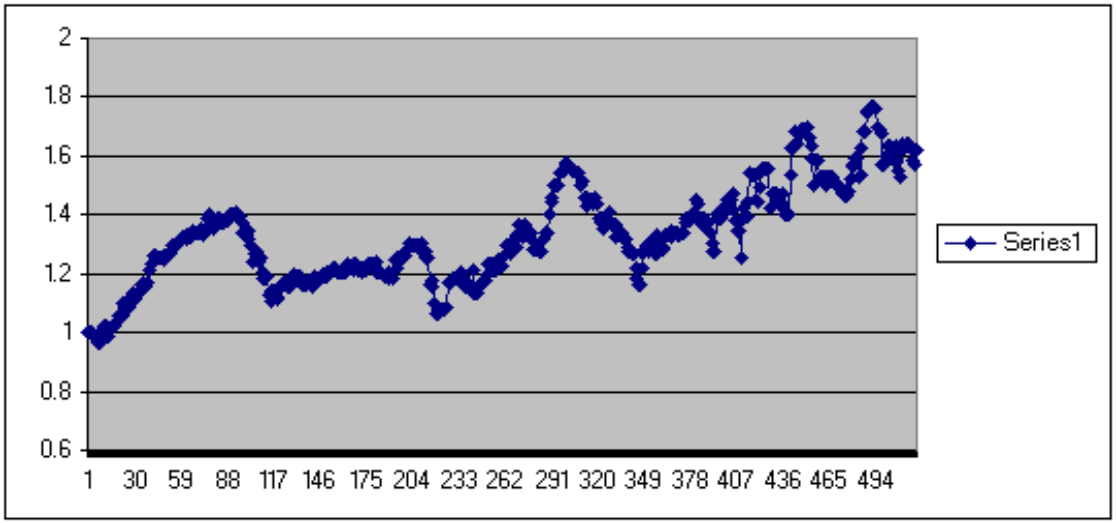
Change of stock prices in portfolio and change of invested capital (France)





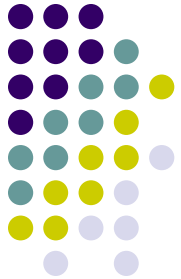


Change of invested capital (NYSE)



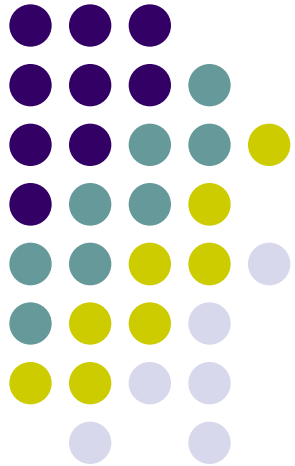
Change of invested capital (Sweden)

Conclusions

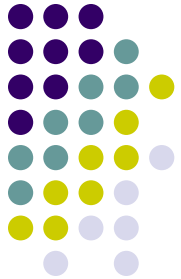


- Performed experiments in capital and exchange markets allow to make a conclusion that separate investors could incur considerably lower loss than the general market recession.
- The use of double trump model, tested with historical data and with real-time demo versions in the real time probably could be an assumption for success in the real investment process.

The scheme of analysis of efficiency, riskness and reliability interaction for management of multi-industrial balance and production functions of the general model



Simplified multi-industrial balance and production functions general model version



