Assignment on

Dhaka Stock market Database (Report)

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Introduction

A stock market, equity market, or share market is the aggregation of buyers and sellers of stocks (also called shares), which represent ownership claims on businesses; these may include securities listed on a public stock exchange, as well as stock that is only traded privately, such as shares of private companies which are sold to investors through equity crowdfunding platforms. Investment in the stock market is most often done via stockbrokerages and electronic trading platforms. Investment is usually made with an investment strategy in mind. Stocks can be categorized by the country where the company is domiciled. For example, Nestlé and Novartis are domiciled in Switzerland and traded on the SIX Swiss Exchange, so they may be considered as part of the Swiss stock market, although the stocks may also be traded on exchanges in other countries, for example, as American depositary receipts (ADRs) on U.S. stock markets. The total market capitalization of equity backed securities worldwide rose from US$2.5 trillion in 1980 to US$83.53 trillion at the end of 2019.[17] As of December 31, 2019, the total market capitalization of all stocks worldwide was approximately US$70.75 trillion.[1] As of 2016, there are 60 stock exchanges in the world. Of these, there are 16 exchanges with a market capitalization of $1 trillion or more, and they account for 87% of global market capitalization. Apart from the Australian Securities Exchange, these 16 exchanges are all in either North America, Europe, or Asia.[18] By country, the largest stock markets as of January 2020 are in the United States of America (about 54.5%), followed by Japan (about 7.7%) and the United Kingdom (about 5.1%).[19] Stock market and stock exchange - are used interchangeably, the latter term is generally a subset of the former. If one says that she trades in the stock market, it means that she buys and sells shares/equities on one (or more) of the stock exchange(s) that are part of the overall stock market. The leading stock exchanges in the U.S. include the New York Stock Exchange (NYSE), Nasdaq, and the Chicago Board Options Exchange (CBOE). These leading national exchanges, along with several other exchanges operating in the country, form the stock market of the U.S. Though it is called a stock market or equity market and is primarily known for trading stocks/equities, other financial securities - like exchange traded funds (ETF), corporate bonds and derivatives based on stocks, commodities, currencies, and bonds - are also traded in the stock markets. The terms equity market and stock market are synonymous. Both refer to the purchase and sale of ownership shares in public companies through any of the many stock exchanges and over-the-counter markets in the U.S. and around the world. A share of stock represents an equity interest in a company. That is, the investor is buying an ownership stake in the company in the expectation of receiving a share of the profits in the form of dividends, or benefiting from the growth of its stock price, or both.

Key Takeaways

- The buyer of a share of stock is buying an ownership or equity interest in a company.
- Stock owners share in a company's success via dividend payments or price growth or both.
- Equity market is a broad term for many stock exchanges around the world that match buyers and sellers of stocks.

To a company, selling shares is a way to raise cash to expand the business. In order to do so, it lists its stock on one of the stock exchanges, such as the New York Stock Exchange, the Nasdaq, or the London Stock Exchange. The process of listing a new stock issue in the U.S. is long and arduous, as it includes detailed financial filings that meet the regulations of the Securities and Exchange Commission. An alternative for a company in search of financing is issuing bonds. A bond is a form of debt that is repaid over time with interest. Most public companies over time issue both stock shares and bonds. There are two primary types of stock that company’s issue: common stock and preferred stock. The trade in common stock is far more active, and when a stock price is quoted it always refers to the price of a single share of common stock. Owners of common stock shares usually are entitled to exercise their voting rights regarding a company's board of directors and other important company decisions. They may or may not get regular dividends. The

board decides at least annually whether it will pay a dividend and how much it will pay based on the company's latest revenue.

Guaranteed Dividends

Preferred stock owners do not usually have voting rights. However, preferred stock shares are issued with a guaranteed payment at regular intervals of larger dividends than common stockholders receive. Shares of preferred stocks do not tend to rise or fall in price as sharply as common shares over time. Investors value them for their dividends, not for their potential for growth. That makes preferred stock shares a kind of hybrid of a stock and a bond. Preferred stock shares are sometimes convertible into common stock shares under specific conditions. The equity interest of preferred stockholders takes precedence over the interest of common stockholders in the event that the company goes into liquidation.

How the Stock Market Works

In a nutshell, stock markets provide a secure and regulated environment where market participants can transact in shares and other eligible financial instruments with confidence with zero- to low-operational risk. Operating under the defined rules as stated by the regulator, the stock markets act as primary markets and as secondary markets. AS a primary market, the stock market allows companies to issue and sell their shares to the common public for the first time through the process of initial public offerings (IPO). This activity helps companies raise necessary capital from investors. It essentially means that a company divides itself into a number of shares (say, 20 million shares) and sells a part of those shares (say, 5 million shares) to common public at a price (say, $10 per share).

To facilitate this process, a company needs a marketplace where these shares can be sold. This marketplace is provided by the stock market. If everything goes as per the plans, the company will successfully sell the 5 million shares at a price of $10 per share and collect $50 million worth of funds. Investors will get the company shares which they can expect to hold for their preferred duration, in anticipation of rising in share price and any potential income in the form of dividend payments. The stock exchange acts as a facilitator for this capital raising process and receives a fee for its services from the company and its financial partners. Following the first-time share issuance IPO exercise called the listing process, the stock exchange also serves as the trading platform that facilitates regular buying and selling of the listed shares. This constitutes the secondary market. The stock exchange earns a fee for every trade that occurs on its platform during the secondary market activity. The stock exchange shoulders the responsibility of ensuring price transparency, liquidity, price discovery and fair dealings in such trading activities. As almost all major stock markets across the globe now operate electronically, the exchange maintains trading systems that efficiently manage the buy and sell orders from various market participants. They perform the price matching function to facilitate trade execution at a price fair to both buyers and sellers.

listed company may also offer new, additional shares through other offerings at a later stage, like through rights issue or through follow-on offers. They may even buyback or delist their shares. The stock exchange facilitates such transactions. The stock exchange often creates and maintains various market-level and sector-specific indicators, like the S&P 500 index or Nasdaq 100 index, which provide a measure to track the movement of the overall market. Other methods include the Stochastic Oscillator and Stochastic Momentum Index. The stock exchanges also maintain all company news, announcements, and financial reporting, which can be usually accessed on their official websites. A stock exchange also supports various other corporate-level, transaction-related activities. For instance, profitable companies may reward investors by paying dividends which usually comes from a part of the company’s earnings. The exchange maintains all such information and may support its processing to a certain extent.

