

**ECONOMIC
DETERMINANTS
OF THE
NEW YORK
STOCK MARKET**

By
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in partial fulfillment of the requirements for the degree of
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Beirut
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Lebanese American University
Graduate School Of Business Administration

***ECONOMIC
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OF THE
NEW YORK
STOCK MARKET***

Approved By

Prof. Yusuf Shibl



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Beirut
April 18, 1996

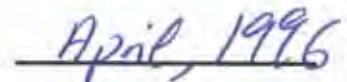
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Dedication

To my husband, Abdul Al Latif Hassounah, who brings joyous serenity to my life and new meaning to the word of understanding

To my daughter, Najwa, the sweet daughter , whose pride in me has been a tremendous source of pleasure and relief. For the person you are , and for the person you will become. The fine woman, the good friend and maybe the great business woman.

To my brothers, Yahya, Mohammed and Ibrahim, and to my only sister Rawya, with all my love and heart.

And To my mother, the best friend, the greatest love, the sweetest woman , the most extraordinary blessing in my life how lucky we all are to have you.

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ABSTRACT

Profit maximization is the aim of investors whether working as individuals or as enterprises. One of the ways to achieve profit is to invest in the stock market. Consequently, forecasting the New York stock market as revealed by the Dow Jones Industrial Average becomes a crucial task.

The purpose of this study was to predict stock prices represented by the Dow Jones Industrial Average depending on certain macroeconomic variables in the United States Of America namely: Inflation rate, Interest rate, Federal Budget Deficit, Trade Deficit, and Gross Domestic Product. This is in conformity with the Traditional or Fundamental Approach to stock determination.

The study provided a historical review about stock markets. It examined the evolution of the stock market, differentiated between securities markets according to the type of market, market time periods, location of the transaction, the institutional arrangement, and the capital formation. Moreover, it differentiated between the Over-the-Counter Market and the Securities Exchanges and gave a brief summary about the major markets.

The study explained the investment approaches behind stock market behavior. It discussed the four major approaches to investing in common stocks:

1. The Traditional or Fundamental Approach.
2. The Technical Analysis Approach.
3. The Randomized Selection Approach.
4. The Portfolio Theory Approach.

Moreover, the study discussed the three most widely known investment theories:

1. The Dow Theory.
2. The Random Walk Theory.
3. The Efficient Market Hypothesis.

A regression analysis was conducted to determine the association between the Dow Jones Industrial Average and the five basic economic variables namely: interest rate, inflation rate, Gross Domestic Product, trade deficit, and Federal budget deficit. Moreover, it assessed the impact of the Dow Jones Industrial Average on each of the five aforementioned economic variables. Five hypothesis were tested through using Regression Model analysis.

Finally, the paper came out with some comments and recommendations namely:

1. The existance of a negative association between Dow Jones Industrial Average versus trade deficit and federal budget deficit.
2. Revealed a positive correlation between Dow Jones Industrial Average and the Gross Domestic Product.
3. The study refused the existance of a valid association between the Dow Jones Industrial Average and either of interest rate or inflation rate.

CHAPTER I

INTRODUCTION

A- PURPOSE OF STUDY

The purpose of this study is to predict stock prices represented by the Dow Jones Industrial Average depending on certain macroeconomic variables namely: Inflation rate, Interest rate, Federal Budget Deficit, Trade Deficit, and Gross Domestic Product within the United States of America. Financial factors, although very crucial are not the concern of this study.

The stock market plays an important role in a modern industrial economy, both as a harbinger and a facilitator of economic activity. Stock price levels effect the confidence and behaviour of both businesses and households. Moreover, the equity markets are a primary means by which businesses and industries raise capital to finance growth and provide jobs. Besides the importance of stock sales in raising funds, stock

sales provide new equity capital and public equity markets to finance innovative business ventures which are the primary engine for the nation's economic growth.¹

Moreover, "equity markets are also inextricably tied to the wider financial system through the banks and other financial institutions. Given the importance of the equities markets to the economy and to the public, effectively structured and functioning equities markets are essential."²

It is worth mentioning here that investors usually make comparisons of valuations in different countries. This leads to a process of ratching up among worldwide stock markets. Amongst this globalization of equity investment, trading volume on the U.S. markets continued to dominate worldwide trading. This has made the trading on the U.S. markets a leader of trading on the markets around the world.³

B- SCOPE OF STUDY

Profit maximization is the aim of investors whether working as individuals or as enterprises. This could be easily achieved if we could forecast stock prices. More words have been written and time spent on forecasting stock prices than any other financial subject.⁴

¹ The Presidential Task Force on Market Mechanisms, Report of The Presidential Task Force on Market Mechanisms (Washington D.C.: U.S. Government Printing Office, 1988), p. 1.

² The Presidential Task Force on Market Mechanisms, p. 1.

³ The Presidential Task Force on Market Mechanisms, p. 10.

⁴ Martin J. Pring, How to forecast Interest Rates A Guide To Profits For Consumers, Managers, And Investors (New York: McGraw-Hill Book Company, 1981), p.1.

However, due to the importance and power that the United States stock markets have worldwide, the New York stock market was chosen as the basis for this study.

This study is composed of five chapters. The First Chapter is an introductory one. The Second Chapter is a theoretical one and will concentrate on the historical review of the United States stock markets. Chapter Three states the theories of different macro economist schools in explaining stock market behavior and its impact on the economy.

Chapter Four includes regression analysis and states the empirical results of the statistical tests performed. These tests are used to test whether prices of stocks in the New York Stock Market can be predicted.

Finally, Chapter Five represents the conclusion of this study.

C- METHODOLOGY AND DATA LIMITATIONS

To achieve the purpose of the study, and in addition to the research reviewed, regression analysis and related statistical tests are used to determine the impact of the macroeconomic variables on the Dow Jones Industrial Average.

The reason why regression analysis is used in this study is that it is a statistical technique used to discover the apparent dependence of one variable upon one or more other variables. Regression allows conclusions to be drawn from the pattern that emerges in the relationships between the sets of observations. Moreover, when the

quantifiable data is entered into the regression analysis, it helps to determine their impact upon the dependent variables.⁵

The regression results in this study are reached using the Microsoft Excel Package, Version 5.0, and time series data over the twenty seven years extending from 1964 to 1990. Synchronized and lagged variables are separately tested regarding the effect of the macroeconomic variables namely: Inflation Rate, Interest Rate, Trade Deficit, Federal Budget Deficit, and Gross Domestic Product on the prices of stocks that may be represented by the Dow Jones Industrial Average.

The 1960-1990 daily data on the Dow Jones Industrial Average was available. Annual data on the Dow Jones Industrial Average could not be attained. Thus, the average of the daily data had to be calculated to reach the required annual data.

Moreover, the data on the macroeconomic variables: Inflation Rate, Interest Rate, Trade Deficit, Federal Budget Deficit, and Gross Domestic Product could not be attained for the period 1960 to 1963. Thus, the study had to be constrained for the period extending from 1964 to 1990 instead of 1960 to 1990.

⁵ Evan J. Douglas, Managerial Economics Theory, Practice, and Problems (Englewood Cliffs, New Jersey: Prentice Hall, inc., 1983), pp.182-183.

demand could be brought together and where the seller has his best chance in finding currency in trading his property. But, this stock market can only gain importance and become an exchange if the number of securities traded is very large to entice middlemen to visit the market and thus encourage the public to invest their money in the securities that are traded in this market.

B. DIFFERENTIATION OF SECURITIES MARKETS⁷

The securities market is any place where transactions in securities take place. Securities markets are usually differentiated by the functions and by the institutions associated with them.

Differentiating securities markets according to:

1- Types Of Markets

- a. The Primary Market: Is the market for new issues of securities.
- b. The Secondary Market: Is the market for existing securities.

2- Market Time Periods

- a. The Capital Market: Is the market for long-term securities.
Long-term means a period of one year or more.
- b. The Money Market: Is the market for short-term securities.
Short-term means a period of one year or less.

⁷ Charles A. D' Ambrosio, A Guide To Successful Investing (Englewood Cliffs, New Jersey: Prentice Hall Inc. , 1970), pp. 31-34.

3- Location Of Transaction

- a. Over-The-Counter Market: No Physical or Geographical location exists.
- b. Securities Exchange: Is when transactions take place at a specific Physical and Geographical location.

There are fourteen securities exchanges registered with the US Securities and Exchange Commission (SEC), but the best known of these are the New York Stock Exchange (NYSE) and the American Stock Exchange (AMEX), that approximately execute 95% of all transactions of securities exchange.

4- The Institutional Arrangement

This is a way of differentiating the securities market by the institutions involved, which are various. These institutions include investment companies, insurance companies, private pension funds, investment banks and the like. These institutions act as merchants who buy, sell, and underwrite securities.

5- Capital Formation

Capital formation is the sum of net additions to the capital stock of a society. Capital stock consists of all physical goods which are being used for the production of other goods and services, as well as the inventories on shelves and stores. Capital formation takes place on the primary market so that the firm that needs money to invest in plant and equipment can have a cash flow.

Nevertheless, secondary markets have an essential role by providing the easy resale of these securities, thus making it easier the sale of new issues by the primary market which lowers the cost of capital and results in capital formation.

C. THE SECURITIES MARKET

The securities market consists of the Over-The-Counter market and the Securities Exchange.

1. Over-The-Counter Market (OTC)

The over-the-counter market serves a larger number of companies than the listed exchanges although the dollar-volume of stock transactions is greater on the latter. Disregarding certain exceptions, usually the securities of smaller firms are listed on the OTC market.

Dealer inventories usually buy and sell securities in the OTC market mostly. These dealers are basically established investment banking or brokerage houses that usually undertake to make markets for certain securities. The profits gained by these dealers is the mark-up between the offer and the bid price. The risk these dealers take is that a large number of investors may want to sell, thus, increasing the inventory of these dealers which obliges them to make price concessions to move the inventory to other investors.

The status of the OTC market has been greatly improved by the National Association of Securities Dealers (NASD) which now maintains computer records of price information that can be accessed on "Quote Machines" just as listed securities are. Although these quotes are not reported through ticker service, daily price ranges as well as the volume of actual

a. **NASDAQ**¹⁰

The National Association Dealers Automated Quotation System. It ranks third in size after the NYSE and the Tokyo Stock Exchange. It serves as an electronic link between OTC market makers and almost all of the major retail firms. The NASDAQ is a computerized communications system that collects, stores, and displays instant quotations from a nationwide network of OTC market makers.

To meet the needs of investors, OTC traders and market makers, the NASDAQ operates on three levels:

Level 1 enables individual investors, as clients of retail branches of brokerage firms, to get current, accurate and visible quotations. This is established through obliging market makers to feed changes in bid or asked prices into the system immediately.

Level 2 are special units with TV-type screens that serve large scale professional order executors and broker dealers retailing OTC securities to the public.

Level 3 terminals are similar to those of Level 2, but they have additional features that allow dealers to enter, change, or update quotations for the stocks in which they make markets.

10 Cohen and Zimbarg and Zeikel, p. 58.

b. The National Market System:¹¹

The National Market System (NMS) was established in 1979. It now has a share volume that is half that of the NASDAQ and more than 2,000 issues listed. It allows for liquidity through the competition of the multiple market makers. Requirements for listing for companies with a four year record are:

- Capital surplus should be \$ 8,000,000.
- At least 300 shareholders.
- At least two market makers for each issue.
- A public float of 800,000 shares.

However, newer companies should have a public float of 350,000 shares, a net income of \$ 300,000 for the previous fiscal year, and a minimum price of \$ 3 per share.

c. The National List:¹²

The securities listed on the National List are similar to those listed on the NMS except that the listing requirements demanded by the National List are less demanding. Moreover, they report only bid and asked quotes and volume.

¹¹ Cohen and Zinbarg and Zeikel, p. 59.

¹² Cohen and Zinbarg and Zeikel, p. 59.

d. **The Supplement List:**¹³

In the Supplement List only the bid and the asked quotes are reported. Over 1,000 companies do not meet the qualifications for listing in the NMS or the National List, but are high in dollar-value.

2. **Securities Exchange**

A Security Exchange is a formal association of members, with by-laws and a constitution that must be registered under the Securities and Exchange Act of 1934.¹⁴

As mentioned earlier, there are a number of registered exchanges and two National Exchanges, the NYSE and the AMEX.

a. **The New York Stock Exchange(NYSE)**¹⁵

The NYSE, known as the "Big Board", is the second oldest and the largest of the 16 principal US financial markets; it accounts for over 80 percent of all domestic stock exchange activity. Once the largest world market in total market capitalization, it now ranks second to the Tokyo Stock Exchange.

