Movement of Share Prices and Sectoral Analysis: A Reflection Through Interactive and Dynamic Graphs

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Abstract

Interaction in graphs gives the user with an advantage to analyze the data in greater depth. With the help of interactive graphics users can get better insight of the data in comparison to the static graphical tools. This paper introduces an interactive graphical tool consisting of two graphs, a line diagram complemented by a boxplot. The line diagram helps to understand how successive values of a variable are related to time and box plot can help the visual comparison of several such variables. Here the line diagram is used to visualize share prices of a company corresponding to a number of days and the boxplot displays the position of the Share price of all companies in a particular sector. An investor in share market needs to consider a number of factors before making any decision about investment. Some of the factors influencing the decision are the performance of the particular security in recent past, its position in terms of share price in its own sector. The graphical technique used in this software tool shall be helpful while making investment decision.

Keywords: Boxplot, Line Diagram, Share Market, Statistical Graphics.

1. INTRODUCTION

Interactive and dynamic graphs can be prepared easily with the help of advanced graphical software. Interactive graphics allows analyst to draw better inferences in comparisn to the non-interactive methods. Through live visual displays, interactive graphics offer insights which are impossible to achieve with traditional statistical tools [1]. The present state of computer software and hardware technology encourages to draw graphs in delightfull way to portray the insight of available data. Today's advanced state of information technology has opened up opportunities to communicate statistical information in a way that can be easily understood not only by experts but even by the layman [2]. Application of interactive graphics can be found in various fields like national statistics [3], national economy [4], time series data [5] etc. Use of dynamic and interactive graphs can be found in the field of financial analysis. A good number of web based applications like online technical charts [6] and standalone charting application software can be found that are used to analyze stock market information in dynamic and interactive way.

This paper presents a software developed using Microsoft Visual Basic 6.0 for drawing two graphical tools viz. line diagram and boxplot. The line diagram is drawn taking the closing share price of a particular company for last few days. It shall depict how the share price of the said company has been moving during those days. The boxplot, on the other hand, shall depict the position of all the companies in a particular sector.

2. FLUCTUATIONS IN SHARE MARKET

Investment is the sacrifice of current consumption for the future benefit. There are various avenues for investment. Some of the avenues provide certain return and there are certain avenues providing uncertain return. The investment instruments that provide certain return includes bank fixed deposits, corporate bonds, government securities etc. However, there are another set of instruments that does not guarantee the return and one such instrument is equity share. The return from the share is dependent upon the performance of the company. The return from the equity shares depends upon the price of the equity shares in the market. Price of a share at every given moment is an "efficient" reflection of the expected value. The fluctuation in the price of the shares is dependent on many factors. Some of the factors are performance of the company, market conditions, general economic conditions, cyclic fluctuations, condition of the industry/sector to which company belongs etc. Besides, interest rates, inflation, quarterly earnings reports, news on corporate events, crime and fraudulent activities, energy prices, war and terrorism, and other local and worldwide political factors also play significant role in determining the share prices [7].

Another theory of share price determination comes from the field of Behavioral Finance. According to Behavioral Finance, humans often make irrational decisions particularly, related to the buying and selling of securities. It is based upon fears and misperceptions of outcomes. The irrational trading of securities can often create securities prices which vary from rational, fundamental price valuations [8].

All the above factors affect the supply and demand for the shares. The price of a stock is determined by supply and demand. The price of the stock moves in order to achieve and maintain equilibrium. For example, if there are more people wanting to buy a stock than to sell it, the price will be driven up because those shares are rarer and people will pay a higher price for them and vice versa. Even if there is nothing wrong with a company, a large shareholder who is trying to sell millions of shares at a time can drive the price of the stock down, simply because there are not enough people interested in buying the stock he/she is trying to sell.

3. INDUSTRIAL OR SECTORAL ANALYSIS IN SHARE MARKET

The fields of fundamental analysis and technical analysis attempt to understand market conditions that lead to price changes, or even predict future price levels. Fundamental analysis is the examination of the underlying forces that affect the well being of the economy, industry groups, and companies. As with most analysis, the goal is to derive a forecast and profit from future price movements. At the company level, fundamental analysis may involve examination of financial data, management, business concept and competition. At the industry level or sector level, there might be an examination of supply and demand forces for the products offered. To forecast future stock prices, fundamental analysis combines economic, industry, and company analysis to derive a stock's current fair value and forecast future value [7].

By analyzing the sector or industry, an investor would want to consider the overall growth rate, market size, and importance to the economy. Although, the individual company is still important but its industry group is likely to exert just as much, or more, influence on the stock price [7]. When stocks move, they usually move as groups; there are very few lone guns. Sometimes it is said that it is more important to be in the right industry/sector than in the right stock. There are certain things that are more relevant to be seen from the sectors point of view rather than that of the individual company. These are product position, competitive advantage, leader in the sector, barriers to entry in the industry etc. Each industry/sector has differences in terms of its customer base, market share among firms, industry-wide growth, competition, regulation and business cycles. Learning about how the industry or sector works will give an investor a deeper understanding of a company's financial health.