Functions of a Stock Market

A stock market primarily serves the following functions:

Fair Dealing in Securities Transactions

Depending on the standard rules of demand and supply, the stock exchange needs to ensure that all interested market participants have instant access to data for all buy and sell orders thereby helping in the fair and transparent pricing of securities. Additionally, it should also perform efficient matching of appropriate buy and sell orders. For example, there may be three buyers who have placed orders for buying Microsoft shares at $100, $105 and $110, and there may be four sellers who are willing to sell Microsoft shares at $110, $112, $115 and $120. The exchange (through their computer operated automated trading systems) needs to ensure that the best buy and best sell are matched, which in this case is at $110 for the given quantity of trade.

Efficient Price Discovery

Stock markets need to support an efficient mechanism for price discovery, which refers to the act of deciding the proper price of a security and is usually performed by assessing market supply and demand and other factors associated with the transactions. Say, a U.S.-based software company is trading at a price of $100 and has a market capitalization of $5 billion. A news item comes in that the EU regulator has imposed a fine of $2 billion on the company which essentially means that 40 percent of the company's value may be wiped out. While the stock market may have imposed a trading price range of $90 and $110 on the company's share price, it should efficiently change the permissible trading price limit to accommodate for the possible changes in the share price, else shareholders may struggle to trade at a fair price.

Liquidity Maintenance

While getting the number of buyers and sellers for a particular financial security are out of control for the stock market, it needs to ensure that whosoever is qualified and willing to trade gets instant access to place orders which should get executed at the fair price.

Security and Validity of Transactions

While more participants are important for efficient working of a market, the same market needs to ensure that all participants are verified and remain compliant with the necessary rules and regulations, leaving no room for default by any of the parties. Additionally, it should ensure that all associated entities operating in the market must also adhere to the rules, and work within the legal framework given by the regulator.

Support All Eligible Types of Participants

A marketplace is made by a variety of participants, which include market makers, investors, traders, speculators, and hedgers. All these participants operate in the stock market with different roles and functions. For instance, an investor may buy stocks and hold them for long-term spanning many years, while a trader may enter and exit a position within seconds. A market maker provides necessary liquidity in the market, while a hedger may like to trade in derivatives for mitigating the risk involved in investments. The stock market should ensure that all such participants are able to operate seamlessly fulfilling their desired roles to ensure the market continues to operate efficiently.

Investor Protection

Along with wealthy and institutional investors, a very large number of small investors are also served by the stock market for their small number of investments. These investors may have limited financial knowledge, and may not be fully aware of the pitfalls of investing in stocks and other listed instruments. The stock exchange must implement necessary measures to offer the necessary protection to such investors

to shield them from financial loss and ensure customer trust.For instance, a stock exchange may categorize stocks in various segments depending on their risk profiles and allow limited or no trading by common investors in high-risk stocks. Exchanges often impose restrictions to prevent individuals with limited income and knowledge from getting into risky bets of derivatives.

Balanced Regulation

Listed companies are largely regulated and their dealings are monitored by market regulators, like the Securities and Exchange Commission (SEC) of the U.S. Additionally, exchanges also mandate certain requirements – like, timely filing of quarterly financial reports and instant reporting of any relevant developments - to ensure all market participants become aware of corporate happenings. Failure to adhere to the regulations can lead to suspension of trading by the exchanges and other disciplinary measures.

Regulating the Stock Market

A local financial regulator or competent monetary authority or institute is assigned the task of regulating the stock market of a country. The Securities and Exchange Commission (SEC) is the regulatory body charged with overseeing the U.S. stock markets. The SEC is a federal agency that works independently of the government and political pressure. The mission of the SEC is stated as: "to protect investors, maintain fair, orderly, and efficient markets, and facilitate capita

Stock Market Participants

Along with long-term investors and short-term traders, there are many different types of players associated with the stock market. Each has a unique role, but many of the roles are intertwined and depend on each other to make the market run effectively.

Stockbrokers, also known as registered representatives in the U.S., are the licensed professionals who buy and sell securities on behalf of investors. The brokers act as intermediaries between the stock exchanges and the investors by buying and selling stocks on the investors' behalf. An account with a retail broker is needed to gain access to the markets.

Portfolio managers are professionals who invest portfolios, or collections of securities, for clients. These managers get recommendations from analysts and make the buy or sell decisions for the portfolio. Mutual fund companies, hedge funds, and pension plans use portfolio managers to make decisions and set the investment strategies for the money they hold.

Investment bankers represent companies in various capacities, such as private companies that want to go public via an IPO or companies that are involved in pending mergers and acquisitions. They take care of the listing process in compliance with the regulatory requirements of the stock market.

Custodian and depot service providers, which are institution holding customers' securities for safekeeping so as to minimize the risk of their theft or loss, also operate in sync with the exchange to transfer shares to/from the respective accounts of transacting parties based on trading on the stock market.

Market maker

A market maker is a broker-dealer who facilitates the trading of shares by posting bid and ask prices along with maintaining an inventory of shares. He ensures sufficient liquidity in the market for a particular (set of) share(s), and profits from the difference between the bid and the ask price he quotes.

How Stock Exchanges Make Money

Stock exchanges operate as for-profit institutes and charge a fee for their services. The primary source of income for these stock exchanges are the revenues from the transaction fees that are charged for each trade carried out on its platform. Additionally, exchanges earn revenue from the listing fee charged to companies

during the IPO process and other follow-on offerings. The exchange also earns from selling market data generated on its platform - like real-time data, historical data, summary data, and reference data – which is vital for equity research and other uses. Many exchanges will also sell technology products, like a trading terminal and dedicated network connection to the exchange, to the interested parties for a suitable fee. The exchange may offer privileged services like high-frequency trading to larger clients like mutual funds and asset management companies (AMC), and earn money accordingly. There are provisions for regulatory fee and registration fee for different profiles of market participants, like the market maker and broker, which form other sources of income for the stock exchanges. The exchange also makes profits by licensing their indexes (and their methodology) which are commonly used as a benchmark for launching various products like mutual funds and ETFs by AMCs. Many exchanges also provide courses and certification on various financial topics to industry participants and earn revenues from such subscriptions.