The NYSE was originated by a group of twenty four stock traders who met in the financial district of lower Manhattan, on 62 Wall

13 Cohen and Zinbarg and Zeikel, pp. 59-60.

14 Hayes and Bauman, p. 61.

15 Howard M. Berlin, The Handbook Of Financial Market Indexes, Averages, and Indicators (Homewood, Illinois: Richard D. Irwin, Inc. , 1990), pp. 46-50.

Street, on May 17, 1792, so as to arrange for a place for organized stock trading. This association became known as the New York Stock and Exchange Board, on March 8, 1817. In 1869, this association was renamed as the New York Stock Exchange.

Currently, the NYSE computes 5 capitalization-weighted indexes, and on December 31, 1965 each of these indexes was assigned a base level of 50.

However, when a change in capitalization occurs, such as when a listed company acquires an unlisted company or when a company offers rights for new shares, adjustments are directly made to compensate for such changes.

A brief discussion of the 5 indexes that are computed by the NYSE follows:

1. NYSE Composite Index

The NYSE Composite Index is a broad-based index of the prices of the 1,600+ shares of the companies that are listed on the NYSE and which represent 46 industrial sectors. It is also called the all-share Composite-Index. Nevertheless, the SIC codes determine the placement of a company within a particular sub-index depending upon the related company's major source of revenues.

On May 28, 1964 the computation of the composite index began on a daily basis by the NYSE.

2. **NYSE Industrial Index**

The NYSE Industrial Index is also a broad-based index that represents more than 1,000 NYSE listed industrial companies and they are distributed over 29 industrial groups.

3. **NYSE Utilities Index**

Contrary to the other indexes, the NYSE utilities index is a narrow-based index that approximately represents 40 NYSE-listed public utility companies whose work mainly involves electric power, natural gas, telecommunications, and water supply.

4. **NYSE Transportation Index**

The NYSE Transportation Index is a broad-based index that represents more than 175 NYSE-listed companies whose work mainly involves transportation services in air, rail, trucking, and miscellaneous.

5. **NYSE Financial Index**

The NYSE Financial Index is also a broad-based index representing around 400 NYSE-listed credit agencies, savings and loans associations, banks, exchanges, insurance, security and commodity brokers, and investment companies.

The NYSE has now become a corporation that has 1,366 members who have bought their memberships or seats on the exchange. The prices of those seats rise and fall with market volume and stock

prices. That is, the greater the volume of the market the higher goes the price of the seat ownership. These seats can be leased by a member provided the approval of the exchange. Members through payment of an annual fee are entitled to physical or electronic access to the trading floor.¹⁶

Not any firm can be listed on the NYSE, there are certain qualifications to be met, in addition to keeping the public informed on the progress of its affairs. The most important determinants for eligibility are:

1. Is the firm local or national in scope.
2. What is the firm's relative position and standing in the industry.
3. Is the firm engaged in an expanding industry, and what are the prospects that it is to maintain its position.

It should be noted that each application for initial listing in the exchange is judged on its own merits, but there are minimum requirements for listing in the Exchange, these requirements are:

- "a. Demonstrated earning power under competitive conditions of \$ 2.5 million annually before taxes for the most recent year and \$ 2 million for each of the two preceding years- or an aggregate for the last three fiscal years of \$ 6.5 million together with a minimum in the most recent fiscal year of \$ 4.5 million. (All three must be profitable).

16 Cohen and Zinbarg and Zeikel, p. 48.

- b. Net tangible assets of \$ 16 million, but greater emphasis is placed on the aggregate market value of the common stock.
- c. A maximum of \$ 10 million in market value of publicly held common stock.
- d. A total of 1 million shares of publicly held common stock.
- e. Two thousand holders of 100 shares or more."¹⁷

Currently the association of more than 1,500 major companies are listed on the NYSE, which means they have been accepted for trading. Trading on the NYSE takes place between the hours of 9:30 A.M. and 4:00 P.M. New York time, from Monday and till Friday.

The exchange floor is almost the size of a football field, physically. There exists fourteen all-electronic posts, that have a core of data processing and communication equipment at which listed stock issues are traded.

Automation has made possible the orderly processing of the 150-million-share day and is expected to be able to handle the 400-million-share day of the future. The consolidated tape system that is used is a high-speed ticker capable of printing 900 characters/minute. This system provides composite tape carrying reports of trades in NYSE listed stocks whether these trades have been carried on the regional exchange or on the floor of the NYSE itself. Thus, the broker who is using a desk-top-electronic machine

¹⁷ Cohen and Zinbarg and Zeikel, pp. 53-54.

can immediately know the state of the market of any listed security simply by punching in the stock symbol.¹⁸

b. The American Stock Exchange(AMEX)

Previously known as the "New York Curb Exchange" until 1953 when its name was changed to the American Stock Exchange. Its first name was due to the fact that it was an outdoor market, whose members traded along the curb on Broad and Wall Street from its origin and until 1921.

The listing requirements and the procedures taken on the AMEX are similar to those of the NYSE. Nevertheless, the companies listed on the NYSE are generally more mature and more seasoned than those listed on the AMEX. Thus, the AMEX usually provides a kind of ground-proving for newer companies which as they grow and expand, transfer their listing to the NYSE.

However, dual listing of shares on both exchanges was permitted starting 1976, so as to allow for moving to a more centralized market system.

Automation on the AMEX moves with that of the NYSE and in cooperation with it.

In an effort to cut costs and for enhanced efficiencies, the Securities Industry Association has suggested the merging of the AMEX and the NYSE. Such a merge would be a step towards the desired central market place for securities but the issue of disagreement was

¹⁸ Cohen and Zinbarg and Zeikel, p. 48.

who would have the options market, knowing that the AMEX is very successful with its options market. The NYSE sells about 80%, the AMEX 7%, and all the other regional exchanges sell about 12% of the total shares that are sold over the registered exchanges. Moreover, AMEX companies can choose specialists from among a list of seven provided by the exchanges whereas there is no choice allowed on the NYSE.¹⁹

The listing requirements on the AMEX are the following:

- "A corporate net worth of \$ 4 million.
- Annual earnings of \$ 400,000 after all charges and taxes, not including non recurring items.
- 500,000 shares of common stock not including those held by corporate officers and directors, but including 150,000 shares held in lots of 100 or more.
- 1,000 public shareholders, of whom 500 each owns 100 or more shares.
- A market value of \$ 3 million."²⁰

c. **The Regional Exchanges**²¹

There are five regional exchanges, Midwest, Pacific, Boston, Philadelphia, and the Cincinnati. These exchanges have expanded their proportion of total shares sold on all registered exchanges since they have benefited from the Inter market Trading System (ITS) that linked the seven exchanges with the OTC market. More

¹⁹ Cohen and Zinbarg and Zeikel, pp. 54-55.

²⁰ Howard M. Berlin, p. 22.

²¹ Cohen and Zinbarg and Zeikel, pp. 55-56.

than 90% of the issues traded on the regional exchanges are also traded on the NYSE and the AMEX. Moreover, over a third of the member organizations are also members of the NYSE.

The larger regional exchanges generally list some 600 to 900 companies each, and usually odd lots are a larger part of the total trading volume.

The Cincinnati Exchange

The Cincinnati Exchange was created by the SEC in accordance with rule 19c-3. It is entirely computerized and trading on this exchange is limited in the number of shares traded and in the specific stocks that can be traded, except for a few stocks which have an active market on this exchange.

The most active participant in this market was Merrill Lynch, but it withdrew since the organized markets had greater order flow.

Eight stock exchanges are tied into an electronic communications network through the ITS. These exchanges are the NYSE, AMEX, Boston, Midwest, Pacific, Philadelphia, Cincinnati, and NASDAQ. Traders are enabled through this linkage to be completed by brokers and market makers in seconds, thus, providing information on the best attainable price within the total national network.

The last trade price and the local bid and offer at each exchange are shown through the ITS monitor for all listed stocks traded within this system. Steady growth in the number and volume of these stocks has been noted. A central computer to store those bid and

offer prices is used and transactions are automatically reported in sequence so that all brokers and investors can have equal access to all bids and offers. So, the representative checks his screen to see which exchange offers the best price, wires the order which is flashed on the screen and confirmation of the order is made after sellers and buyers are matched. Less than two minutes are needed for the whole trade to take place.

The Philadelphia Exchange

The Philadelphia stock exchange is the oldest. It began stock options trading in 1975 which now accounts for more than 50% of the exchange's business. Moreover, it is the only market for more than 75 stock options. It has about 100 primary listings and 30 regional stocks that are neither listed on the NYSE nor on the AMEX, in addition to trading in more than 1,400 multi-listed stocks.

The Philadelphia stock exchange has gained a reputation for innovation, for in 1982, it has begun trading in foreign-currency options and has linked with the London Stock Exchange for foreign-currency options.

The Boston Exchange

The Boston exchange is the smallest and has the least trading volume. Moreover, it is the least modernized and was the last on to be computerized and to be linked to the ITS.

The Pacific Coast Exchange

The Pacific Coast Exchange has 10% market share of the NYSE listed stocks, i.e. 4% of trading volume. It now opens more than the NYSE and that is why it finds itself busier after the closing of the NYSE.

D- STOCK - EXCHANGE ORDERS:²²

There are many types of orders, the most commonly used are the Market Order, the Limit Order, the Good Till Canceled Orders, Stop Orders, Stop-Loss order, Stop-Limit Order, Complete Discretionary Orders and Limited Discretionary orders.

1. Market Orders:

When a market order reaches the commission broker, he or she has to immediately execute the order at the best price that can be obtained at the post where the specified stock is traded. It is always a one day order since they are quick to execute. About 75% to 85% of all orders are market orders. However, market orders are mostly sell orders and not buy orders since the seller is usually more anxious to take action than the buyer.

²² Cohen and Zinbarg and Zeikel, pp. 49-50.

2. **Limit Orders:**

Such an order takes place when the seller or buyer want to specify the price at which the order is to be executed. Thus, the commission broker usually executes such types of orders at the limit set or if he/she can attain a better price for the customer. So if it is a buy order, it has to be executed at the price set by the customer or lower and if it is a sell order, it has to be executed at the price set by the customer or higher.

Nevertheless, if at the time the limit order reaches the commission broker the market price of the stock is not around the specified limit price, the customer has to wait till the market price approaches the desired specified price. Meanwhile, the commission broker handles the limit order over to the stock specialist who enters it in the specialist's book which is known as the "Limit Order System". This system electronically files orders so as to be instantly executed when and if the market reaches the specified limit price. Limit orders up to 30,099 shares are accepted in the "Electronic Display Book System" and printed orders are delivered to the trading post or member firm's booth for storage.

3. **Good - Till - Canceled Orders:**

Good - Till - Canceled Orders which are not executed on the day of submission, are automatically stored until executed or canceled.

This process is coordinated through the use of the Designated Order Turnaround System (DOT and Super DOT). The DOT System is an electronic order totaling system through which market and limit orders of member firms are directly transmitted to the post where the relevant stock is traded. Upon

the execution of an order, a report is directly flashed to the member firm through the same electronic circuit within a maximum of three minutes . 58% of all orders are DOT participated. DOT system allows member firms to enter market orders up to 1,099 shares and limit orders up to 30,099 shares.

4. **Stop Orders:**

To try to limit a possible loss or to protect a paper profit, stop orders are used. Stop orders are of two kinds, stop orders to sell and stop orders to buy. They are conditional market orders and may be day, week, month or Good-Till-Canceled, they are executed if something happens. Thus, the stop order to buy is used to limit losses and the stop order to sell is used to protect gains.

5. **Stop-Loss Order:**

A stop-loss order is placed when the investor is not sure of getting the exact price specified by the stop-order. An example is when the market takes a sharp sudden drop, the commission broker sells at whatever price that can be obtained, which may be below the stop-price. But stop-loss orders has caused the NYSE to become worried and to stop the placement of such orders in certain stocks and for a certain period of time so as to prevent market repercussions, since if the market takes a sudden drop in high-flying speculative stocks, it could cause a chain of stop-loss orders to be executed which may cause a sharp break in the price of such stocks.

6. **Stop - Limit Order:**

The stop-limit order is a hybrid between the stop-loss order and the stop-order. It allows the investor to designate the acceptable minimum and maximum price for purchase or sale. Thus, if the commission broker cannot execute the order at the specified price or better, the transaction doesn't take place. Stop-Limit orders may be one day, week, month or open Good-Till Canceled.

7. **Complete Discretionary Order:**

A complete discretionary order is when the investor gives a written permission, with the approval of a member of the firm, to the commission broker to determine when to sell or buy, what to sell or buy and in what volume.

8. **Limited Discretionary Orders:**

A limited discretionary order is similar to the complete discretionary order, but the commission broker determines only the timing and the price.