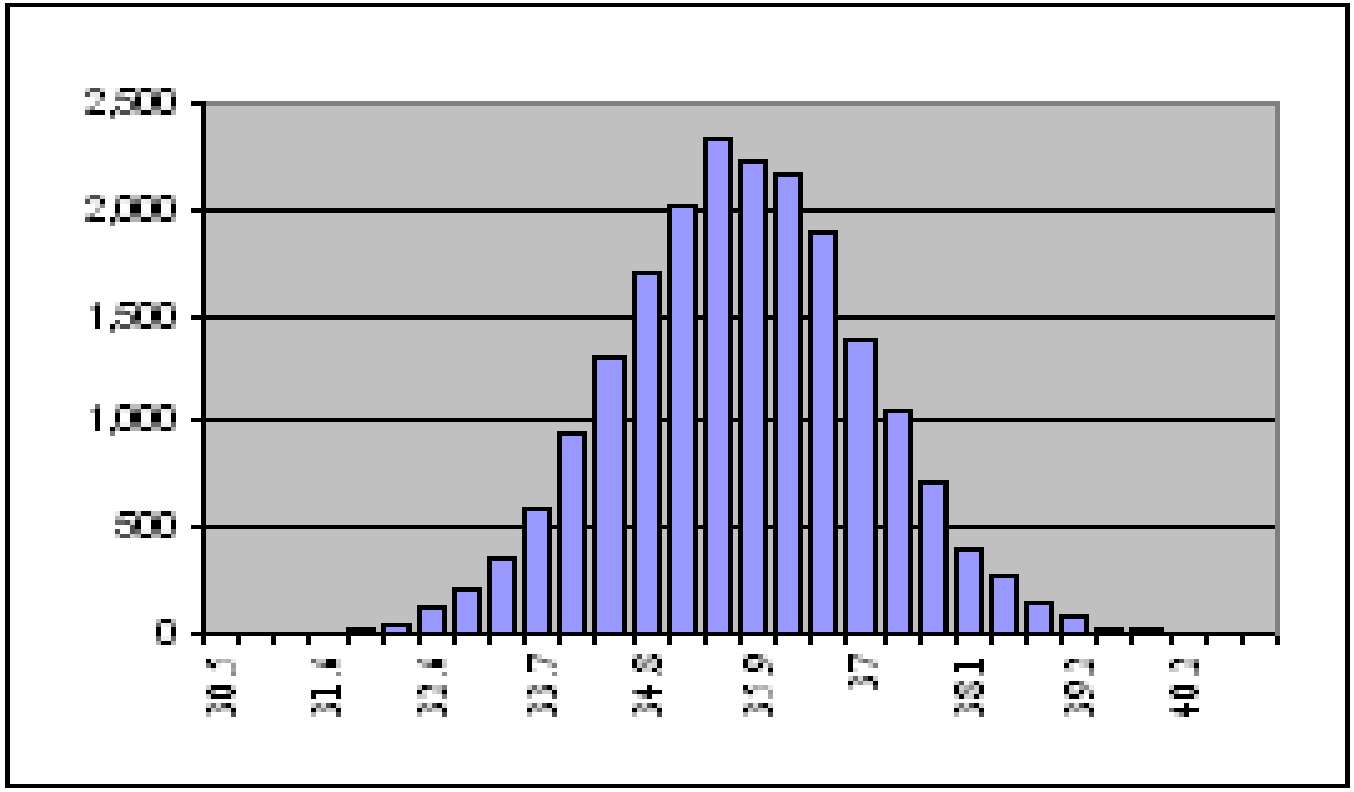
Let us have the following two-industries constraints system:

$$\begin{cases} y_1 = (1-a_{11})x_1 - a_{12}x_{12} - z_1(x_1) \\ y_2 = -a_{12}x_1 + (1-a_{22})x_2 - z_2(x_2) \\ x_1 + x_2 = C \end{cases}$$