In doing the sectoral analysis, one can compare a stock price to other companies in the same sector. It stands to reason that two or more publicly traded companies in the same sector should be roughly similar in stock price, but this is rarely the case. By analyzing an entire business sector (airlines, banking, construction, IT etc.), one gets a feel for which are the best

performing stocks in that particular sector. Comparing the stock prices side by side often reveals which companies are best poised for growth in that sector. There are certain factors in sectoral analysis which have influence in the performance of individual stocks belonging to the same sector [9]. These are given below:

(i)   Industry Growth
(ii)   Competition within the Industry
(iii) Regulatory Framework within the Industry

Industry analysis is the examination made in a specific sector or industry. Industry analysis investigates the general fundamentals of the equities within the industry but more importantly investigates the state of external factors and how they should affect the particular industry or sub sector. Different macroeconomic data and other statistics have a particular bearing on certain industries and analysts gauge to see how these data will affect them. Furthermore industry analysts also investigate the level of demand such as consumer tastes and supply such as competition within the industry and how stock prices should get affected by them.

4. THE NEED FOR INDUSTRY ANALYSIS
To summarize, these are the reasons why industry analysis is important:

(i)   Generally the performance of a company is a function of the performance of the industry. For example, if raw material in a particular industry has gone up then all the companies in the industry will get affected.
(ii)   If an industry suddenly gets in vogue or if a sudden change in the news is perceived to be good or bad for an industry the price of the stock will be affected mainly from what the average investor believes and most investors will follow industry trends.
(iii) Choosing a stock after sectoral analysis has its advantages. It is a lot easier to pick a stock from a specific industry, especially if one has to develop a long/short position with the purpose of removing industry and market risk.

A popular tool for analysing the share price of a particular organization is the Japanese Candlesticks. There are number of websites (e.g., [10], [11]) and standalone software packages (e.g., [12]) where one can draw the Japanese candlesticks for analysing the share price of a particular organization. A candlestick displays the opening price, closing price, maximum price and minimum price for a single day for a particular organization. For a period of time; for every single day, a candlestick is drawn. Thus a candlestick pattern provides visualization of performance of a single company for selected number of days.

One drawback with the Japanese Candlestick patterns is that it provides visualization of a single company only. i.e., one can visualize the performance of a single company for a selected period of time. It is difficult to find the summary of data. Also studying a sector is difficult using the candlestick patterns. To overcome this drawbacks of candle sticks this paper proposes a new software tool developed using Microsoft Visual Basic 6.0; that will consist of two graphical techniques viz. a line diagram and a boxplot. The line diagram shall present the closing share price of a single company for period of time and the box plot shall present the data summaries of a particular sector for those days depicted by corresponding line diagram.

5. GENERAL OVERVIEW OF THE SOFTWARE
As Microsoft Excel is the most widely used package for entering, editing and storing data; the software also uses Microsoft Excel for the same purpose. The software has two windows viz. entry and main window as shown in the Figure 1 and Figure 2. The user needs to enter the location
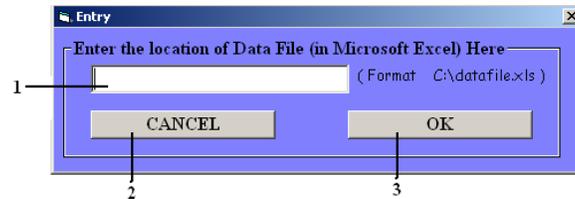
Figure 1: Entry window for entering the location of dataset
1. Text box for entering location of data file. 2. Cancel button. 3. Ok button

of the Microsoft Excel file; where dataset is stored, in the text box in the entry window. In the main window there is one file menu, two dropdown menus, one list menu, two command buttons two picture boxes and a legend as shown in Figure 2.

6. THE ENTRY WINDOW

The entry widow is designed as the starting point of the software tool. The user needs to enter the location of the Microsoft Excel file in which the dataset is stored. The format for entering the location is given in the right hand side of the textbox for reference. It is quite easy to enter the location; the user needs to open the folder where the file is stored and copy the address from the address bar and paste it to the textbox. After this the user needs to put a back slash and the file name. This completes the steps for entering location of the dataset. After this, user can click on the command button OK to proceed to drawing the graphs.

7.1 The File Menu

The main window, as shown in the Figure 3 has a file menu. Under file menu it has four different sub menus viz. New, Save Line Diagram, Save Box Plot and Exit. The save Line Diagram and Save Box Plot submenus can be used to save the graphs line diagram and box plot respectively. The exit submenu can be used to terminate the software.