It allows companies to raise money by offering stock shares and corporate bonds. It lets common investors participate in the financial achievements of the companies, make profits through capital gains, and earn money through dividends, although losses are also possible. While institutional investors and professional money managers do enjoy some privileges owing to their deep pockets, better knowledge and higher risk-taking abilities, the stock market attempts to offer a level playing field to common individuals. The stock market works as a platform through which savings and investments of individuals are channelized into the productive investment proposals. In the long term, it helps in capital formation & economic growth for the country.

Factors on Stock Market

It is common knowledge that investing in the stock market can fetch you high returns. However, the contrary is also true. Missteps or mistakes in your investment strategies can cause you to lose your capital. This is due to the fact that the stock market is a highly volatile environment, where the share prices are constantly fluctuating. And when it comes to the stock market, there are several factors influencing share prices. Here’s some information on some of the most important factors affecting share prices in India, which can help you understand stock price movements better.

Factors affecting share prices

While there are numerous factors influencing share prices, briefly explained below are some of the most crucial and decisive factors that cause stock prices to move up or down.

Demand and supply

The stock market is designed to work on the age-old economic principle of demand and supply. These are the two factors that drive the price of a particular stock. When the demand for a particular stock exceeds its supply, it effectively means that the number of buyers for the stock are more than the number of sellers. This invariably leads to a rise in the price of that particular share since it signifies that the buyers are more than willing to shell out money to purchase the stock.

The converse is also true. When the supply for a particular stock is more than its demand, it essentially signifies the presence of more sellers than buyers. This drives the price of a stock downward since it indicates that the sellers are trying to get out of the particular stock, selling it at whatever price the buyers are willing to part with.

Fundamental factors

The financials of a particular company are often termed as fundamental factors. And the financial performance of a company is one of the most important factors affecting share prices in India. Investors

will often overlook companies with weak financial performance, thereby leading to a downward spiral in the stock price. Also, traders and investors looking to generate wealth always tend to gravitate towards companies with exceptionally strong financials, which then consequently leads to an increase in demand for that particular stock, thereby driving the prices up.

Economy

Most investors tend to discount the impact of the current economic climate when predicting the price movement of shares. The state of the country's economy and the developments in the global economy are one among the many important factors influencing share prices. Stock markets are not only made up of domestic investors, but also involve a significant number of Foreign Institutional Investors (FIIs) as well. When a country's economy shows signs of a slowdown, it discourages further investments from FIIs. Additionally, depending on the severity of the economic climate, it might also prompt FIIs into selling off their shareholdings and moving their investment into other more stable economies.

Government policies

The policies of the Government are often considered to be major factors affecting share prices in the stock market. If the policies announced by the Government are perceived as favorable by the investors, the share prices of the associated industries and sectors tend to rise. However, unfavorable policies, especially those that are concerned with taxation, can cause investors to lose faith. This subsequently prompts a sell-off, which can quickly put the share prices in a downward spiral.

Political scenario

While this might seem like an innocuous factor, in reality, it is far from it. Investors always try to stay away from investing in countries going through political uncertainty or turmoil, since such a scenario significantly increases the risk of their capital being eroded. Also, any major shift in the internal political scenario can, in the short-term, dictate the price movement of the shares in the stock market.

Dividend declarations

Although minor, declarations of dividend are meaningful factors affecting share prices in India. This is something that can be easily identified in the price chart of a particular stock. Typically, the prices of a company's stock tend to rise upon the declaration of dividend. The reason for the rise in the share price is because investors generally perceive companies declaring dividend as being financially strong and stable. However, if the declaration of dividend by a company does not meet the expectations of the investors, it increases the likelihood of the share price going down.

This list of factors affecting share prices are merely indicative and are not exhaustive. Another important factor that is capable of driving the share prices of companies is the overall market sentiment. Unlike most other factors, this one is purely emotional. If the market sentiment is bullish, the share prices will invariably go up. In the event of a bearish market sentiment, the prices of shares will most likely come tumbling down. Before you decide on your next trade, it's prudent to consider these factors to get a better idea of how the market may move.

Company Category

A-Category Companies: Companies, which are regular in holding the **Annual General Meetings** and have declared dividend at the rate of **10 percent** or more in the last English calendar year.

B-Category Companies: Companies, which are regular in holding the **Annual General Meetings** but have **failed** to declare dividend at least at the rate of **10 percent** in the last English calendar year.

Z-Category Companies: Companies which have **failed** to hold the **Annual General Meeting** when due or have **failed to declare any dividend** based on annual performance or which are **not in operation continuously for more than six months** or whose **accumulated loss** after adjustment of revenue reserve, if any, exceeds its paid up capital.

N-Category Companies: Newly listed companies except green-field companies, which shall be transferred to other categories in accordance with their first dividend declaration and respective compliance after listing of their shares.

Category of stock

Common Stocks

Common Stocks allow shareholders to participate in the company's profits. They also provide voting rights to the shareholder. Investors who own common stocks of the company have the potential of earning dividends, but these dividends are not guaranteed.

Preferred Stocks

Preferred Stocks allow shareholders to have a certain degree of ownership in the company. However, most companies do not offer voting rights to preferred shareholders. In case of preferred shareholders, they get higher, guaranteed dividend payouts. Since they are preferred during bankruptcy, preferred stocks are less risky than common stocks.

Hybrid Stocks

Hybrid Stocks are preferred stocks but with an option to be converted into a fixed number of common stocks at a specific time. Hybrid stocks are popularly known as 'convertible preferred shares'. Since they are a hybrid of common and preferred shares, they may or may not come with voting rights.

Large-cap stocks

SEBI defines the top 100 company in terms of full market capitalization as large-cap companies. Examples of large-cap stocks in India include Reliance Industries, HDFC Bank, TCS, Infosys etc. Large-cap stocks are also popularly known as "blue-chip stocks."

The share price of large-cap stocks is stable and experience low volatility. Large-cap stocks provide high dividend yields and are less risky than mid and small-cap stocks. Large-cap stocks are perfect for conservative investors.