However, the limited and the complete discretionary orders are usually used by those who are ill, aged, or who are on a prolonged vacation. The basic requirement for the placement of such orders is a long and close relationship with a reputable commission broker.

It is essential at this point to discuss how an order, whatever is its type, is handled on the exchange. The exchange itself is merely the marketplace, the physical setting, and the equipment provided to execute orders. It neither buys, nor sells, nor sets prices of stocks. A number of prospective buyers and sellers bid in an active market in a double auction manner so as to determine the prices. This is done through the electronic clerk system, called the Opening Automated Report Service (OARS). This system works by matching all the sell and the buy orders that are entered before the stock market opens everyday, thus enabling the specialist to determine the opening price of stocks. Moreover, the NYSE enables a member firm to directly send an order to the specialist, through the Designated Order Turnaround system, discussed earlier, at his post where he will be exposed to the full flow of orders in that stock. When the order is executed, it will be confirmed to the member firm through the same DOT system, and the latest

quotes will show on all screens on each trading post. The Touch Trade, is a new electronic system that allows a trade to be executed by a single touch, reported to the tape and to the originating firm. It also enters the transaction into the comparison system for accuracy, thus updating the quotes for both limit - orders and market orders.

CHAPTER III

THEORIES EXPLAINING STOCK MARKET BEHAVIOR

A- INVESTMENT APPROACHES

There are four identifiable approaches to investing in common stocks. These are the Traditional or Fundamental Approach, the Technical Analysis Approach, the Randomized Selection Approach, and the Portfolio Theory Approach.

1- THE TRADITIONAL OR FUNDAMENTAL APPROACH²³

The Traditional Approach is the predominant approach to investing in common stocks. This approach states that before the investment in common stocks is made, the investor should make a thorough investigation of the fundamental factors that indicate the value of a security. The most important of these fundamental factors are:

- a. The economic status of the economy as a whole.
- b. The economic status of the specific industry.
- c. The specific firm's basic operating risks, its earnings, dividend records, its historical and future expected growth rate.

²³ Charles A D' Ambrosio, p. 4.

After studying all these factors and many other, the investor places a value for these securities based on the selling prices of other securities that have comparable risk. Thus, according to the traditional approach, if the appraised value is more than the market price of the valued stock, it should be bought or if held it should not be sold. On the other hand if the appraised value is less than the market price of the valued stock, it should not be bought or if held it should be sold.

Nevertheless, the most difficult problem that faces those applying the traditional approach is the correct determination of the appropriate risk level for the evaluation and classification of a stock in a specific class, and the establishment of the correct expected earnings per share and the appropriate time-period that should be taken into account.

2- TECHNICAL ANALYSIS DEFINED²⁴

Technical Analysis reflects the idea that the trends of the stock market are determined by the changing attitudes of investors towards the different economic, psychological, political, and monetary forces. The art of technical analysis lies in the early identification of the changes in these trends and to maintain an investment posture up to the point when a reversal of that trend is identified. Thus, by studying previous market turning points, analysts may be able to develop some characteristics that can help identify major market junctures. It should be mentioned that the market never repeats a performance exactly, but the recurrence of similar characteristics is enough for the technical analyst to identify the tops and bottoms of the market.

²⁴ Martin J. Pring, Technical Analysis Explained The Successful Investor's Guide To Spotting Investment Trends And Turning Points (New York: McGraw Hill Inc. , 1985), pp. 2-5.

Technical Analysis can be broken into three essential areas: The Sentiment Indicators, The Flow Of Funds Indicators, and The Market Structure Indicators.

a. **The Sentiment Indicators:**

The sentiment or expectational indicators monitor the actions of most market participants. History has proved that the actions of certain groups of investors are consistent in their investments at major market junctures. An example is the actions of mutual funds and advisory services who are usually wrong at market turning points, i.e. they are bullish at market bottoms and bearish at market tops. On the other hand, the major stockholders and key employees of a company as well as the NYSE members are usually correct at the market turning point, i.e. they buy at market bottoms and sell at market tops.

b. **The Flow - Of - Funds Indicators:**

For each sale there has to be a purchase, thus the amount of money flowing out of the market should equal the amount flowing in. Thus, the flow of funds' approach is concerned with the balance before-the-fact between supply and demand that is known as the "ex-ante" relationship. An example is when at a given price there is more demand than supply on an ex-ante basis, the price of the stock will eventually rise to bring back supply and demand into balance.

The most widely used indicator for this approach is the short-interest ratio that is calculated by dividing the NYSE short interest position, i.e. the number of shares sold short, by the daily volume for the month in action. A high short interest of 1.8 to 2.0 or more is considered bullish.

The disadvantage of this approach is that the data reported are usually after the fact. Moreover, although the data measures the availability of money, there is no guarantee that investors will use this money to invest in the stock market.

c. **The Market Structure Indicators:**

This approach embraces the character of the market indicators that monitor the trend of price indexes, market cycles, market breadths, and market volume so as to evaluate the market.

The theory adopted by the technical analysis approach is that the stock market is a reflection of mass psychology in action. Thus, it attempts to forecast future price movements by identifying market changes early since trends tend to perpetuate themselves.

3- **THE RANDOMIZED SELECTION APPROACH** ²⁵

The randomized selection approach will be discussed thoroughly later on, so it will be mentioned briefly here. It states that the investor should take all the listings on the NYSE, randomly through fifteen darts, and construct a portfolio consisting of the securities hit by the fifteen darts since stock price movements are random and do not follow a trend.

4- **THE PORTFOLIO THEORY**²⁶

The Portfolio Theory approach states that upon constructing a portfolio, of stocks for example, the risk and return of each stock evaluated for inclusion in the portfolio should have as little correspondence as possible to the risk and

25 Charles A D'Ambrosio, p. 5.

26 Charles A D'Ambrosio, p. 5.

expected return of the other evaluated stocks that are considered to be included in the portfolio.

It should be noted that the portfolio approach should be used in conjunction with the traditional approach since the basic input data for the portfolio approach is arrived at by the traditional approach on a stock - by - stock basis. Thus, the relationship between the basic input data, i.e the expected return and risk of a particular stock must be related to those of the other candidate stocks considered for inclusion in the portfolio so as to arrive to the portfolio that best suits the investor. In this approach, the selection must be made on a portfolio - by - portfolio basis and not on a stock - by - stock basis as that of the traditional approach.

Nevertheless, Technical Analysis does not provide suitable input data for the portfolio approach since technical analysts evaluation of the expected return and risk is usually highly subtle.

On the other hand, the randomized selection approach is the least suited for the portfolio approach since the random selection of stocks is made randomly with equal chance given to each and every stock regardless of its expected return or risk.

The significance of the portfolio approach is that, unlike the traditional approach, it takes into consideration all the stocks included in a portfolio. Thus, allowing an investor to note the effect that results from adding or deleting a stock on the entire portfolio's risk - rate of return combination.

B- INVESTMENT THEORIES

The most important and widely known theories to investment are The Dow Theory, The Random Walk Theory, and The Efficient Market Hypothesis.

I. THE DOW THEORY²⁷

The oldest and the most publicized method for identifying major trends in the stock market is the DOW THEORY. Its object is determining changes in Primary or major market movements. Its concern is in the direction of a trend and does not forecast the duration or the size of the change.

This theory evolved from the work of Charles H. Dow and was published in a series of Wall Street Journal editorials between 1900 and 1902. The behavior of the stock market was used by Dow as a barometer of business conditions and not as a basis for forecasting stock prices themselves.

Dow's principles as we know them today were developed and organized by Dow's successor, William Peter Hamilton, who has outlined those principles rather loosely in his book The Stock Market Barometer, published in 1921. But it was Robert Rhea who wrote Dow Theory in 1932 and published a complete and formalized account of the principles.

Dow's theory assumes that the majority of the stocks, most of the time, follow the underlying trend of the market. Two indexes were constructed by Dow in order to measure the market: The Dow Jones Industrial Average, which is a combination of 12 (now 30) blue - chip stocks, and The Dow Jones Rail Average, which is a combination of 12 railroad stocks. The name of the Dow Jones Railroad Average was changed to Dow Jones Transportation Average in

27 Martin J. Pring, pp. 21-30.

order to incorporate other forms of this industry due to the evolution of aviation and other forms of transportation.

INTERPRETING THE THEORY

A record of the daily closing prices of the two averages and the total of transactions on the NYSE should be gotten so as to interpret the Dow Theory correctly.

There are six basic tenets of the Dow Theory and they are the following:

1. **The Averages Discount Everything:**

The aggregate emotions and judgment of all stock market participants, whether current or potential are reflected by the changes in the daily closing prices. Thus, this process is assumed to discount everything whether predictable or known that can affect the demand and supply relationship of stocks.

2. **The Market Has Three Movements:**

There exists three simultaneous movements in the stock market.

a. **Primary Movement**

The primary or major trend is the most important market movement. It usually lasts from several weeks to less than one year. Primary market movements are generally known as either bullish or bearish.

A primary bear market is a long decline that consists of three stages:

Stage I begins as the hopes on which the stocks were purchased are abandoned.

Stage II occurs as level of business activity and profits decline.

Stage III is the climax of the bear market, i.e. when the stocks are liquidated regardless of their intrinsic value.

A primary bull market is a broad upward movement that is interrupted by secondary reactions. It averages at least 2 years and it also consists of three stages:

Stage 1 begins when the worst possible news have been discounted by the averages and confidence about the future begins to revive.

Stage 2 begins when equities begin to respond to improvements in the business conditions.

Stage 3 is an over-optimistic stage in stocks and usually this over-confidence is advanced on projections which prove to be unfounded.

b. Secondary Movement

"A secondary or intermediate reaction is defined as an "...important decline in a bull market or advance in a bear market, the movement generally retraces from 33 to 66 percent of the primary price changes since the termination of the last

secondary reaction." (Robert Rhea, Dow Theory, Barron's, New York, 1932)".

However, the most difficult problem that Dow theorists face is the correct differentiation between the first leg of a new primary trend and a secondary movement within the existing trend.

c. **Minor Movement**

Minor movements usually last from a few hours to about 3 weeks. Its only importance is that it forms part of the primary or secondary moves. Its got no forecasting value for longer-term investors. But unlike the primary or secondary trends, the minor movements can be manipulated to some extent.

3. **Lines Indicate Movements**

A line, as defined by Rhea, is a price movement that lasts 2 to 3 weeks or longer. The price variation of both averages during this period moves within a range of approximately 5% of their mean average. A movement above the limits of the line is an accumulation, i.e. a bullish market, and eventually higher prices and vice versa.

4. **Price/Volume Relationship Provide Background**

Normally, volume expands on rallies and contracts on declines. If the contrary occurs, this is a warning that the current trend may soon be reverted. But it should be noted that the price of the respective averages is the conclusive evidence of trend reversals, thus this principle should be used as background information only.

5. **Price Action Determines The Trend**

Indications of a bullish market are noted when successive rallies penetrate peaks while the trough of an intervening decline is above trough. On the other hand, indications of a bearish market are noted from a series of declining peaks and troughs.

6. **The Averages Must Confirm**

The movement of the Dow Jones Industrial Average (DJIA) and the Dow Jones Transportation Average (DJTA) should be always considered together, i.e. they must always confirm each other.

Criticisms of the Dow Theory is that many of its signals are late, but it should be noted that signals should never be considered in a pure mechanistic manner. They require experienced judgment.

2. **THE RANDOM WALK THEORY**²⁸

The Random Walk Theory was originated on 1900 by Louis Bachelier who was a French Mathematics student. Bachelier examined the fluctuations of commodity prices and found out that their movements appeared to be random. Moreover, future prices could not be predicted through studying recent price data. But Bachelier's work remained dormant until 1960 when evidence of the randomness of stock prices mounted.

The principle behind the random walk theory is rather simple. It can be explained through the use of an example. If a person who drank a few cups was taken outdoors his steps will be random. He will walk aimlessly with no

²⁸ David N. Dreman, Psychology and the Stock Market, Investment Strategy Beyond Random Walk (New York: AMACOM, 1977), pp. 18-29.

discernible pattern, his next steps could not be predicted from his first steps for he may go left, right, or backwards.

Thus, the random walk theory of stock price behavior holds that through studying past stock price movements and trading volume, the investor will get no information that will allow him to do consistently better than using a buy-and-hold strategy for managing his portfolio. This implies that the market has no "memory", for what has occurred will provide no hints for what the next movements will be. Investors cannot outperform the market by analyzing information regarding stock prices and volume. This is emphasized by statisticians who state that if a coin was tossed 10 times, for example, and heads came 10 times, there will still be a 50-50 chance that the next toss will also be heads. Thus, no matter how definite a market trend may look, the tossing of a coin will give the investor the same chance of being correct.