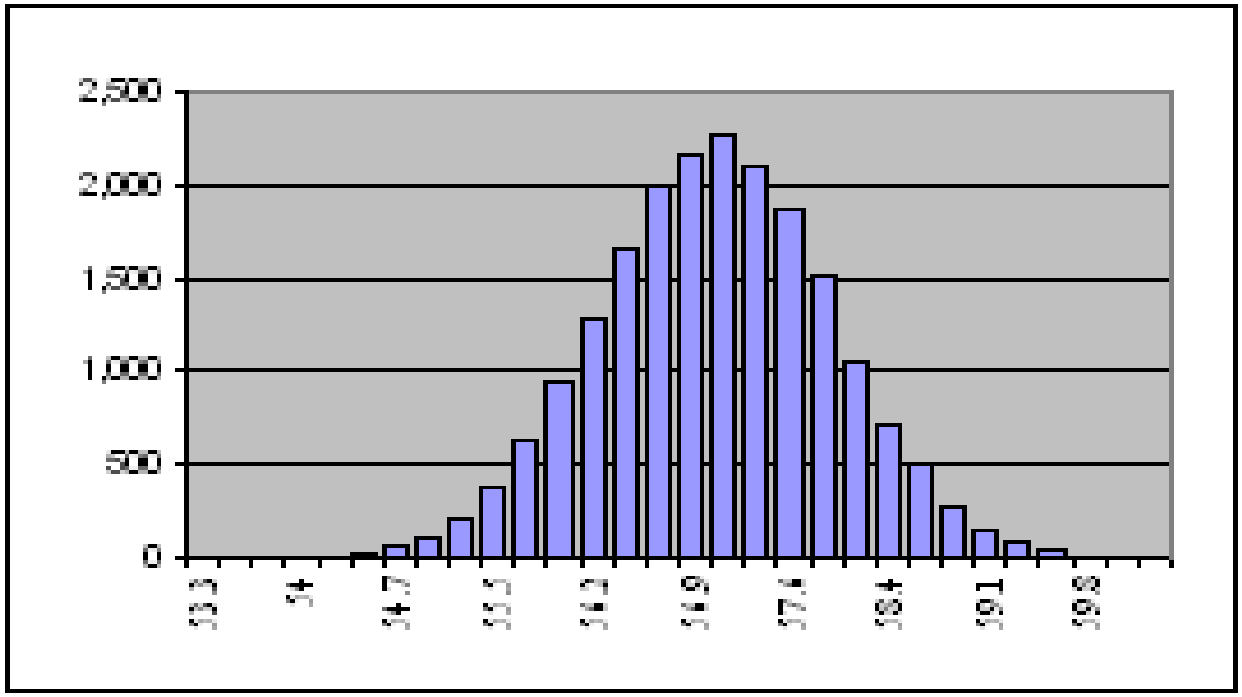
- here x_1, x_2 – the volume of gross domestic product production in respective industries of activity;
- $z_1(x_1)$, $z_2(x_2)$ – the volume of capital investments which is required for 1st and 2nd industries. These are the decisions of production functions with respect to invested capital.
- a_{ij} – coefficients showing the interaction of the analysed industries of activity in the production process, i, j = 1, 2.

First problem:

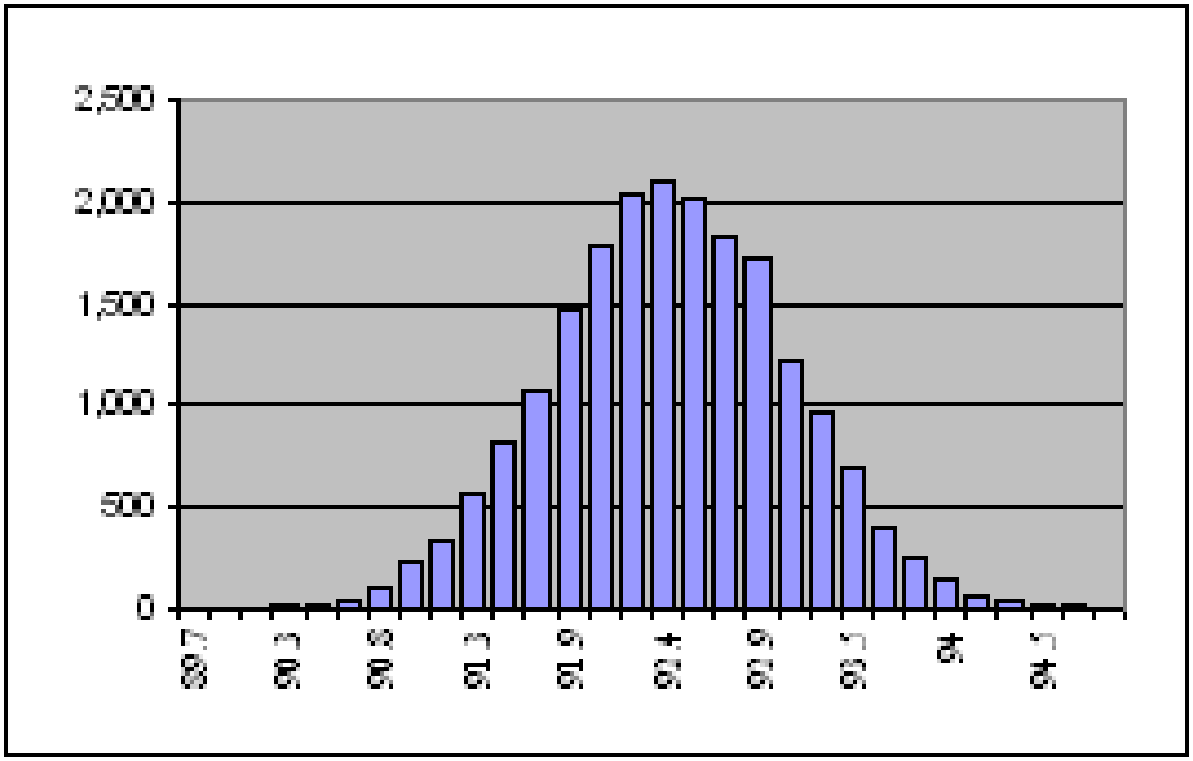
We have to find the probability distribution $y = y_1 + y_2$ if in the 1st system a_{ij}, as well as z_1, z_2 functions are stochastic variables.