7.2 Data Option

In the data option group there are two drop down menus and a list box. The first dropdown box under the title *Sector* lists all the sectors present in the data set. The user needs to select a sector first to start the drawing process. After selecting the sector it is time to select the appropriate company name from the data set. This is option is offered by the dropdown
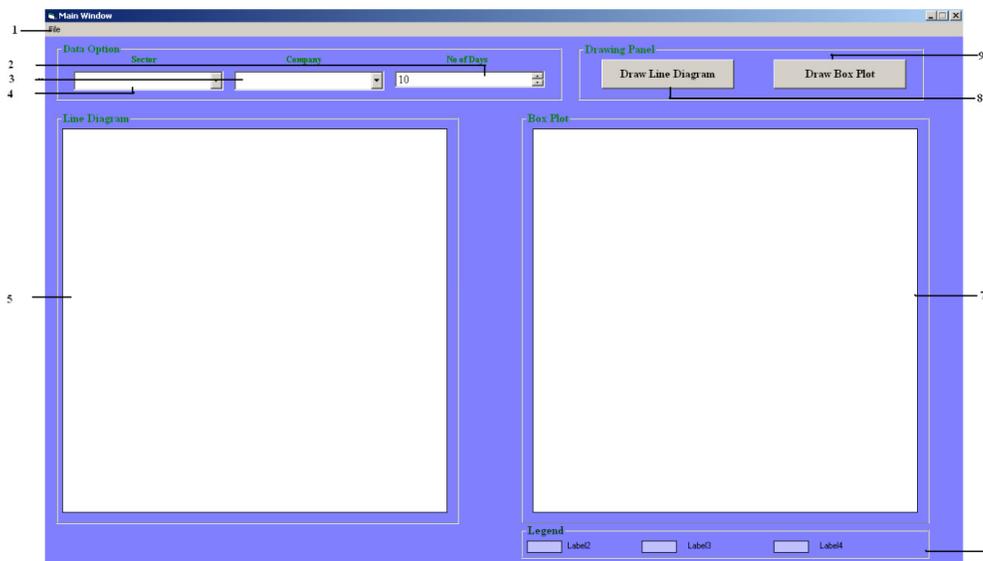

FIGURE. 2: The main window of the Software

1. File Menu, 2. Combo – Box for selecting no of days. 3. Dropdown menu for selecting company   4. Dropdown menu for selecting sector. 5. Picture box for drawing line diagram. 6. Legend. 7. Picture box for drawing boxplot. 8. Command button for drawing Line Diagram. 9. Command button for drawing boxplot.
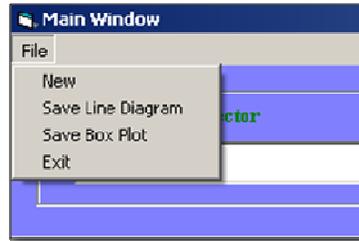2.

FIGURE 3: File Menu

menu company. The company dropdown menu presents the names of all the companies present under the selected sector in the dataset. The user needs to single out one company to draw the graphs. In the example shown in the figure 4.1 above, the data set contains two sectors stored viz. Banking and IT. So when user tries to select a sector by clicking on the dropdown menu *Sector,* he/she gets two options. Assuming that the user selects banking Sector and proceeds for choosing a bank, he/she gets all the names of the banking sector stored in the dataset as shown in the Figure 4.2. The list box under the title *No of Days* comes into play after drawing the graphs. This list box is used for selecting the number of days for which the graphs need to be drawn.

7.3 Drawing Panel
There are two command buttons in the group Drawing Panel with names Draw Line Diagram and Draw Box Plot. As the names suggest the buttons are used to draw the diagrams respectively. On clicking the Draw Line Diagram the user can draw a line diagram for the selected company and clicking on the Draw Box Plot user can draw box plots. The graphs are drawn in the two picture boxes named Line Diagram and Box Plot. The figure 5 below shows two buttons Draw Line Diagram and Draw Box Plots.
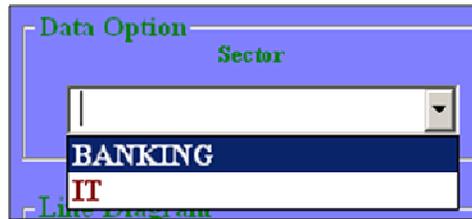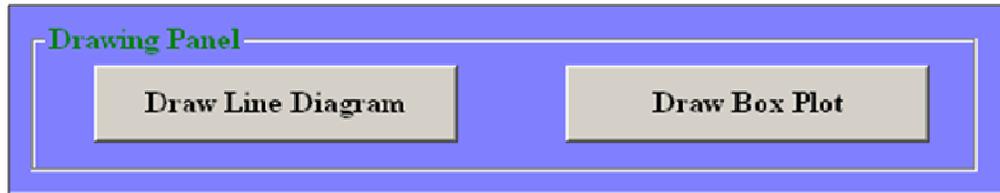

FIGURE. 4.1: Sector dropdown menu

FIGURE 4.2: Sector and Company dropdown menu

The figure 6.1 depicts a line diagram drawn using the software. The line diagram helps us to understand how successive values of the variable are related to specified point of time [13]. In a line diagram values of one variable are plotted against x axis and the corresponding values of the other variable are plotted against y axis and the points are connected by a line.