Mid-cap stocks

SEBI defines the companies which range from 101 – 250 in market capitalization as Mid-cap stocks. Mid-cap stocks offer higher returns as these companies are in the growing stage. Mid-cap stocks are risky and suitable only for aggressive investors. Mid-cap stocks also include 'baby blue-chip stocks' i.e. companies with steady growth but low market capitalization.

Small-cap stocks

SEBI defines the companies from 251st onwards in terms of full market capitalization as Small-cap stocks. Small-cap stocks are highly volatile and suitable for only aggressive investors with a long time horizon.

Income Stocks

Income stocks are stocks which distribute dividends regularly and are known as dividend-yield stocks. Income stocks provide stable returns, consistent dividends and are less risky.

Growth stocks

Growth Stocks usually do not pay dividends as the company prefers to reinvest the earnings in its own projects. This reinvestment of profit helps the company grow faster and hence, such stocks are referred to as growth stocks. In growth stocks, investors earn through capital appreciation (rise in stock price).

Blue-chip stocks

Blue-chip stocks are stocks of well-established companies with stable earnings and returns. These companies have lower liabilities which helps them pay regular dividends to their shareholders. Also, blue-chip companies provide stable returns and are less risky.

High Beta stocks

Research analysts describe 'Beta', as a measure of risk. Beta can either be positive or negative. A positive beta means that the stock and the market are moving in the same direction. A negative Beta means the stock and market are moving in opposite directions. Higher the value of beta, greater the volatility and thus more the risk.

Cyclical stocks

Stocks of companies that are affected by the economic environment and see high price fluctuations are known as cyclical stocks. As the economy starts to boom, the company's share price tends to rise and vice versa.

Various examples of cyclical stocks are:

Airline Industry: During strong economic conditions, both individuals and businesses tend to spend money on travel more than during times of Recession.

Automobile industry: Consumers and businesses tend to buy new vehicles in prosperous times, when the economy is booming and cut back during poor economy.

[Suggested Reading: Best Automobile stocks to buy]

Defensive stocks

Defensive stocks are the type of stocks which are unmoved by the economic conditions of the country. Example: Stocks of FMCG sector, Pharmaceuticals and insurance companies. Defensive stocks are a preferred investment option among investors when economic conditions are poor, while cyclical stocks are preferred when the economy is booming!

Literature Review

In 12th-century France, the courtiers de change were concerned with managing and regulating the debts of agricultural communities on behalf of the banks. Because these men also traded with debts, they could be called the first brokers. The Italian historian Lodovico Guicciardini described how, in late 13th-century Bruges, commodity traders gathered outdoors at a market square containing an inn owned by a family called Van der Beurze, and in 1409 they became the "Brugse Beurse", institutionalizing what had been, until then, an informal meeting.[1] The idea quickly spread around Flanders and neighboring countries and "Beurzen" soon opened in Ghent and Rotterdam. International traders, and specially the Italian bankers, present in Bruges since the early 13th-century, took back the word in their countries to define the place for stock market exchange: first the Italians (Borsa), but soon also the French (Bourse), the Germans (börse), Russians (birža), Czechs (burza), Swedes (börs), Danes and Norwegians (børs). In most languages the word coincides with that for money bag, dating back to the Latin bursa, from which obviously also derives the name of the Van der Beurse family.

In the middle of the 13th century, Venetian bankers began to trade in government securities. In 1351 the Venetian government outlawed spreading rumors intended to lower the price of government funds. Bankers in Pisa, Verona, Genoa and Florence also began trading in government securities during the 14th century. This was only possible because these were independent city-states not ruled by a duke but a council of influential citizens. Italian companies were also the first to issue shares. Companies in England and the Low Countries followed in the 16th century. Around this time, a joint stock company—one whose stock is owned jointly by the shareholders—emerged and became important for colonization of what Europeans called the "New World".[2]

The first modern stock, for the Dutch East India Company, was traded on the Nieuwe Brug in Amsterdam, the Netherlands in 1602. Initially only trading on that single company, the first derivatives were traded in 1607, with the first dividend distributions following several years later. [3] Futures trading [4] and short-selling [5] were also invented in Amsterdam in these early years.

This enigmatic business i.e., the inner workings of the stock exchange in Amsterdam, primarily the practice of VOC and WIC stock trading] which is at once the fairest and most deceitful in Europe, the noblest and the most infamous in the world, the finest and the most vulgar on earth. It is a quintessence of academic learning and a paragon of fraudulence; it is a touchstone for the intelligent and a tombstone for the audacious, a treasury of usefulness and a source of disaster, — Joseph de la Vega, in his book Confusión de confusions. (1688) [6]

Business ventures with multiple shareholders became popular with commenda contracts in medieval Italy (Greif, 2006, p. 286), and Malmendier (2009) provides evidence that shareholder companies date back to ancient Rome. Yet the title of the world's first stock market deservedly goes to that of seventeenth-century Amsterdam, where an active secondary market in company shares emerged. The two major companies were the Dutch East India Company and the Dutch West India Company, founded in 1602 and 1621. Other companies existed, but they were not as large and constituted a small portion of the stock market - Edward P. Stringham & Nicholas A. Curott, in "The Oxford Handbook of Austrian Economics" [On the Origins of Stock Markets]. (2015) [7]

In the 17th and 18th centuries, the Dutch pioneered several financial innovations that helped lay the foundations of the modern financial system.[8][9][10][11] While the Italian city-states produced the first transferable government bonds, they did not develop the other ingredient necessary to produce a fully fledged capital market: the stock market.[12] In the early 1600s the Dutch East India Company (VOC) became the first company in history to issue bonds and shares of stock to the general public.[13] As Edward Stringham (2015) notes, "companies with transferable shares date back to classical Rome, but these were usually not enduring endeavors and no considerable secondary market existed (Neal, 1997, p. 61)."[14] The Dutch East India Company (founded in the year of 1602) was also the first joint-stock company to get a fixed capital stock and as a result, continuous trade in company stock occurred on the Amsterdam Exchange. Soon thereafter, a lively trade in various derivatives, among which options and repos, emerged on the Amsterdam market. Dutch traders also pioneered short selling – a practice which was banned by the Dutch authorities as early as 1610.[15] Amsterdam-based businessman Joseph de la Vega's Confusion de Confusions (1688) [15] was the earliest known book about stock trading and first book on the inner workings of the stock market (including the stock exchange). Crowd gathering on Wall Street (New York City) after the 1929 crash, one of the worst stock market crashes in history. There are now stock markets in virtually every developed and most developing economies, with the world's largest markets being in the United States, United Kingdom, Japan, India, China, Canada, Germany (Frankfurt Stock Exchange), France, South Korea and the Netherlands.[16]