Output 2

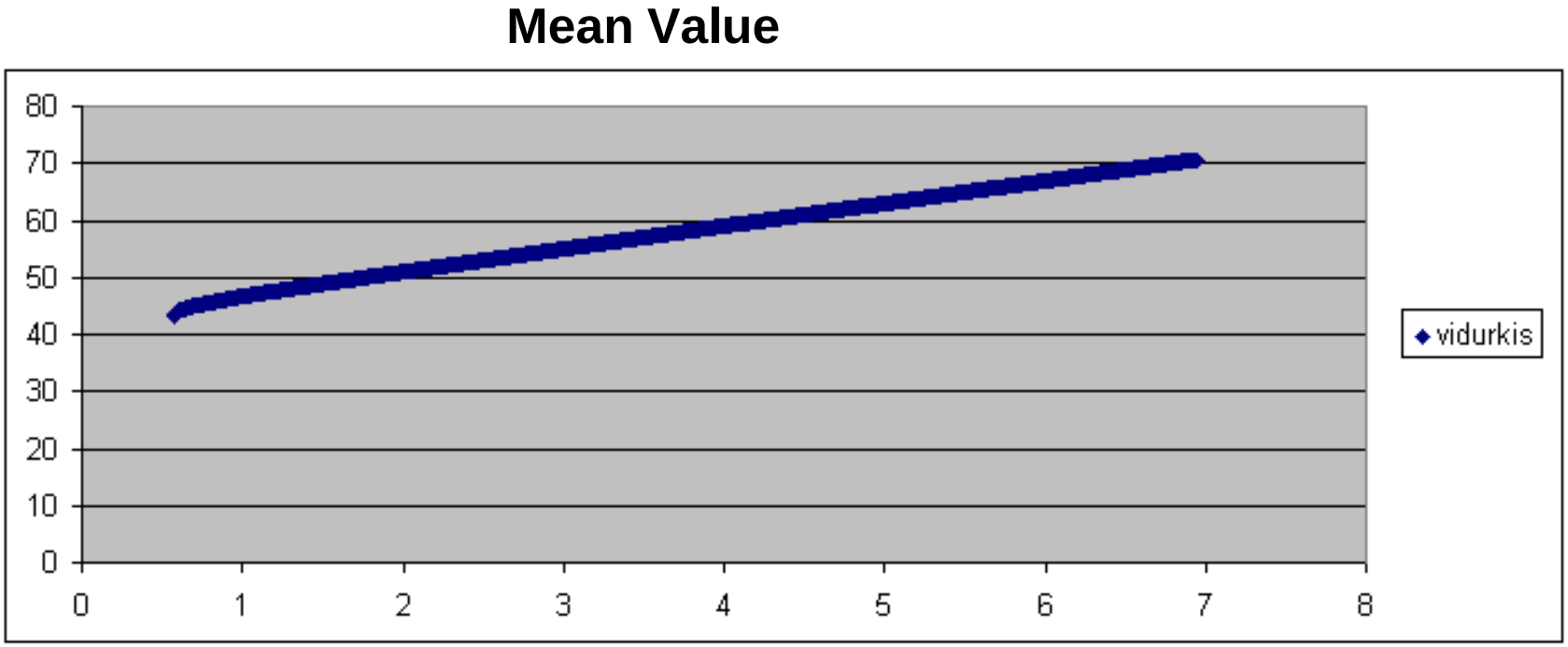


Output 3

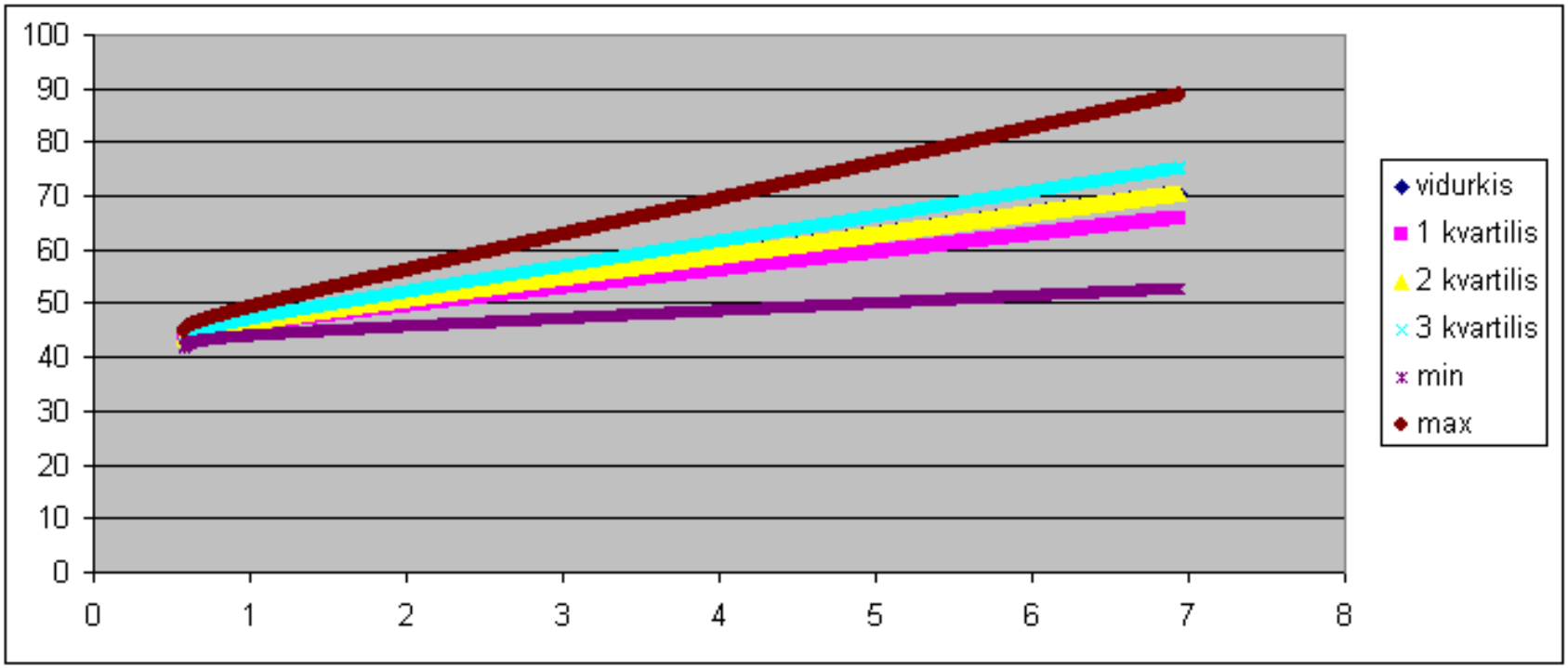


Second problem:

- We should generate information allowing to select the most advantageous decision with respect to efficiency, riskness and reliability, x_1 and x_2 combination.