FIGURE 5 Drawing Panels for drawing the graphs

For the purpose of demonstrating the working of software the researcher has taken share prices of four banks viz. State Bank of India (SBI), Bank of Baroda (BOB), Punjab National Bank (PNB) and ICICI and four organizations from IT Sector viz. Tata Consultancy Services (TCS), Wipro, Infosys (INFY) and Patni Computer Services Limited (PCS) for the period of September 01, 2011 to October 17, 2011 for discussion. In the Figure 6.1 the share prices of ICICI bank for the period of September 01, 2011 to November 17, 2011 are plotted against the number of days. The number of days are plotted along the x axis and the share prices of the bank are plotted along y axis. As seen in the Figure the share prices vary between 779 and 919.3 in the mentioned period.

On clicking the command button *Draw Box Plot* the user gets a set of four mean box plots, one for each bank in the sector. The names appearing above the box plots means that the box plot is drawn for that particular bank. A mean box plot is a graphical tool that represents summaries of datasets. The bottom of the box extends to mean minus twice standard deviation and the top of the box extends to mean plus twice standard deviation. The line segment within the box is drawn at the mean value of the data [14]. As shown in the figure 6.2 the bold line in the middle represents mean of values, the rectangle above the line represents mean plus standard deviation and the line below the mean line represents mean minus standard deviation.

Thus a box plot of a particular bank represents mean value of the share price and it's fluctuation during the selected period of time. From the Figure. 6.2 one can visualize that the share price of SBI is having the maximum mean value and that of BOB is the minimum. Also the SBI is having the longest box and BOB has the shortest box. That means variation in the share price of SBI is maximum in comparison to the others in the group for the selected number of days and that for BOB is the minimum.

After drawing the line diagram and the boxplot, one can select the number of days for which he/she whishes to draw the graphs. This option is available in the panel *data option* under *no of days*. Once the user selects the number of days; both the graphs will be drawn taking the latest data of that many days from the dataset. That is if a user selects 15 from *no of days*; the line diagram and the boxplots will be drawn using the last 15 days data from the dataset. The minimum value available under this option is 10 and the maximum is 30. i.e., one can check how a particular company's share price changed during last 10 days to last 31 days. This facilitates the user to draw inference about a company's performance and its position in its group during the selected number of days.
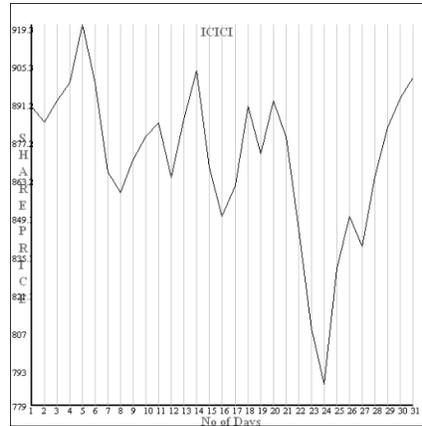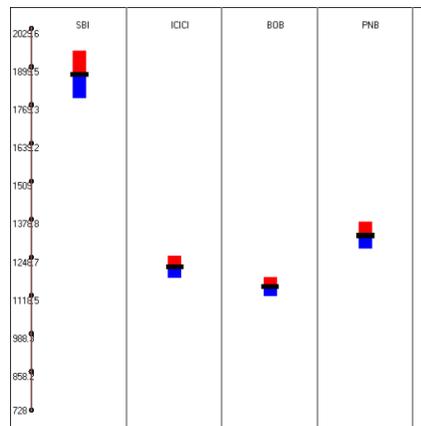
FIGURE 6.1 Line diagram

FIGURE 6.2 Boxplot

8. CONCLUSION

The graphical tools presented in this paper shall be handy for making better investment decision. The line diagram shall be useful for exploring the performance of a single company for a period of time while the box plots shall depict summaries of performance of different companies belonging to the same sector. The line diagram shall present how the share price of a company has been moving during the selected period of time. From the box plot one can draw the inference about the average share price and the fluctuations of every single company belonging to that group. The user also has the advantage of interacting with the graphs by selecting the number of days; that empowers the user to analyze the performance of the companies for the time various periods. Hence, the user would be able to make better decision using this software tool.

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