Over the past two decades many important changes have taken place in the environment of financial markets. The development of powerful communication and trading facilities has enlarged the scope of selection for investors. Forecasting stock return is an important financial subject that has attracted researchers' attention for many years. It involves an assumption that fundamental information publicly available in the past has some predictive relationships to the future stock returns. In order to be able to extract such relationships from the available data, data mining techniques are new techniques that can be used to extract the knowledge from this data. For that reason, several researchers have focused on technical analysis and using advanced math and science. Extensive attention has been dedicated to the field of artificial intelligence and data mining techniques. Some models have been proposed and implemented using the above-mentioned techniques, the authors of Tsang, P.M., Kwok, P., Choy, S.O., Kwan, R., Ng, S.C., Mak, J., Tsang, J., Koong, K., and Wong, T. made anempirical study on building a stock buying/selling alert system using back propagation neural networks (BPNN), their NN was codenamed NN5. The system was trained and tested with past price data from Hong Kong and Shanghai Banking Corporation Holdings over the period from January 2004 to December 2005. The empirical results showed that the implemented system was able to predict short-term price movement directions with accuracy about 74%. The research by Wu, M.C., Lin, S.Y., and Lin, C.H., used decision tree technique to build on the work of Lin. where Lin tried to modify the filter rule that is to buy when the stock price rises k% above its past local low and sell when it falls k% from its past local high. The proposed modification to the filter rule was by combining three decision variables associated with fundamental analysis. An empirical test, using the stocks of electronics companies in Taiwan, showed Lin's method outperformed the filter rule. According to Wu, M.C., Lin, S.Y., and Lin, C.H.,, in Lin's work, the criteria for clustering trading points involved only the past information; the future information was not considered at all. The research by Wu, M.C., Lin, S.Y., and Lin, C.H., aimed to improve the filter rule and Lin's study by considering both the past and the future information in clustering the trading points. The researchers used the data of Taiwan stock market and that of NASDAQ to carry out empirical tests. Test results showed that the proposed method outperformed both Lin's method and the filter rule in the two stock markets.

The model of Wang, J.L., Chan, S.H. (2006) "Stock market trading rule discovery using two-layer bias decision tree", applied the concept of serial topology and designed a new decision system, namely the two-layer bias decision tree, for stock price prediction. The methodology developed by the authors differs from other studies in two respects; first, to reduce the classification error, the decision model was modified into a bias decision model.Second, a two-layer bias decision tree is used to improve purchasing accuracy. The

empirical results indicated that the presented decision model produced excellent purchasing accuracy, and it significantly outperformed than random purchase.

The authors Enke, D., Thawornwong, S. presented an approach that used data mining methods and neural networks for forecasting stock market returns. An attempt has been made in this study to investigate the predictive power of financial and economic variables by adopting the variable relevance analysis technique in machine learning for data mining. The authors examined the effectiveness of the neural network models used for level estimation and classification. The results showed that the trading strategies guided by the neural network classification models generate higher profits under the same risk exposure than those suggested by other strategies.

The research by Cao, Q., Leggio, K.B., and Schniederjans, M.J., was basically a comparison between the work of Fama and French's model and the artificial neural networks in order to try to predict the stock prices in the Chinese market. The purpose of this study is to demonstrate the accuracy of ANN in predicting stock price movement for firms traded on the Shanghai Stock Exchange. In order to demonstrate the accuracy of ANN, the authors made a comparative analysis between Fama and French's model and the predictive power of the univariate and multivariate neural network models. The results from this study indicated that artificial neural networks offer an opportunity for investors to improve their predictive power in selecting stocks, and more importantly, a simple univariate model appears to be more successful at predicting returns than a multivariate model.

Al-Haddad et al., presented a study that aimed to provide evidence of whether or not the corporate governance & performance indicators of the Jordanian industrial companies listed at Amman Stock Exchange (ASE) are affected by variables that were proposed and to provide the important indicators of the relationship of corporate governance & firms' performance that can be used by the Jordanian industrial firms to solve the agency problem. The study random sample consists of (20) Jordanian industrial firms. The study founds a positive direct relationship between corporate governance and corporate performance. Hajizadeh et al. provided an overview of application of data mining techniques such as decision tree, neural network, association rules, and factor analysis and in stock markets. Prediction stock price or financial markets has been one of the biggest challenges to the AI community. Various technical, fundamental, and statistical indicators have been proposed and used with varying results. Soni surveyed some recent literature in the domain of machine learning techniques and artificial intelligence used to predict stock market movements. Artificial Neural Networks (ANNs) are identified to be the dominant machine learning technique in stock market prediction area. El-Baky et al., proposed a new approach for fast forecasting of stock market prices. The proposed approachuses new high-speed time delay neural networks (HSTDNNs). The authors used the MATLAB tool to simulate results to confirm the theoretical computations of the approach.

V. Vamitha, M. Jeyanthi, S. Rajaram and T. Revathi,s research about Multivariate Markov Chain also gave a new approach in the stock market prediction systems. Since 1993 researchers proposed many methods for forecasting enrollments, Temperature prediction, stock price etc in time variant and time invariant first order, higher order, two factor and dual variables. In this paper, we propose a model to temperature prediction from correlated categorical data sequence obtained from similar source. We study a multivariate Markov chain model for categorical data sequences to fuzzy time series. The proposed method gets higher average forecasting accuracy rate than some of the existing methods on temperature prediction. Anass Nahil prposed a new method on stock market prediction which will help many investors to invest their money in right time by which they will get more benefit in near future. Their proposed method was about support vector machine (SVM). It is a popular tool in time series forecasting for the capital investment industry. This machine learning technique which is based on a discriminative classifier algorithm, forecasts more accurately the financial data. By examining the stock price of 5 Moroccan banks, the experiment shows that the SVM can perform better when we add the global evolution of the market to the independent variables. To express the global evolution of the market, three indices of the Casablanca Stock Exchange are used :