Quartiles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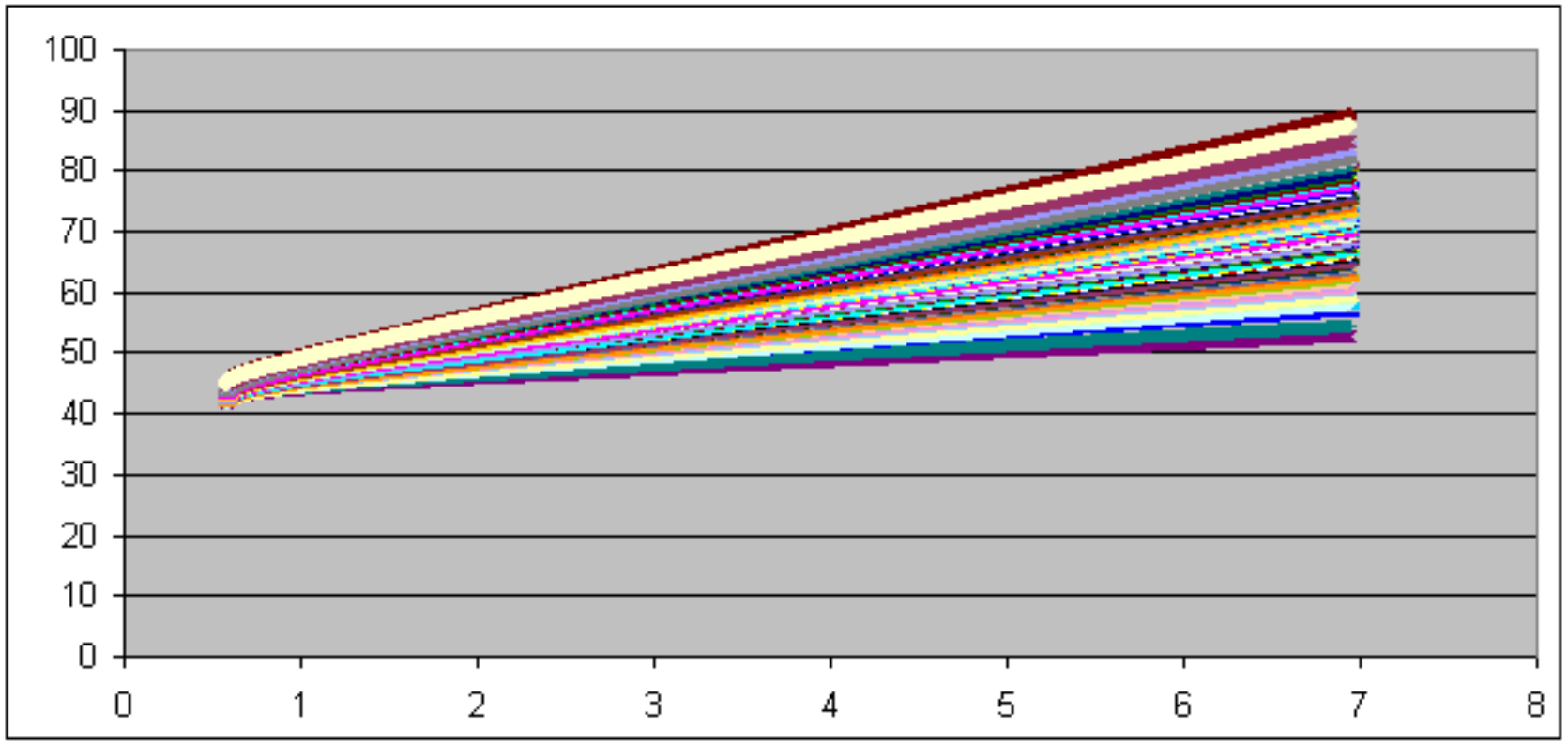
Percentiles



Thank you for your attention!