In the early sixties, a number of detailed studies were made and asserted the random walk hypothesis. No proof of trend that is vital to the technician was found. These tests were performed by Arnold Moore in 1962, Clive Granger and Oscar Morgenstern in 1963, and Eugene Fama in 1965. Relatively minor departures from randomness was ever found, although extensive testing was used employing statistical procedures. Randomness in stock price movements was proved day to day and up to date and no evidence was found that could refute the random walk hypothesis.

3. THE EFFICIENT MARKET HYPOTHESIS²⁹

The concept of efficient markets is a by-product of a chance discovery. It was originated in 1953 by Maurice Kendall who was a distinguished statistician. Kendall wrote a rather unusual paper about the behavior of stock and commodity prices. To Kendall's surprise he could not find regular price cycles, on the contrary, prices seemed to follow a random walk. But Kendall's idea was not completely novel, it had been proposed by Louis Bachelier 53 years earlier in his doctoral thesis and was completely forgotten. But Kendall's work was not neglected although it was to most economists a bizarre and startling idea. This was due to the advance in computers and the availability of data. Thus, economists and researchers started studying price movements and concluded with remarkable unanimity that there is no useful information in the sequence of past changes in stock prices.

An efficient market as defined by economists, is a market where information is widely available to all investors and where all ascertainable and relevant information is already reflected in the prices of securities.

The efficient market hypothesis is a stronger form of the random walk model. It is actually a refinement and generalization of the random walk.

Harry Robbins has defined three levels of market efficiency, the Weak Form, the Semi Strong Form, and the Strong Form.

²⁹ Richard A. Brealey, Stewart C. Myers, Principles Of Corporate Finance (Singapore: McGraw Hill Book Company, 1988), pp. 282-299.

a. **The Weak Form:**

The weak form of the Efficient Market Hypothesis is the case in which prices reflect all information contained in the record of past prices. Prices of securities are independent, thus, past prices have no predictive power for future prices. Such independence of stock price movements has given the market its descriptive term a random walk.

The market is at least efficient in this weak form.

b. **The Semistrong Form:**

The semistrong form is the case where the prices reflect all published information in addition to past prices. Tests have been conducted by researchers by studying specific items of news such as declaration of dividends, announcement of earnings, changes in accounting practices, mergers, and forecasts of company earnings. Results of such studies have ascertained that most of this information was quickly and accurately reflected in the prices of stocks.

c. **The Strong Form:**

In the strong form of market efficiency, prices do not only reflect public information but also all information that can be obtained by fundamental analysis of the company and the economy as a whole. Thus, the stock market in the semistrong form would be like an ideal auction house. Prices Of stocks would always be fair to everybody and no investor would be able to outperform the market or to consistently be able to make superior forecasts of stock prices.

Tests of this strong form of market efficiency have been done and have involved an analysis of the performance of professionally managed

portfolios. These tests have concluded that after the differences in risk have been taken into account, no group of institutions have been able to consistently outperform the market and that even the differences between the performance of individual funds are not better than would be expected from chance.

However, some misconceptions of the Efficient Market Hypothesis often take place. Some of these misconceptions are:

- The Efficient Market Hypothesis implies perfect forecasting ability. This is not true since the E.M.H. only implies that prices reflect all available information.
- Another misconception is that prices do not represent fair value since they are always changing. The truth is that prices would not reflect fair value unless they went up and down. It is because the future is so uncertain and because people are so often surprised that prices fluctuate.
- There is a temptation to believe that institutions are unable to achieve superior portfolio profits due to the incompetence of portfolio managers. This is not true off course since market efficiency exists only because competition is keen and managers are doing their job.
- Another error is to believe that random behavior of stock prices means that the stock market is irrational. On the contrary, randomness and irrationality are not synonymous. Randomness exists because investors are rational and competitive.

An efficient market implies fair prices and well market functioning. Thus, for the financial manager the concept of market efficiency entails six main lessons. These are the following:

1- Markets have no memory.

The randomness of stock prices stated by the weak form of market efficiency emphasize economists idea that markets have no memory. Thus, the cycles that financial managers tend to rely on do not exist.

2- Market Prices should be trusted.

Prices in an efficient market can always be trusted since they contain all available information about the value of each security. This, implies that in an efficient market there is no way for an investor to consistently achieve superior profits since to do so would mean not only to know more than anyone else, but to know more than everyone else.

3- There are no financial illusions.

No financial illusions exist in an efficient market. All investors are logically concerned about the cash flows and to their entitlement of these cash flows. For example, upon the declaration of a stock split or dividends by a corporation, it is an illusion to think that the investor is better off. The company's cash flows and the proportions of these cash flows to investors will not be affected.

4- The Do-It-Yourself Alternative.

In an efficient market investors are not ready to pay others what they can do themselves. For example, when a corporation merges so as to diversify and have a more stable firm, an investor can diversify by purchasing the stocks of two separate companies. The same case exists

when a financial manager issues debt instead of common stocks so as to create financial leverage, the stock will be more risky and will offer a higher expected return. But investors can create financial leverage by issuing debt on their own account. Thus, the problem that faces the financial manager is to determine whether the corporation, under the prevailing business and economic conditions, can issue debt more cheaply than the individual shareholder.

5- Seen One Stock, Seen Them All.

Demand elasticity for any product measures the percentage change in the quantity demanded for each percentage addition to the price. The elasticity of demand is said to be strongly negative when the product has close substitutes. If the product has no substitutes, the elasticity will be near zero.

Investors usually buy a stock because it offers the prospects of a fair return for its risk and not because for its unique qualities. Thus, stocks should be perfect substitutes for each other, the demand for the company's stock should be very elastic. If its perspective risk premium is higher relative to its risk than other stocks, everybody will want to hold it. If it is lower, nobody will want to hold it.

6- Reading the entrails.

Prices in an efficient market impound all available information. Thus, security prices can tell us a lot about the future if we can learn to read the entrails.

The National Bureau of Economic Research has identified several leading indicators of economic activity. Stock prices are heavily influenced by economic prospects, thus, they earn relatively high marks

as a leading indicator meaning that the stock market represents an informed consensus about the nations economic prospects.

CHAPTER IV

REGRESSION ANALYSIS

A- PURPOSE AND HYPOTHESES

Prices in the New York Stock Market have fluctuated consistently from 1960 through 1990. Different approaches and theories have been used in trying to predict the Dow Jones Industrial Average by knowing certain macroeconomic variables namely; interest rate, inflation rate, gross domestic product, trade deficit, and Federal budget deficit which in turn have fluctuated between improvement and deterioration through the aforementioned period. The objectives of this research is two folds:

- 1- To determine the direction of association between the Dow Jones Industrial Average and the basic macroeconomic indicators, namely: interest rate, inflation rate, gross domestic product, trade deficit, and Federal budget deficit.
- 2- To assess the relative impact of interest rate, inflation rate, gross domestic product, trade deficit, and Federal budget deficit on the Dow Jones Industrial Average.

Six hypotheses will be tested in this research.

Hypothesis 1:³⁰

There is a negative relationship between stock prices as measured by the Dow Jones Industrial Average and inflation rate.

Presumably stocks represent claims on "real assets"- physical capital, land, resources, and goods- whose dollar value is supposed to rise with inflation. But the inflation that ravaged the United States during the 1960's and 1970's showed that stocks are a poor hedge against inflation. The devastation of the equity markets during inflationary periods sent economists scrambling for explanations.

Franco Modigliani theorized that the equities market suffered during inflationary periods because investors failed to realize that inflation, in addition to driving up interest rates, would eventually enhance corporation's cash flows. Moreover, many investors are not sophisticated enough to realize the difference between stocks which are claims on real assets, and bonds which are claims on monetary assets. Hence, investors were almost treating stocks and bonds alike. That is, when interest rates rose, they sold their stocks, and consequently, stock prices declined. However, when investors became inflation minded, they started to discount expected dividends by the real interest rate which caused the value of stocks to rise. This, according to Modigliani, explains the sharp rise in the Dow Jones Industrial Average in the early eighties.

Another explanation was brought about by Eugene Fama of the University of Chicago, who suggested that the inflation in the United States during the 1960's and 1970's was brought about by the expansionary monetary policy and the reduced growth of the

³⁰ Marshall E. Blume, Jeremy J. Siegel, and Dan Rottenberg, Revolution on Wall Street The Rise and Decline of the New York Stock Exchange (New York: W.W. Norton and Company, 1993), pp.65-67.

U.S. output. Thus, the fall in stock prices reflected that slowdown of growth and explained why stock prices fell as inflation rose.

Hypothesis 2:

There is a negative relationship between interest rates and stock prices. This is because the stock market smells out a sharp reduction in business activity that accompanies falling interest rates³¹. Moreover, when interest rates rise to high levels, it will automatically lead to higher discount rates that will be applied to the earnings and dividends of the relevant stocks. Thus, lowering the Price/Earning Multiple.³²

The Fed's Open Market Committee, through buying /selling government securities increases/decreases the banking systems' reserves. These reserves form the base upon which financial institutions support their deposits, thus, influencing the money supply. Moreover, the Fed makes weekly money supply announcements. If the announced money supply was greater than expected, interest rates would rise as a result of credit tightening.³³

Hypothesis 3:

There is a positive relationship between the stock market and economic growth. Economic Growth, or the increase in an economy's output of goods and services, is clearly one of the Fed's major goals. When the economy is operating below capacity,

³¹ Martin J. Pring, How To Forecast Interest Rates A Guide To Profits For Consumers, Managers, And Investors (New York: McGraw-Hill Book Company, 1981), pp.170-171.

³² Hayes and Bauman, pp. 487-488.

³³ Blume, Siegel, and Rottenberg, pp. 55-68.

increases in the money supply stimulates the economy, thus, stimulating the growth rate in the United States, in terms of annual changes in the Gross Domestic Product (GDP). Therefore, economic expansion and employment can reduce interest rates, stimulate investment, encourage consumption, and lead to the creation of new jobs. This economic growth will be positively reflected on the stock market and hence, there exists a positive relationship between stock prices and the gross domestic product.³⁴

Hypothesis 4:

There is a negative relationship between stock prices and trade deficit. A trade deficit occurs when real output is less than real absorption. Thus, a country's imports are more than its exports. Equilibrium occurs when a country's exports equals its imports. Disequilibrium will result in a state of Deficit or Surplus.³⁵

The Federal Reserve System, as the central bank of the United States of America, conducts the national monetary policy which influences interest rates and other macroeconomic variables that determine the prices of securities.

In other words, money supply is highly influenced by the actions of the Federal Reserve System. An increase in the money supply places a downward pressure on the equilibrium interest rates, thus, causing interest rates to decline.³⁶

³⁴ Frank J. Fabozzi, Franco Modigliani, and Michael G. Ferri, Foundations Of Financial Markets and Institutions, (Englewood Cliffs, New Jersey: Prentice Hall Inc., 1994), pp. 107-111.

³⁵ Charles P. Hindleberger, Jack Guttentag, Richard Herring, Henry C. Wallish, Dale W. Henderson, and Randall Hinshaw, International Financial Markets And Capital Movements A Symposium in Honor of Arthur I. Bloomfield (Princetown, New Jersey: Princetown University Press, 1985), pp. 57-66.

³⁶ Jeff Madura, Financial Markets And Institutions, (Saint Paul: West Publishing Company, 1992), p.365.

Moreover, trade deficit has led to the devaluation of the U.S. dollar against other currencies. This devaluation reflects itself on the stock market since investors tend to invest in other currencies or in other markets so as to avoid the loss that will result due to the devaluation of the U.S. dollar.

Hypothesis 5:

There is a negative relationship between Federal budget deficit and stock prices. Changes in the Federal budget position can influence short term inflation rates directly as a consequence of the particular sectors to which Federal spending is channeled, through differences in the Federal spending multipliers and through the influence of the budget position on financial markets and interest rates. The Federal budget policy influences the distribution of total spending in the economy. Thus, whether a Federal budget deficit is financed through net borrowing or through creation of reserves to support more rapid monetary expansion, it also influences inflation. For example, if the deficit is financed through borrowing, it tends to crowd out private investment spending and consumption. When the deficit is financed through money printing, it raises the rate of monetary expansion and puts a pressure on long term inflation trends and will depress stock prices³⁷

A higher Federal budget deficit increases the quantity of loanable funds demanded at any prevailing interest rate, thus causing an outward shift in the demand schedule which will cause interest rates to rise. Excessive government demand for these funds

³⁷ Paul H. Earl, Analysis of Inflation (Georgetown: D.C, Heath and Company, 1975), pp. 6-8.

tends to “crowd out” the private demand (by consumers and corporations) for funds, thus depressing stock prices.³⁸

Hypothesis 6:

The Dow Jones Industrial Average cannot be solely predicted by knowing certain macroeconomic variables namely : interest rate, inflation rate, trade deficit, Federal budget deficit, and gross domestic product as theorized by the Random Walk Theory.³⁹

B- REGRESSION MODEL

1- THE MODEL

Investors are interested in trying to predict stock market prices and market trends beforehand so as to be able to make profits. This analysis will try to study the influence of the major macroeconomic variables on the Dow Jones Industrial Average. The analysis will be divided into six sections. The six sections will consider the Dow Jones Industrial Average as an independent variable. In the first five sections a single macroeconomic indicator will be considered as a dependent variable, and in the sixth section the the five basic macroeconomic indicators will be considered as the dependent variables.