MASI, MADEX and Banks Sector Index. Narendra Pahuja, Abhishek Oturkar, Kailash Sharma, Jatin Shrivastava, Dimple Bohra's ARIMA model made a huge change in stock market prediction. Over the years it is observed that stock market data is nonlinear, chaotic & dynamic. This paper is going to present a predictive model for prices of the stocks with the help of ARIMA model. The stock data which is published from the Bombay Stock Exchange (BSE) & National Stock Exchange (NSE) has been used with the model developed for the prediction of stock price. From the results which are obtained, we come to the conclusion that for short-term prediction the ARIMA model has a great potential & also it shows competence with the already present methods for stock price prediction

Mahantesh Angadi, Amogh Kulkarni Sai proposed the method of stock market prediction by using Data Mining Techniques with R. In this work, we explore recurrent neural networks with character-level language model pre-training for both intraday and interday stock market forecasting. In terms of predicting directional changes in the Standard & Poor's 500 index, both for individual companies and the overall index, we show that this technique is competitive with other state-of-the-art approaches.

Nghiem Van Tinh,Nguyen Thi Thu Hien Nguyen Tien Duy proposed the method by using k-means clustering algorithm. Most of the fuzzy forecasting methods based on fuzzy time series used the static length of intervals, i.e., the same length of intervals. The drawback of the static length of intervals is that the historical data are roughly put into intervals, even if the variance of the historical data is not high. In this paper, we present a new method for forecasting enrolments based on Fuzzy Time Series and K-Mean clustering(FTS-KM). To verify the effectiveness of the proposed model, the empirical data for the enrolments of the University of Alabama are illustrated, and the experimental results show that the proposed model outperforms those of previous forecasting models with various orders and different interval lengths. [21]

Objectives

1. To build a classification model for analyzing the features of the companies related to the Stock exchange and Classify in to market category then compare with existing category.
2. To build a clustering model for clustering the existing companies and compare with market category.

Methodology

For this project, we use Dhaka **Stock data.**

First, need to data prepossessing and cleaning the dataset.

Check the data set to find variables and find any missing value in dataset. If any missing value in dataset then clean by imputation or just delete this.

Then explore the data and find the correlation among variables to identify most un-correlated variables.

Select the independent variables to make a classifier.

Secondly, deploy different type of classification algorithm to make a prediction model.

In this analysis choose the following machine learning algorithm

- Logistic Regression
- Decision Tree Classifier
- Support vector Machine

- Random Forest
- Support Vector Machine
- Stochastic gradient descent
- Naïve Bayes Classifier

All classifier use for multi-label classification.

After deploying all algorithm need to find the accuracy score, confusion matrix, Exact Match Ratio, Hamming loss, Recall, Precision, F1 Measure for selecting appropriate model.

Here use K-fold cross validation process to find the accuracy of all model also.

Accuracy

Accuracy for each instance is defined as the proportion of the predicted correct labels to the total number (predicted and actual) of labels for that instance. Overall accuracy is the average across all instances.

Hamming Loss

It reports how many times on average; the relevance of an example to a class label is incorrectly predicted. Therefore, hamming loss takes into account the prediction error (an incorrect label is predicted) and missing error (a relevant label not predicted), normalized over total number of classes and total number of examples.

Precision

It is the proportion of predicted correct labels to the total number of actual labels, averaged over all instances.

Recall

It is the proportion of predicted correct labels to the total number of predicted labels, averaged over all instances.

F1-Measure

Harmonic means of precision and recall.

Clustering analysis

For clustering use Kmeans algorithm. In Kmeans no need to split the dataset into test and training set. here using the whole dataset. To finding optimal cluster number use Elobow method. Initialization error create at random initialization. To avoid this use Kmean++ method at initialization.

Data Analysis

Exploratory data analysis

Original Data set has 374 Rows of information but 3 rows have Null value for Net asset value (NAV) of the stock which cannot impute from others row. So for this analysis, this three row is deleted.

Total Dataset size after cleaning, Total row =371 and column = 13.

Variables

In this dataset, have thirteen variables where category variable is our target variable

Variable	Variable description
Company Name	Name of stock company
Sector	Category of stock
Last price	Market price of the stock
NAV	Net asset value (NAV) of the stock
EPS	Earnings Per Share (EPS)
p/e	Price-to-earnings (P/E) ratio of the stock
Paid up	Paid-up capital per share
Dir	Percentage of director holding share
Pub	Percentage of public holding share
Inst	Percentage of institute holding share
Foreign	Percentages of foreign holding share
Govt	Percentages of government holding share
Category	The category of the stock.

Total Market category:

In present dataset company categories are A,N,B,Z .

