STOCK MARKET AND VORTEX THEORY

1. Introduction

The simulation plays an important role in searching of behaviour on the stock market. Simulation is the process of attempting to build up the model of the studied system and use it for the purposes of the system behaviour. It is possible to find the similarities with nature phenomena and stock market. For example weather changes and natural catastrophes have similarities in behaviour of investors on the stock market. It is possible to present the changes of values of indexes, prices of shares, commodities and currency ratios influenced by investors characterised by cyclic and/or severe changes of values and prices etc. The vortex theory describes some nature phenomena, such as rotation of tornadoes given by its structure, rotation of liquid flows through the pothole. Phenomena such as whirlwind, eruption on the sun, sand storms etc. could be also mentioned. It is possible to find out similar behaviour of changes of values of indexes, prices of shares, commodities, currency ratios and volume of sell and buy in time. The movement in the society is considered as the highest form of organization in the nature. The surplus of money is transferred from one place to another. Therefore there is an idea of possible use of vortex theory on capital markets. The capital market is realized by purchase and sale where sales and buys are phase shifted.

2. Used Methods

The phenomenon is possible to describe by system of equation in the form

$x=A*\sin(\omega t)$
$y=A*\cos(\omega t)$
$z=k*t$
$A=ke^{\alpha t}$,

where A is exponential curve influencing shape of vortex – the size of volume of business, ω means the phase shift caused by supply and demand, k is the intensity of changes of values of instrument and t is time. Because of shift phase among supply and demand the movement could be represented by vortex. The program was created for vortex simulation in MATLAB program. See prog.1.

```
clear; clc; close all
for d=1:1:2;
   if (d==1)
     omega =50;
else
  omega=100;
 end;
hold on;
k=1;alpha=1; i=0;
for  t= 1: 1/360 : 7200/360;
i=i+1;
A=k*exp(alpha*t);
x(i)=A*sin(omega*t);
y(i)=A*cos(omega*t);
% z(i)=-k*t;
z(i)=k*t;
% if ((z(i)>-16))
%   z(i) = -16;
if ((z(i)<15))
  z(i) = 15;
end;
end;
   if (d==1)
plot3(x,y,z, 'Color','red','LineWidth',1)
else
plot3(x,y,z, 'Color','blue','LineWidth',1)
 end;
end;
grid on
xlabel('Offer');ylabel('Demand');zlabel('Price')
```

```
title('Financial Vortex')
view(30,30)
```

Prog. 1 Vortex simulation

3. Case study

The program was used for simulation of case study, where constant k and ω was set up to be 1. The program plotted the graph in the shape of vortex. The graph represents the change of prices (axis z) and change of offer (axis x) and demand (axis y). See three and two dimensional graph (fig.1, fig.2).

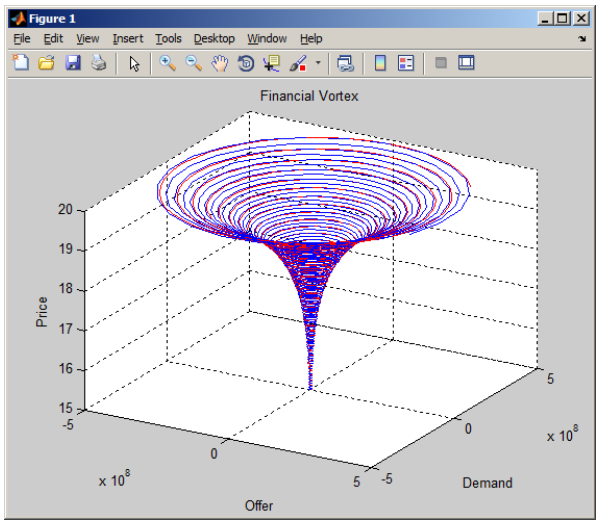

Fig. 1 Vortex – three-dimensional graph

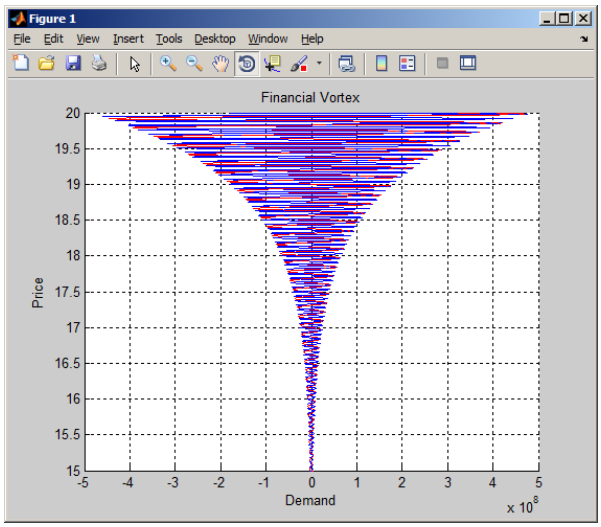

Fig. 2 Vortex – two-dimensional graph

4. Conclusion

The presented vortex theory could be used in some cases as a description of behaviour on the stock market. The presented article provides idea of possible use of vortex theory on the capital markets. The work will be developed by search of practical application of vortex theory on behaviour of some indexes, shares, commodities and currency ratios on capital market.