³⁸ Jeff Madura, p.38.

³⁹ David N. Dreman, pp. 18-29.

The model that will be studied consists of the following functions:

1. $DJIA_t = f\{r_t, \Delta P/P_t, GDP_t, T.D._t, F.B.D._t\}$
2. $DJIA_t = f\{r_{t-1}, \Delta P/P_{t-1}, GDP_{t-1}, T.D._{t-1}, F.B.D._{t-1}\}$

where,

$DJIA_t$ = The Dow Jones Industrial Average at time t.

r_t = The treasury bill interest rates in the United States at time t.

$\Delta P/P$ = The inflation rate at time t.

$G.D.P._t$ = Gross Domestic Product at time t.

$T.D._t$ = The amount of trade deficit in the United States at time t.

$F.B.D._t$ = The amount of Federal budget deficit in billions of US Dollars at time t.

t = The year.

The value of the macroeconomic variables at a given time is treated as a separate observation, and since the empirical study will cover twenty seven simultaneous periods, from the year 1964 through the year 1990, this will result in a total of twenty seven observations.

2- METHOD OF ANALYSIS

Correlation or linear regression will be used in studying the relationship between the Dow Jones Industrial Average and the five macroeconomic variables. The advantage of such an analysis is that the numeric coefficient is the measure of the magnitude of the relationship in terms of the amount of change in the dependent variables as the result of the change in the independent variable.

Lag is used in the regressions so that the effects of the change in the independent variables will become evident.

3- DATA SOURCES

The above mentioned equations were tested using monthly and annual data for the period 1964 to 1990. The data was collected from different sources:

1. The Dow Jones Averages 1885-1990 from which the monthly record of the Dow Jones Industrial Average were extracted.

2. International Financial Statistics Yearbook from which most of the annual data , namely Treasury Bills interest rates, inflation rate, gross domestic product, trade deficit, and Federal budget deficit for the years 1964 to 1990 were collected.

3. US Department of Commerce Bureau of the Census, Historical Statistics of the US: Colonial times to 1970(Washington DC: US Department of Commerce, 1975) Series E 135: US Economic Indicators (Washington DC, monthly).

Fortunately, most of the required data was collected except for the data on the Treasury Bills interest rates, gross domestic product, trade deficit, and Federal budget deficit for the years 1960 to 1963. Thus, the study had to be done on the years 1964 to 1990 instead of 1960 to 1990.

4- HISTORICAL DATA

The United States economic conditions during the period 1964 through 1990, and the relationship between the different macroeconomic variables : inflation rate, interest rate, gross domestic product, trade deficit, Federal budget deficit, and their effect on the Dow Jones Industrial Average can be better understood by reviewing a set of quantitative data which shows the changes in each of the above factors along the abovementioned period.

The annual United States inflation rates during the period 1964-1990 are summarized in Appendix 1, Table 1.

The annual United States Treasury Bills interest rates during the period 1964-1990 are summarized in Appendix 1, Table 2.

The annual United States gross domestic product during the period 1964-1990 are summarized in Appendix 1, Table 3.

The annual United States trade deficit during the period 1964-1990 are summarized in Appendix 1, Table 4.

The annual United States Federal budget deficit during the period 1964-1990 are summarized in Appendix 1, Table 5.

Table 6, Appendix 1 represents the annual Dow Jones Industrial Average during the period 1960-1990.

Table 7, Appendix 1 represents a more detailed monthly record of the Dow Jones Industrial Average during the period 1960-1990.

C- RESULT ANALYSIS

1- IMPACT OF INFLATION RATE ON DOW JONES AVERAGE

A linear regression was conducted on the annual data observations for the United States inflation rate (See Appendix 1, Table A 1) as a measure of the Dow Jones Industrial Average (See Appendix 1, Table A 6).

The regression resulted in a coefficient of determination (R^2) of 0.0737, indicating that the inflation rate explains 7.37 percent of the variations in the Dow Jones Industrial Average, and consequently stock prices. The remaining 92.63 percent of the Dow Jones Industrial Average changes are explained by other variables than the inflation rate.

The empirical test revealed a negative correlation between the Dow Jones Industrial Average and the inflation rate as stated in the hypothesis and as

apparent in Figure 1. Accordingly, as inflation increases, stock prices decrease as stocks have proved to be a poor hedge against inflation. The estimated equation for the Dow Jones Industrial Average was found to be

$$\text{D.J.I.A.} = 1,445.578 - 48.909 \text{ Inf}_t \quad R^2=0.07372 \quad (1.1)$$

(6.550) (-1.411)

The coefficients or parameters were not significant even at 0.10 percent level of significance since the critical t-value $t_{0.05} = 1.708$.

The critical F-value for one variable and 27 observations, $F(1,25)$ at 5 percent significance level is 4.24 which is greater than the computed F-value (1.99). Thus, the regression parameters are not significant even at the 5 percent level of significance.

This result contradicts the suggested hypothesis concerning the existence of a negative relationship between stock prices and the inflation rate. The regression results are summarized in Table 1, equation 1.1.

Moreover, at 0.05 significance level, the hypothesis is also rejected since the computed p-value of 0.17 is greater than the chosen alpha of 0.05.

However, the regression was repeated with a lag period of one year to see if the inflation rate of the previous period affects the prices of stocks, as depicted by the Dow Jones industrial Average, of the next period. The results were not improved. (Table 1, equation 1.2.)

The regression resulted in a coefficient of determination (R^2) of 0.09837, indicating that 9.837 percent of the variations in the Dow Jones Industrial Average, and consequently stock prices are explained by the variations in the inflation rate of the past period.

The estimated equation for the Dow Jones Industrial Average was found to be

$$\text{D.J.I.A.} = 1,499.02 - 56.095 \text{ Inf}_{t-1} \quad R^2=0.09837 \quad (1.2)$$

(6.758) (-1.618)

The coefficients or parameters did not pass the t-test even at 0.10 percent level of significance (critical t-value $t_{0.05} = 1.711$), which means that the relationship is not significant.

The critical F-value, $F(1,24)$ at 5 percent significance level is 4.26 which is greater than the computed F-value (2.618). Also the computed p-value of 0.118, at 5 percent significance level supports rejecting the hypothesis. Thus, the regression parameters are not significant even at the 5 percent level of significance.

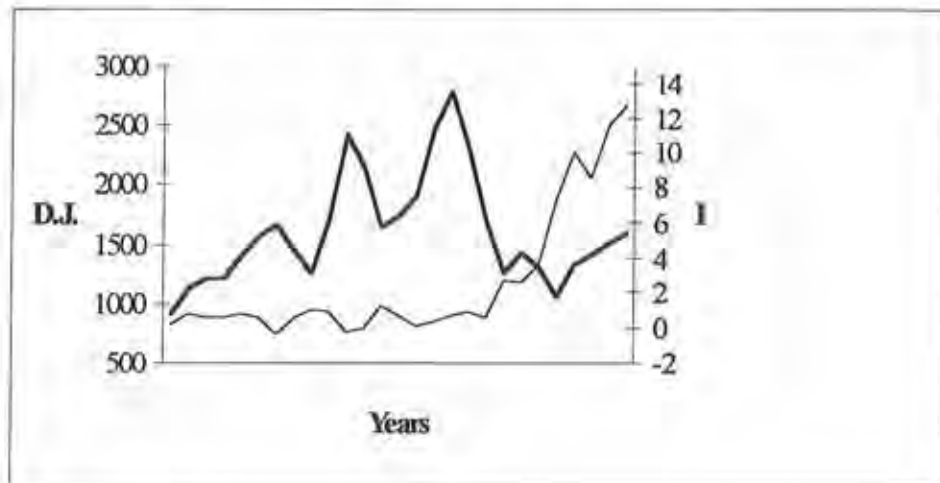
Table 1. Linear Regression Estimates Of Dow Jones Industrial Average Versus Inflation Rate 1964-1990 (t-value in parenthesis)

N=27, p=level of significance.

Independent Variable	DJIA _t Dow Jones Industrial Average Regression Results	
	Eq.1.1	Eq.1.2
Constant	1,445.578 (6.550)	1,499.021 (6.758)
Inf_t	-48.909 (-1.411)	
Inf_{t-1}		-56.095 (-1.618)
R²	0.0737	0.0983
P-Value	0.171	0.119
F-Ratio	1.990	2.618
Stand. Error	554.899	554.715

Regression was computed using a 95 % Confidence Interval.

Figure 1 : Impact of Inflation On Dow Jones Average



— I: Inflation
— D.J: Dow Jones

2- IMPACT OF INTEREST RATE ON THE DOW JONES AVERAGE

Linear regression was applied trying to estimate the influence of the interest rate (See Appendix 1, Table A 2) on stock prices indicated by the Dow Jones Industrial Average(See Appendix 1, Table A 6).

The coefficient of determination (R^2) was found to be 0.15 percent, indicating that the interest rate explains 0.15 percent of the variations in the Dow Jones Industrial Average, and consequently stock prices. The remaining 99.85 percent of the Dow Jones Industrial Average changes are explained by other variables than the interest rate.

The empirical test revealed a negative correlation between the Dow Jones Industrial Average and the interest rate as stated in the hypothesis. This is apparent in Figure 2. Accordingly, as interest rates increase, stock prices

decrease. The estimated equation for the Dow Jones Industrial Average was found to be

$$\text{D.J.I.A.} = 1,113.45 + 8.575 \text{Int}_t \quad R^2=0.874 \quad (2.1)$$

(3.394) (0.193)

The critical t-value at the 10% level of significance =1.708, and the computed t-value =0.1935. Thus, the computed t-value is less than the critical t-value, which means that the relationship is not significant. The critical F-value for one variable and 27 observations, F(1,25) at the 5 percent significance level is 4.24 which is greater than the computed F-value of 0.0375. Thus, the regression parameters are not significant even at the 5 percent level of significance.

This result contradicts the suggested hypothesis concerning the existence of a negative relationship between stock prices and the interest rate. The regression results are summarized in Table 2, equation 2.1.

Moreover, at the 5 percent significance level, the hypothesis is also rejected since the computed p-value = 0.848 is greater than the chosen alpha of 0.05.

However, the regression was repeated with a lag period of one year to see if the interest rate of the previous period affects the prices of stocks ,as depicted by the Dow Jones Industrial Average, of the next period. The results were not seriously improved. (Table 2, equation 2.2.)

The regression resulted in a coefficient of determination (R^2)of 0.329 percent, indicating that 0.329 percent of the variations in the Dow Jones Industrial Average, and consequently stock prices are explained by the variations in the interest rate of the previous period.

The estimated equation for the Dow Jones Industrial Average was found to be

$$\text{D.J.I.A.} = 1,098.42 + 12.646 \text{ Int.}_{t-1} \quad R^2=0.00329(2.2)$$

(3.3063) (0.2815)

The hypothesis is also rejected although a lag period of one year was used. All regression parameters were proved to be insignificant through the use of the t-test, the F-Ratio test, and the p-value test.

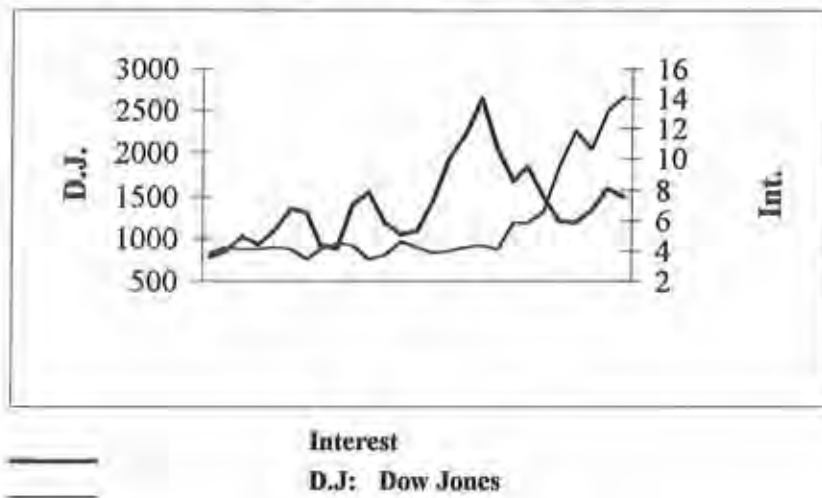
Table 2. Linear Regression Estimates Of Dow Jones Industrial Average Versus Interest Rate 1964-1990 (t-value in parenthesis)

N=27, p=level of significance.