Categories	Total companies
A	270
N	13
B	60
Z	31

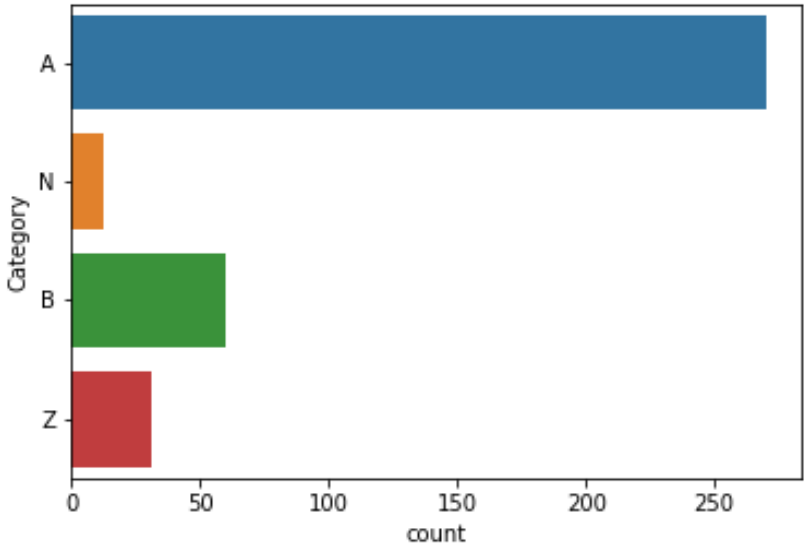
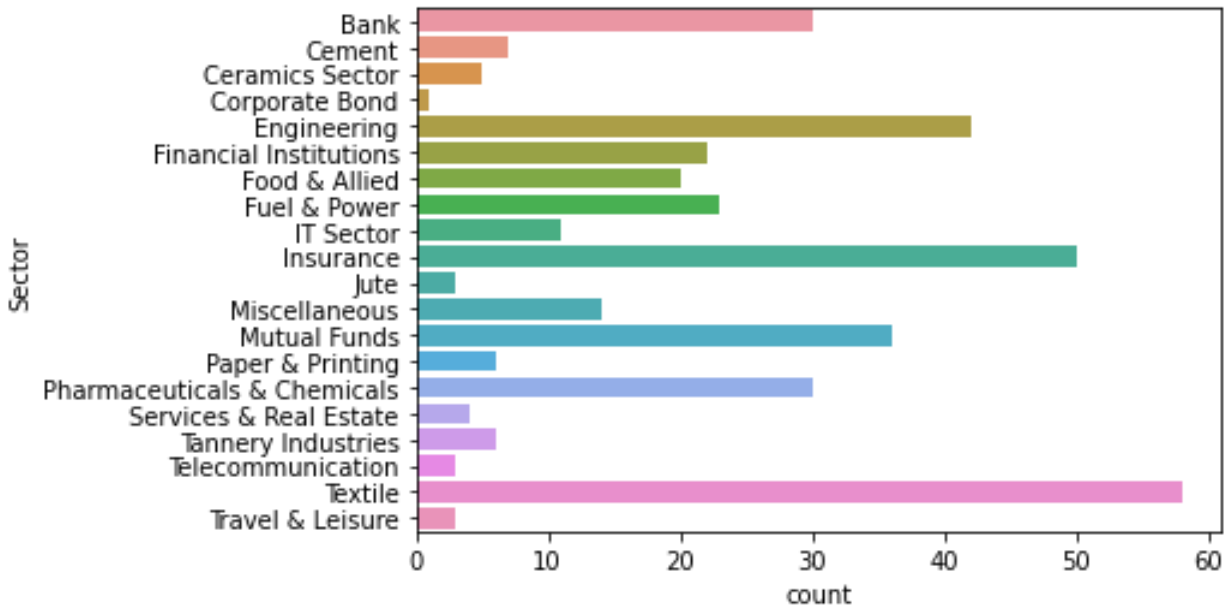


Figure 1: Market categories

Categorical Data

In present dataset has three categorical data- Company name, Sector, Category. In this analysis, company name is dropped because it has no statistical significance. Variable- Sector is converted to numerical value by label encoding. Total sector of "Dhaka stock market data" is 20. In below figure showing total company of each sector.


Bank
Cement
Ceramics Sector
Corporate Bond
Engineering
Financial Institutions
Food & Allied
Fuel & Power
IT Sector
Insurance
Jute
Miscellaneous
Mutual Funds
Paper & Printing
Pharmaceuticals & Chemicals
Services & Real Estate
Tannery Industries
Telecommunication
Textile
Travel & Leisure
Sector
0
10
20
30
40
50
60
count

Correlation Between variables: In below heatmap showing correlation between each variables. There is no strong correlation. Therefore, it can be said that variables are independent.

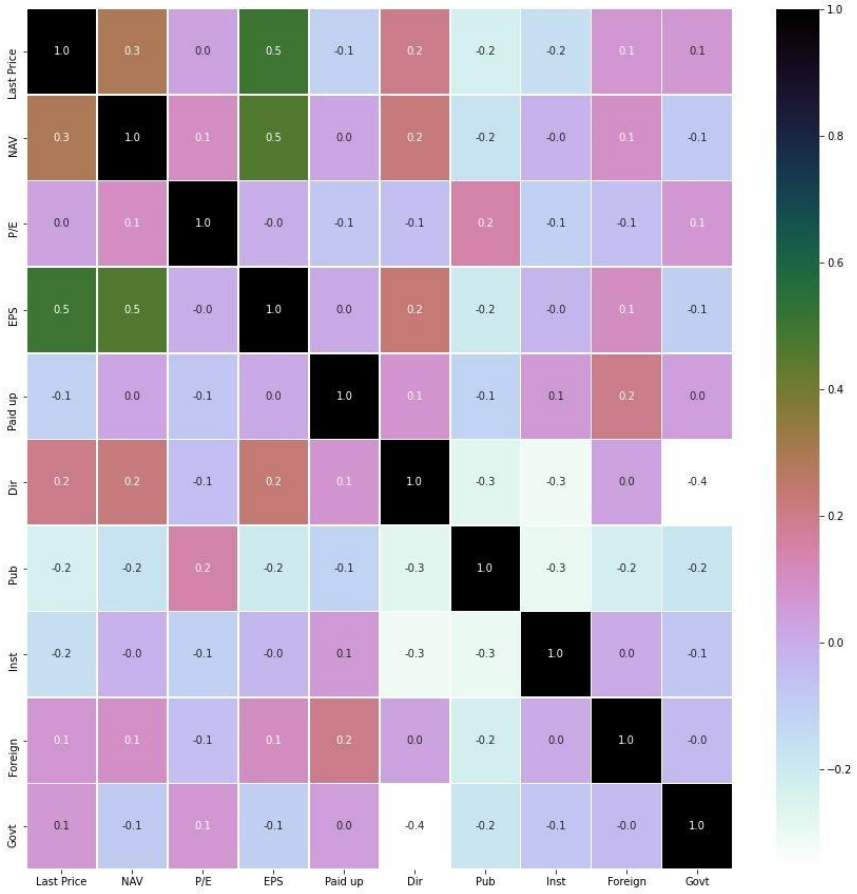


Figure 2: Correlations

Result and Discussion

Table: Model Accuracy

Algorithm name	Accuracy	CV score
Logistic Regression	0.696428571	0.745166177
KNN	0.776785714	0.724613146
Decision Tree Classifier	0.223214286	0.725860584
Random Forest	0.446428571	0.781163682
Support Vector Machine	0.794642857	0.696293326
Naïve Bayes Classifier	0.669642857	0.425970477
Stochastic gradient descent	0.544642857	0.716861208