DJIA_t, Dow Jones Industrial Average		
Regression Results		
Independent Variable	Eq.2.1	Eq.2.2
Constant	1,113.45 (3.394)	1,098.42 (3.3063)
Int_t	8.575 (0.193)	12.646 (0.2815)
R²	0.00150	0.00329
P-Value	0.848	0.7807
F-Ratio	0.0374	103.015
Stand. Error	576.13	583.23

Regression was computed using a 95 % Confidence Interval.

Figure 2 Impact Of Interest On Dow Jones



3- IMPACT OF GROSS DOMESTIC PRODUCT ON THE DOW JONES

INDUSTRIAL AVERAGE

A linear regression was conducted on the annual data observations of the United States Gross Domestic Product (See Appendix 1, Table A 3) as a measure of the Dow Jones Industrial Average. (See Appendix 1, Table A 6).

The coefficient of determination (R^2) was found to be 72.27 percent, indicating that the United States gross domestic product explains 72.27 percent of the variations in the Dow Jones Industrial Average, and consequently stock prices.

The remaining 27.73 percent of the Dow Jones Industrial Average changes are explained by other variables than the gross domestic product.

The empirical test revealed a positive correlation between the Dow Jones Industrial Average and the gross domestic product as stated in the hypothesis.

This is apparent in Figure 3. Accordingly, as the United States gross domestic

product increase, stock prices follow the same direction. The estimated equation for the Dow Jones Industrial Average was found to be

$$\text{D.J.I.A.} = 417,58 + 0.309 \text{ GDP}_{t-1} \quad R^2=0.7227 \quad (3.1)$$

(3.784) (8.072)

The parameters were significant relative to the t-value test at different levels of significance. Moreover, the critical F-value for one variable and 27 observations, $F(1,25)$ at the 5 percent significance level is 4.24 which is less than the computed F-value of 65.15. Thus, the regression parameters are significant even at the 5 percent level of significance.

This result proves the suggested hypothesis concerning the existence of a positive relationship between stock prices and the gross domestic product. The regression results are summarized in Table 3, equation 3.1.

Moreover, at the 5 percent significance level, the hypothesis is also accepted since the computed p-value was found to be negligibly small.

However, the regression was repeated with a lag period of one year to see if the gross domestic product of the previous period affects the prices of stocks, as depicted by the Dow Jones Industrial Average, of the next period. The results were slightly improved. (Table 3, equation 3.2.)

The regression resulted in a coefficient of determination (R^2) of 73.95 percent, indicating that 73.95 percent of the variations in the Dow Jones Industrial Average, and consequently stock prices are explained by the variations in the gross domestic product of the previous period.

The estimated equation for the Dow Jones Industrial Average was found to be

$$D.J.I.A. = 399.68 + 0.3386 GDP_{t-1} \quad R^2=0.7395(3.2)$$

(3.576) (8.256)

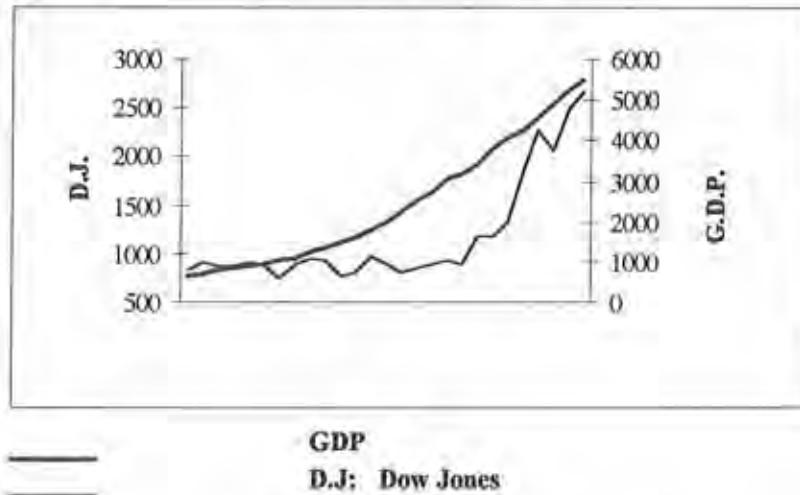
The hypothesis is also accepted although a lag period of one year was used. All regression parameters were proved to be significant through the use of the t-test, the F-Ratio test, and the p-value test.

Table 3. Linear Regression Estimates Of the Dow Jones Industrial Average Versus Gross Domestic Product 1964-1990 (t-value in parenthesis) N=27, p=level of significance.

	DJIA_t, Dow Jones Industrial Average	
	Regression Results	
Independent Variable	Eq.3.1	Eq.3.2
Constant	417.58 (3.784)	399.68 (3.576)
GDP_t	0.309 (8.072)	0.3386 (8.256)
R²	0.7227	0.7395
P-Value	Negligible	Negligible
F-Ratio	65.153	68.164
Stand. Error	303.61	298.11

Regression was computed using a 95 % Confidence Interval.

Figure 3 Impact Of GDP On Dow Jones



4- IMPACT OF TRADE DEFICIT ON DOW JONES AVERAGE

The annual record of the United States trade deficit over the period 1964-1990 (See Appendix 1, Table A 4) is regressed on the synchronized and one period lag of the Dow Jones Industrial Average (See Appendix 1, Table A 6).

The regression results are shown on Table 4.

The estimated equations for the Dow Jones Industrial Average are the following:

$$D.J.I.A. = 811.638 - 8.633 TD_t \quad R^2=0.7046 \quad (4.1)$$

(10.631) (-7.722)

The regression resulted in a coefficient of determination (R^2) of 0.7046, indicating that the trade deficit explains 70.46 percent of the variations in the Dow Jones Industrial Average, and consequently stock prices.

The remaining 29.54 percent of the Dow Jones Industrial Average changes are explained by other variables than the United States trade deficit.

The empirical test revealed a negative correlation between the Dow Jones Industrial Average and the trade deficit as stated in the hypothesis and as can be clearly seen from Figure 4. The coefficients or parameters passed the t-test at different significance levels which means that the relationship is significant.

The F-ratio is significant even at 1 percent level of significance.

This result supports the suggested hypothesis concerning the existence of a negative relationship between stock prices and the trade deficit. The regression results are summarized in Table 4, equation 4.1.

Moreover, at 0.05 significance level, the hypothesis is also accepted since the computed p-value is negligibly small.

However, the regression was repeated with a lag period of one year to see if the trade deficit of the previous period affects the prices of stocks, as depicted by the Dow Jones industrial Average, of the next period. The results were slightly improved. (See Table 4, equation 4.2.)

The lag regression resulted in a coefficient of determination (R^2) of 0.7919, indicating that 79.19 percent of the variations in the Dow Jones Industrial Average, and consequently stock prices are explained by the variations in the trade deficit of the past period.

The estimated equation for the Dow Jones Industrial Average was found to be

$$\begin{aligned}
 \text{D.J.I.A.} = & 818.05 - 9,367 \text{ TD}_{t-1} & R^2=0,7919 & (4.2) \\
 & (12.599) & & (-9,556)
 \end{aligned}$$

The parameters of equation 4.2 passed the t-test even at 0.05 percent level of significance (critical t-value $t_{0,0005} = 3.725$), which means that the relationship is significant.

The critical F-value, $F(1,24)$ at 1 percent significance level is 7.82 which is significantly less than the computed F-value of 91.322. Also the computed p-value is negligibly small which supports accepting the hypothesis. Thus, the regression parameters are significant.

Table 4. Linear Regression Estimates Of Dow Jones Industrial Average

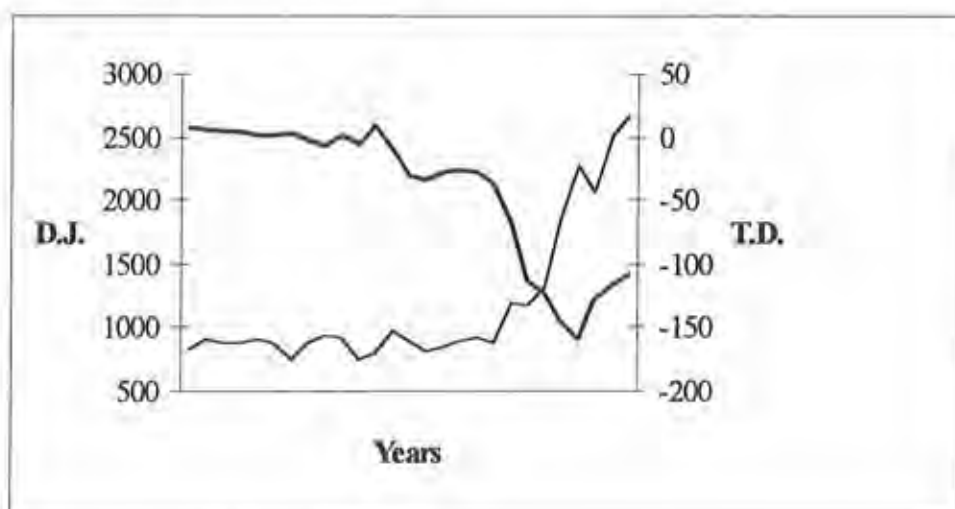
Versus Trade Deficit 1964-1990 (t-value in parenthesis)

N=27, p=level of significance.

Independent Variable	DJIA_t Dow Jones Industrial Average Regression Results	
	Eq.4.1	Eq.4.2
Constant	811.638 (10.631)	818.05 (-9.367)
TD_t	-8.633 (-7.722)	
TD_{t-1}		-9.367 (-9.556)
R²	0.7046	0.7919
P-Value	Negligible	Negligible
F-Ratio	59.630	91.322
Stand. Error	313.367	266.506

Regression was computed using a 95 % Confidence Interval.

Figure 4 Impact Of Trade Deficit On Dow Jones



— Trade Deficit
— D.J.: Dow Jones

5- IMPACT OF BUDGET DEFICIT ON DOW JONES AVERAGE

Two linear regressions are applied trying to estimate the influence of the Federal budget deficit (See Appendix 1, Table A 5) on stock prices indicated by the Dow Jones Industrial Average(See Appendix 1, Table A 6).

The coefficient of determination (R^2) was found to be moderate, about 51.81 percent, indicating that the Federal budget deficit explain 51.81 percent of the variations in the Dow Jones Industrial Average, and consequently stock prices. The remaining 48.19 percent of the Dow Jones Industrial Average changes are explained by other variables than the Federal budget deficit.

The empirical test revealed a negative correlation between the Dow Jones Industrial Average and the Federal budget deficit as stated in the hypothesis. This negative relationship is clearly illustrated in Figure 5. Accordingly, as the

Federal budget deficit increases, stock prices as depicted by the Dow Jones Industrial Average decrease. The estimated equation for the Dow Jones Industrial Average was found to be

$$\text{D.J.I.A.} = 756.039 - 5.282 \text{ FBD}_{t-1} \quad R^2=0.5181 \quad (5.1)$$

(6.788) (-5.185)

The coefficients or parameters passed the t-test even at different significance levels ensuring their validity. The critical F-value for one variable and 27 observations, $F(1,25)$ at 1 percent significance level is 7.77 which is remarkably less than the computed F-value of 26.88. Thus, the regression parameters are both significant even at the 1 percent level of significance.

This result proves the suggested hypothesis concerning the existence of a negative relationship between stock prices and the Federal budget deficit. The regression results are summarized in Table 5, equation 5.1.

Moreover, at 0.01 significance level, the hypothesis is also accepted since the computed p-value is negligibly small.

However, the regression was repeated with a lag period of one year to see if the Federal budget deficit of the previous period affect the prices of stocks ,as depicted by the Dow Jones Industrial Average, of the next period. The results were not slightly improved. (Table 5, equation 5.2.)

The regression resulted in a coefficient of determination (R^2)of 0.5699, indicating that approximately 57 percent of the variations in the Dow Jones Industrial Average, and consequently stock prices are explained by the variations in the Federal budget deficit of the previous period.

The estimated equation for the Dow Jones Industrial Average was found to be

$$\text{D.J.I.A.} = 752.063 - 5.897 \text{ FBD}_{t-1} \quad R^2=0.5699 \quad (5.2)$$

(6.991) (-5.640)

All individual regression parameters passed the t-test ensuring their validity. In addition to passing the F-Ratio test and the p-value test.

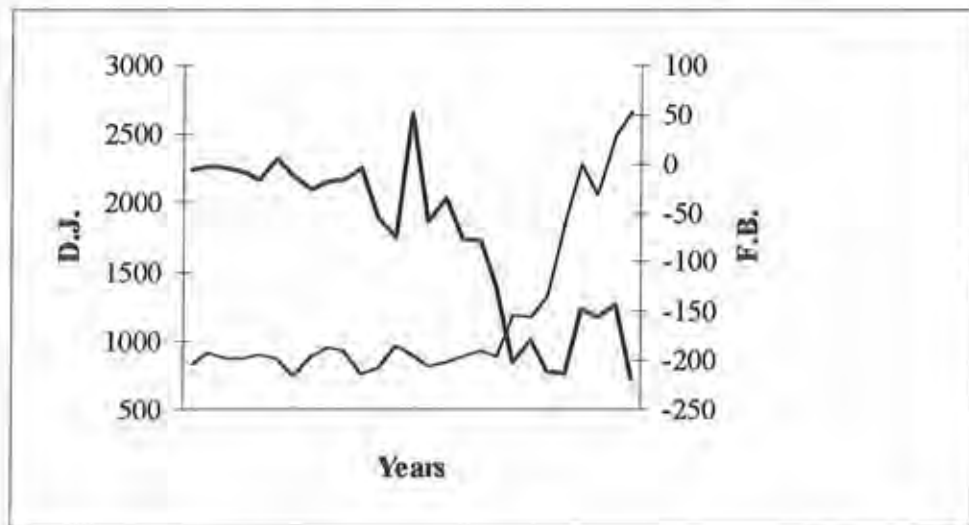
Moreover, a negative correlation between stock prices and the Federal budget deficit was also depicted using a lag period of one year.

Table 5. Linear Regression Estimates Of Dow Jones Industrial Average Versus Federal Budget Deficit 1964-1990 (t-value in parenthesis) N=27, p=level of significance.

	DJIA_t, Dow Jones Industrial Average	
	Regression Results	
Independent Variable	Eq.5.1	Eq.5.2
Constant	756.039 (6.788)	752.063 (6.991)
FBD_t	-5.282 (-5.185)	
FBD_{t-1}		-5.897 (-5.640)
R²	0.5181	0.5699
P-Value	Negligible	Negligible
F-Ratio	26.88	31.807
Stand. Error	400.236	383.106

Regression was computed using a 95 % Confidence Interval.

Figure 5 Impact Of Federal Budget On Dow Jones



— Federal Budget
— D.J.; Dow Jones

6- **IMPACT OF FIVE MACROECONOMIC VARIABLES ON DOW JONES INDUSTRIAL AVERAGE (Inflation, Interest, Gross Domestic Product, Trade Deficit, and Federal Budget Deficit)**

A linear regression was conducted on the annual data observations for the United States inflation rate, interest rate, gross domestic product, trade deficit, and Federal budget deficit (See Appendix 1, Table A 1, Table A 2, Table A 3, Table A 4, and Table A 5) as a measure of the Dow Jones Industrial Average (See Appendix 1, Tables A 6 and A 7).

The regression resulted in a coefficient of determination (R^2) of 0.9338, indicating that the five macroeconomic variables explain 93.38 percent of the variations in the Dow Jones Industrial Average, and consequently stock prices. The remaining 6.62 percent of the Dow Jones Industrial Average changes are

explained by other variables than the five forementioned macroeconomic variables.

The empirical test revealed :

1. A negative correlation between the Dow Jones Industrial Average and the inflation rate.
2. A negative correlation between the Dow Jones Industrial Average and the interest rate.
3. A positive correlation between the Dow Jones Industrial Average and the Gross Domestic Product.
4. A positive correlation between the Dow Jones Industrial Average and the trade deficit.
5. A positive correlation between the Dow Jones Industrial Average and the Federal budget deficit.

The estimated equation for the Dow Jones Industrial Average was found to be

$$\mathbf{D.J.I.A. = 807.696 - 37.33 Inf_{t-} - 83.31 Int_{t-} + 2.56 GDP_{t-} + 4.65 TD_{t-}}$$

$$(8.34) \quad (-2.10) \quad (-3.78) \quad (1.30) \quad (3.97)$$

$$+0.67 FBD_{t-} \quad \mathbf{R^2=0.9338} \quad (6.1)$$

$$(8.02)$$

All coefficients or parameters passed the t-test even at the 90 percent level of significance (critical t-value $t_{0.10} = 1.721$) except the gross domestic product which passed the t-test at the 80 percent significance level, which means that the relationship is considered to be significant.

The critical F-value for five variables and 27 observations, $F(5,21)$ at the 1 percent significance level is 4.04 which is less than the computed F-value (59.30). Thus, the regression parameters are significant even at the 1 percent level of significance.

Moreover, at 0.01 significance level, the hypothesis is also accepted since the computed p-value is negligibly small.

Since we are dealing with time - series data, a basic assumption is that events at time $t - 1$ do not influence events at time t . If this is not true, autocorrelation, or serial correlation, exists and the above mentioned t - and F - tests will become invalid. Autocorrelation can be detected by the Durbin - Watson d - test. Thus, the Durbin - Watson d statistic was calculated by the computer using the S.P.S.S. software and was found to be 1.569449. The critical $d_L = 1.01$ and the critical $d_U = 1.86$ for twenty - seven observations and five variables. Thus, $d_L < d < d_U$. This means that no conclusions can be drawn because the computed d - value fell in the inconclusive range.

This may be better illustrated if we take a look at Figure 6.

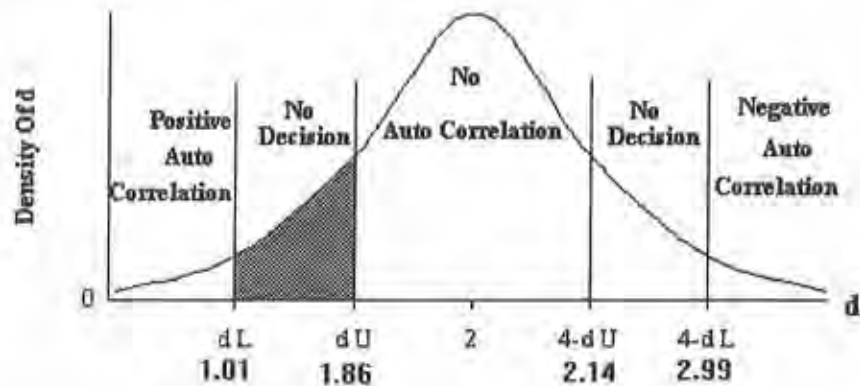


Figure 6

It is worth noting here that although $R^2 = 0.93386$ is relatively very high, but this may be due to the fact that as we increase the number of independent variables R^2 approaches unity. This is solved intuitively by judging whether the variables we add are meaningful variables in explaining the dependent variable. Thus, the basic criterion is of course the scientific theory on which the regression analysis is based. A second criterion is the adjusted coefficient of multiple determination which was found to be 0.91811 which is relatively very high also. Thus, we can say that the regression results that are summarized in Table 6, equation 6.1 are meaningful.⁴⁰

⁴⁰Taro Yamane, *Statistics An Introductory Analysis*, (New York: Harper & Row Publishers, Inc., 1973), p. 930.

Table 6. Linear Regression Estimates Of Dow Jones Industrial Average Versus The 5 Macroeconomic Variables (Inflation Rate, Interest Rate, Gross Domestic Product, Trade Deficit, & Federal Budget Deficit) 1964-1990. (t-value in parenthesis) N=27, p=level of significance.

	DJIA_t Dow Jones Industrial Average Regression Results	
Independent Variable	Eq.6.1	
Constant	807.696	(8.34)
Inf_t	-37.33	(-2.105)
Int_t	83.3067	(-3.7846)
GDP_t	2.557	(1.30)
TD_t	4.652	(3.977)
FBD_t	(0.6668)	(8.021)
R²	0.93386	
P-Value	Negligible	
F-Ratio	59.30	
Stand. Error	161.7895	

Regression was computed using a 95 % Confidence Interval.

However, the probability of multicollinearity might also arise. A linear regression was conducted on the annual data observations for the United States interest rate, gross domestic product, trade deficit, and Federal budget deficit (See Appendix 1, Table A 2, Table A 3, Table A 4, and Table A 5) as a measure of the Dow Jones Industrial Average (See Appendix 1, Tables A 6 and A 7). That is the United States Inflation Rate was excluded since it is supposed to be highly correlated with the United States Interest Rate. Thus these two macroeconomic variables might be affecting the t-test.

The regression resulted in a coefficient of determination (R^2) of 0.9198, indicating that the four macroeconomic variables explain 91.98 percent of the variations in the Dow Jones Industrial Average, and consequently stock prices. The remaining 8.02 percent of the Dow Jones Industrial Average changes are explained by other variables than the four forementioned macroeconomic variables.

The empirical test revealed :

1. A negative correlation between the Dow Jones Industrial Average and the interest rate.
2. A positive correlation between the Dow Jones Industrial Average and the Gross Domestic Product.
3. A positive correlation between the Dow Jones Industrial Average and the trade deficit.
4. A positive correlation between the Dow Jones Industrial Average and the Federal budget deficit.

The estimated equation for the Dow Jones Industrial Average was found to be

$$\text{D.J.I.A.} = 831.08 - 112.91 \text{Int}_t + 0.604 \text{GDP}_t + 1.388 \text{TD}_t$$

$$(8.03) \quad (-6.20) \quad (7.24) \quad (0.678)$$

$$+3.636 \text{FBD}_t \quad \quad \quad \mathbf{R^2=0.9198} \quad (7.1)$$

$$(3.17)$$

The critical t-value $t_{0.10} = 1.717$ was less than the computed t-value except for the trade deficit which was found to be significant at the 50 percent significance level, which means that the relationship is considered to be significant.

The critical F-value for four variables and 27 observations, $F(4,22)$ at the 1 percent significance level is 4.31 which is less than the computed F-value (63.16). Thus, the regression parameters are significant even at the 1 percent level of significance.

Moreover, at 0.01 significance level, the hypothesis is also accepted since the computed p-value is negligibly small.

Table 7. Linear Regression Estimates Of Dow Jones Industrial Average Versus The 4 Macroeconomic Variables (Interest Rate, Gross Domestic Product, Trade Deficit, & Federal Budget Deficit) 1964-1990.
 (t-value in parenthesis) N=27, p=level of significance.

	DJIA_t Dow Jones Industrial Average	
	Regression Results	
Independent Variable	Eq.7.1	
Constant	831.08	(8.03)
Int_t	112.91	(-6.20)
GDP_t	0.604	(7.24)
TD_t	1.388	(0.678)
FBD_t	(3.636)	(3.17)
R²	0.9198	
P-Value	Negligible	
F-Ratio	63.16	
Stand. Error	173.95	

Regression was computed using a 95 % Confidence Interval.

CHAPTER V

CONCLUSION

To study stock exchanges and financial markets, one should rely upon both economic analysis and a careful reading of the lessons of history. A shadow prevailed over stock markets for decades because of one traumatic event - the 1929 panic and crash in Wall Street. This same crash helped in the painful and long Great Depression of the 1930's. The "roaring twenties" witnessed a marvelous stock market boom. Everybody bought and sold stocks. But most of those purchases in this wild bull market were made on "margin". That is, the buyer of US\$ 10,000 worth of stocks had to put only US\$ 2,500 and borrowed the difference of US\$ 7,500, pledging the newly bought stocks as collateral for the new purchases. People bought because they anticipated rising stock prices and this act of buying rises stock prices further. Thus, prices during the twenties rose because of hopes and dreams, not because the profits and dividends of companies were soaring. Eventually, the speculative bubbles burst and the crash began in the "Black October" of 1929. Thus, investors who bought on margin could not cover their holdings and the market fell still further turning the boom market into a bear one. The market had lost 85 percent of its 1929 value by the trough of the Depression in 1933 and only after the banking crisis of 1933 did the stock market begin to recover.

After World War II, the stock market climbed sharply, although the stock market witnessed major downturns every few years (often associated with recessions).

In 1966, the market hit an all-time high, but during the next decade it failed to keep up with inflation. A dramatic bull - market was witnessed during the Reagan's pro - business years. But, by the summer of 1987, real stock prices again attained the level of 1929, and a sharp correction took place with the market meltdown of October 19, 1987. Thus, pushing stock prices down by 22 percent and sending a shock to markets all over the world.⁴¹

Obviously, this research aims at studying the impact of certain econometric indicators on the prices of stocks, as represented by the Dow Jones Industrial Average, in an attempt to predict future stock prices.

The study described the evolution of the stock market in the United States, differentiated among the various stock markets, defined securities markets, and presented a brief view of different market orders and how they are dealt with.