Table: Model Performance

Algorithm name	Exact Match Ratio	Hamming loss	Recall	Precision	F1 Measure
Logistic Regression	0.6964	0.3036	0.8356	0.6964	0.7451
KNN	0.7768	0.2232	0.7426	0.7768	0.7554
Decision Tree Classifier	0.2589	0.7411	0.7553	0.2589	0.3560
Random Forest	0.5089	0.4911	0.8195	0.5089	0.6181
Support Vector Machine	0.7946	0.2054	0.6597	0.7946	0.7184
Naïve Bayes Classifier	0.6696	0.3304	0.7313	0.6696	0.6868
Stochastic gradient descent	0.4732	0.5268	0.8442	0.4732	0.5901

Clustering analysis Results

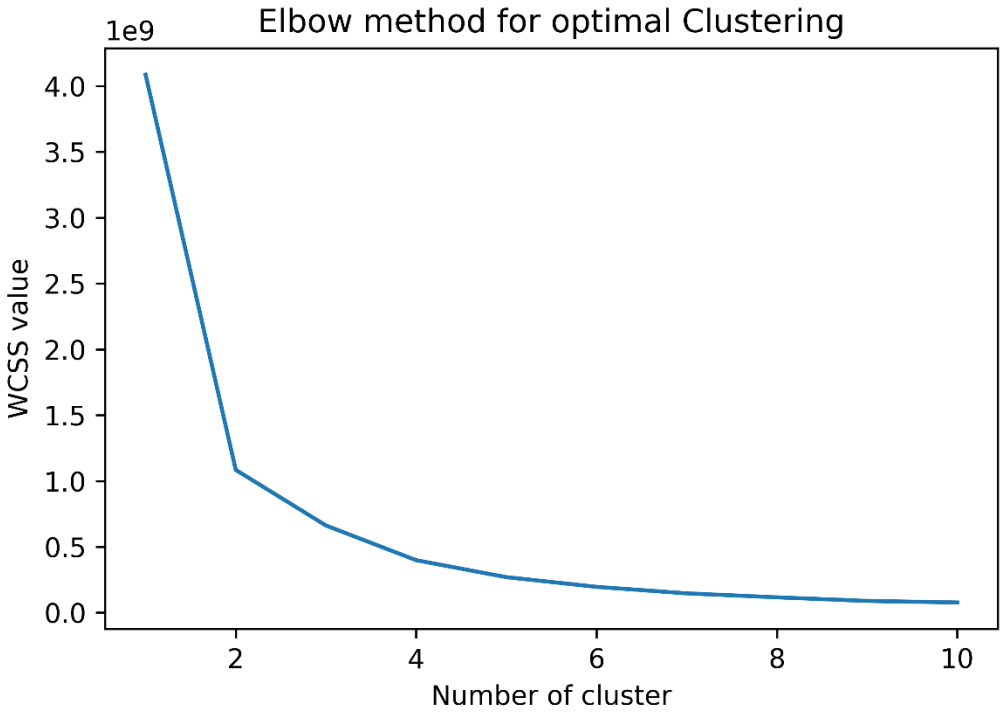


Figure 3: Find the Optimal Clustering

Table: Total predicted members in cluster

cluster	Total member
0	287
1	33
2	1
3	50

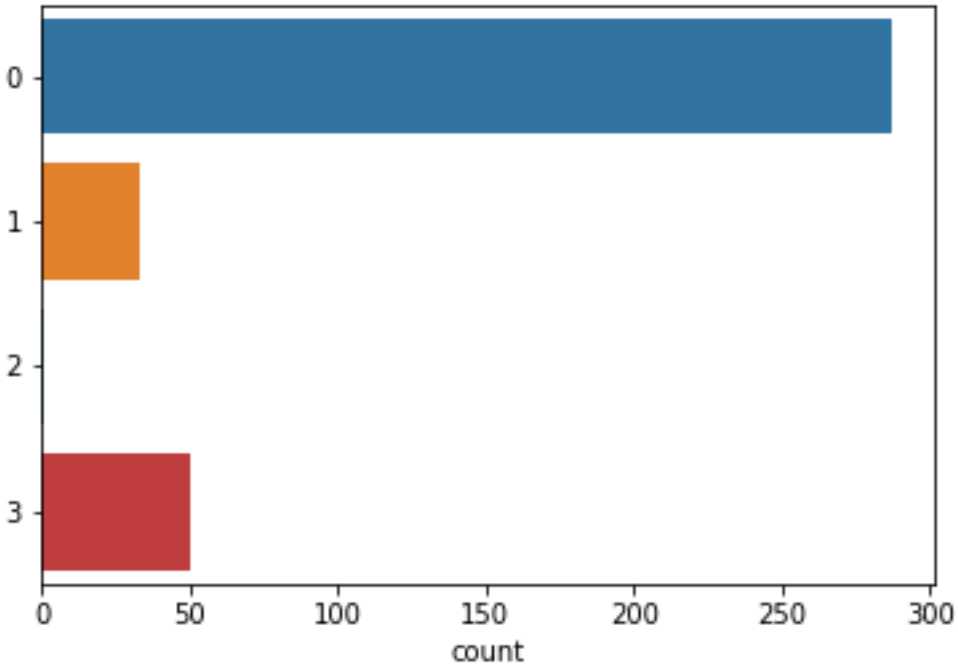


Figure 4: Predicted Cluster members

Table: Cluster analysis performance

Cluster	precision	recall	f1-score	support
0	**0.69**	**0.74**	**0.71**	**267**
1	**0.09**	**0.05**	**0.06**	**60**
2	**0**	**0**	**0**	**13**
3	**0.1**	**0.16**	**0.12**	**31**

Discussion

From above analysis and result, it can say that accuracy level for all algorithm is below 80%. Hamming loss is low for SVM and KNN so that this two model has low prediction error (an incorrect label is predicted) and missing error.

In Logistics regression, Random Forest and Stochastic gradient descent model gives the highest Recall value, which indicate that those models have low False Negative value.

In KNN and SVM model gives the highest Precision value, which indicate that those models have low false positive value.

F1 Measure is high in Logistic Regression, KNN and SVM so this three algorithm is good among others algorithm.

In cluster analysis performance is very low.

Conclusion

From above analysis, we can draw a conclusion that “Dhaka Stock exchange data” is not enough good dataset and not sufficient data for build a classification model to predict market category.

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