Moreover, the study presented how the different schools of thought explained stock market behavior. It summarized the four identifiable approaches to investing in common stocks, which are the Traditional Approach or Fundamental Approach, the Technical Analysis Approach, the Randomized Selection Approach, and the Portfolio Theory Approach. In addition to presenting the most widely known theories to investment which are: The Dow Theory, The Random Walk Theory, and The Efficient Market Hypothesis. All the above is discussed in the theoretical part of the study to help understand the empirical test results.

⁴¹ Paul Samuelson and William Nordhaus, *Economics* (New York: McGraw Hill Book Company, 1898), pp. 248-256.

The model constructed and tested in this study consists of five functions. The model tries to investigate the influence of the major economic indicators(inflation rate, interest rate, Gross Domestic Product, trade deficit, and Federal budget deficit) on the Dow Jones Industrial Average. It is hypothesized that Gross Domestic Product influences the Dow Jones Industrial Average positively, while inflation rate, interest rate, trade deficit, and Federal budget deficit influence the Dow Jones Industrial Average negatively.

The empirical study relied on regression analysis and used annual data for the years 1964 till 1990. Empirical results have emphasized the existence of a negative association between the Dow Jones Industrial Average versus, trade deficit, and Federal budget deficit, and a positive correlation between the Dow Jones Industrial Average and the Gross Domestic Product. However, the study refused the existence of a valid negative association between the Dow Jones Industrial Average and either of interest rates or inflation rate.

APPENDIX ONE

Table A1. Annual Inflation Rate⁴²

YEAR	INFLATION RATE
1964	0.760
1965	2.270
1966	2.860
1967	2.880
1968	4.200
1969	5.370
1970	5.920
1971	4.380
1972	3.210
1973	6.220
1974	11.040
1975	9.130
1976	5.760
1977	6.500
1978	7.590
1979	11.350
1980	13.500
1981	10.320
1982	6.160
1983	3.210
1984	4.320
1985	3.560
1986	1.860
1987	3.650
1988	4.140
1989	4.820
1990	5.400

Source: International Financial Statistics Yearbook 1992.

⁴² International Monetary Fund, International Financial Statistics Yearbook 1992. (New York, 1993), pp. 716-721.

Table A 2. Annual Interest Rate 1964 - 1990⁴³

YEAR	INTEREST RATE
1964	3.550
1965	3.950
1966	4.880
1967	4.330
1968	5.350
1969	6.690
1970	6.440
1971	4.340
1972	4.070
1973	7.030
1974	7.870
1975	5.820
1976	4.990
1977	5.270
1978	7.220
1979	10.040
1980	11.620
1981	14.080
1982	10.720
1983	8.620
1984	9.570
1985	7.490
1986	5.970
1987	5.830
1988	6.670
1989	8.110
1990	7.510

Source: International Financial Statistics Yearbook 1992.

⁴³ International Monetary Fund, International Financial Statistics Yearbook 1992 (New York, 1993) , pp. 716-721.

Table A 3. Annual Gross Domestic Product (Billions USD)1964 - 1990⁴⁴

YEAR	G.D.P.
1964	653.000
1965	708.100
1966	774.900
1967	819.800
1968	895.500
1969	965.600
1970	1,016.800
1971	1,104.500
1972	1,215.200
1973	1,361.800
1974	1,473.700
1975	1,598.100
1976	1,784.100
1977	1,994.600
1978	2,254.600
1979	2,520.800
1980	2,742.100
1981	3,063.800
1982	3,179.800
1983	3,434.500
1984	3,801.500
1985	4,053.600
1986	4,277.800
1987	4,544.500
1988	4,908.200
1989	5,248.200
1990	5,524.600

Source: International Financial Statistics Yearbook 1992.

⁴⁴ International Monetary Fund, International Financial Statistics Yearbook 1992 (New York, 1993) , pp. 716-721.

Table A 4. Annual Trade Deficit (Billions USD)1964 - 1990⁴⁵

YEAR	TRADE DEFICIT
1964	6.800
1965	4.950
1966	3.820
1967	3.800
1968	0.640
1969	0.600
1970	2.950
1971	(2.270)
1972	(6.420)
1973	0.910
1974	(5.510)
1975	8.900
1976	(9.470)
1977	(31.110)
1978	(33.940)
1979	(27.540)
1980	(25.510)
1981	(28.020)
1982	(36.480)
1983	(67.090)
1984	(112.480)
1985	(122.180)
1986	(145.060)
1987	(159.560)
1988	(126.960)
1989	(115.680)
1990	(108.840)

Source: International Financial Statistics Yearbook 1992.

⁴⁵ International Monetary Fund, International Financial Statistics Yearbook 1992 (New York, 1993) , pp. 716-721.

Table A 5. Annual Federal Budget Deficit (Billions USD)1964 - 1990⁴⁶

YEAR	FEDERAL BUDGET DEFICIT
1964	(5.900)
1965	(1.600)
1966	(3.800)
1967	(8.700)
1968	(15.200)
1969	5.400
1970	(11.400)
1971	(24.800)
1972	(18.700)
1973	(16.200)
1974	(4.500)
1975	(53.900)
1976	(74.900)
1977	(52.200)
1978	(58.900)
1979	(36.000)
1980	(76.200)
1981	(78.700)
1982	(125.700)
1983	(202.500)
1984	(178.300)
1985	(212.100)
1986	(212.600)
1987	(147.500)
1988	(155.500)
1989	(143.800)
1990	(218.100)

Source: International Financial Statistics Yearbook 1992.

⁴⁶ International Monetary Fund, International Financial Statistics Yearbook 1992 (New York, 1993) , pp. 716-721.

Table A 6. Annual Dow Jones Industrial Average 1960 - 1990.⁴⁷

YEAR	DOW JONES
1960	613.681
1961	691.551
1962	639.757
1963	715.647
1964	833.650
1965	910.033
1966	873.517
1967	879.107
1968	905.879
1969	874.953
1970	753.158
1971	884.755
1972	950.709
1973	923.859
1974	759.405
1975	802.488
1976	973.676
1977	894.665
1978	820.226
1979	844.404
1980	891.886
1981	932.949
1982	884.357
1983	1,190.309
1984	1,178.478
1985	1,328.263
1986	1,867.986
1987	2,275.998
1988	2,060.853
1989	2,509.012
1990	2,670.961

Source: The Dow Jones Averages 1885-1990.

Table A 7. Monthly Dow Jones Industrial Average 1960 - 1990⁴⁸

	1960	1961	1962	1963	1964	1965
January		632.200	705.159	672.103	777.075	889.892
February		650.009	711.949	679.745	793.026	894.729
March	615.199	670.565	714.185	674.629	812.177	896.437
April	619.978	684.897	690.278	707.152	820.759	907.186
May	615.636	693.030	643.708	720.865	823.122	917.498
June	644.381	691.440	572.641	719.144	817.544	878.064
July	625.831	690.613	581.780	700.748	839.693	873.433
August	624.419	718.637	602.506	714.149	835.297	887.698
September	598.096	711.025	597.021	748.522	863.549	922.182
October	582.597	703.010	580.653	747.524	875.263	944.781
November	601.137	724.742	628.824	743.240	879.558	953.306
December	609.537	728.438	648.380	759.944	866.739	955.193
Average	613.681	691.551	639.757	715.647	833.650	910.033

Source: The Dow Jones Averages 1885-1990.

Table A 7. Continued

	1966	1967	1968	1969	1970
January	985.926	830.559	884.775	930.442	782.497
February	977.146	851.123	847.197	914.624	756.212
March	926.428	858.111	834.759	916.523	777.619
April	943.450	868.661	893.374	927.375	771.652
May	890.703	883.737	909.358	954.860	691.958
June	888.825	872.656	906.818	896.606	699.298
July	875.875	888.511	905.324	844.017	712.804
August	816.679	912.465	883.723	825.458	731.972
September	791.650	923.446	922.802	826.709	759.376
October	778.101	907.545	955.472	832.512	763.722
November	806.554	865.282	964.119	841.087	769.269
December	800.869	887.195	962.833	789.217	821.511
Average	873.517	879.107	905.879	874.953	753.158

Table A 7 Continued

	1971	1972	1973	1974	1975
January	849.042	904.651	1,026.820	857.242	659.086
February	879.691	914.366	973.719	831.339	724.886
March	901.290	939.228	957.354	873.998	765.058
April	932.537	958.162	944.104	847.787	790.929
May	925.491	948.221	922.410	830.254	836.556
June	900.430	943.431	893.900	831.434	845.700
July	887.809	925.917	903.608	783.003	856.280
August	875.405	958.341	883.733	729.305	815.518
September	901.215	950.580	909.982	651.280	818.278
October	872.137	944.099	967.621	638.625	831.264
November	822.107	1,001.193	878.978	642.103	845.510
December	869.904	1,020.315	824.081	596.497	840.795
Average	884.755	950.709	923.859	759.405	802.488

Table A 7 Continued

	1976	1977	1978	1979	1980
January	929.343	971.051	781.086	837.389	860.744
February	971.701	941.765	763.573	825.172	878.217
March	988.552	946.107	756.371	847.839	808.797
April	992.506	929.103	794.656	864.956	786.332
May	988.818	926.305	838.559	837.408	832.956
June	985.591	916.560	840.259	838.646	869.860
July	993.204	908.201	831.710	836.950	910.058
August	981.631	872.263	887.931	873.553	947.330
September	994.371	853.358	878.642	878.499	946.672
October	951.955	823.958	857.694	840.522	949.173
November	929.577	828.508	804.293	815.780	971.084
December	976.864	818.801	807.944	836.138	941.412
Average	973.676	894.665	820.226	844.404	891.886

Table A 7 Continued

	1981	1982	1983	1984	1985
January	962.129	853.407	1,064.293	1,258.889	1,238.569
February	945.499	833.154	1,087.430	1,164.463	1,283.232
March	987.179	812.334	1,129.577	1,161.969	1,268.830
April	1,004.859	844.957	1,168.431	1,152.707	1,266.358
May	979.518	846.723	1,212.858	1,143.418	1,279.398
June	996.266	804.367	1,221.467	1,121.138	1,314.000
July	948.348	818.406	1,213.933	1,113.269	1,343.170
August	926.248	832.109	1,189.294	1,212.821	1,326.180
September	853.383	917.267	1,237.009	1,213.508	1,317.947
October	853.245	988.718	1,252.196	1,199.295	1,351.580
November	860.435	1,027.757	1,249.577	1,211.304	1,432.878
December	878.278	1,033.083	1,257.641	1,188.963	1,517.016
Average	932.949	884.357	1,190.309	1,178.478	1,328.263

Table A 7 Continued

	1986	1987	1988	1989	1990
January	1,534.862	2,065.133	1,947.348	2,234.677	2,679.236
February	1,652.728	2,202.343	1,980.646	2,304.304	2,614.177
March	1,757.349	2,292.477	2,044.307	2,283.111	2,700.133
April	1,807.051	2,302.642	2,036.133	2,348.908	2,708.255
May	1,801.802	2,291.111	1,988.912	2,439.098	2,793.812
June	1,867.651	2,384.064	2,104.940	2,494.900	2,894.818
July	1,809.924	2,481.722	2,104.674	2,554.031	2,934.276
August	1,843.452	2,655.156	2,051.287	2,691.112	2,681.888
September	1,816.710	2,570.804	2,080.065	2,693.408	2,545.805
October	1,817.045	2,224.589	2,144.313	2,693.643	2,464.884
November	2,783.176	1,931.863	2,099.039	2,642.486	2,423.327
December	1,924.078	1,910.071	2,148.580	2,728.467	2,610.917
Average	1,867.986	2,275.998	2,060.853	2,509.012	2,670.961

Table A 7 Continued

	1986	1987	1988	1989	1990
January	1,534.862	2,065.133	1,947.348	2,234.677	2,679.236
February	1,652.728	2,202.343	1,980.646	2,304.304	2,614.177
March	1,757.349	2,292.477	2,044.307	2,283.111	2,700.133
April	1,807.051	2,302.642	2,036.133	2,348.908	2,708.255
May	1,801.802	2,291.111	1,988.912	2,439.098	2,793.812
June	1,867.651	2,384.064	2,104.940	2,494.900	2,894.818
July	1,809.924	2,481.722	2,104.674	2,554.031	2,934.276
August	1,843.452	2,655.156	2,051.287	2,691.112	2,681.888
September	1,816.710	2,570.804	2,080.065	2,693.408	2,545.805
October	1,817.045	2,224.589	2,144.313	2,693.643	2,464.884
November	2,783.176	1,931.863	2,099.039	2,642.486	2,423.327
December	1,924.078	1,910.071	2,148.580	2,728.467	2,610.917
Average	1,867.986	2,275.998	2,060.853	2,509.012	2,670.961

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