# AN APPRAISAL OF METHODS USED FOR TIMING INVESTMENT DECISIONS IN THE STOCK MARKET

by

ALFRED S. ROUSSEAU

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF BUSINESS ADMINISTRATION

in the Department
of
FINANCE

We accept this thesis as conforming to the
required standard

THE UNIVERSITY OF BRITISH COLUMBIA
April, 1968

In presenting this thesis in partial fulfilment of the requirements for an advanced degree at the University of British Columbia, I agree that the Library shall make it freely available for reference and Study. I further agree that permission for extensive copying of this thesis for scholarly purposes may be granted by the Head of my Department or by his representatives. It is understood that copying or publication of this thesis for financial gain shall not be allowed without my written permission.

Department of Commerce

The University of British Columbia
Vancouver 8, Canada

Date April 19, 1968

ABSTRACT

AN APPRAISAL OF METHODS USED FOR TIMING INVESTMENT DECISIONS IN THE STOCK MARKET

by Alfred S. Rousseau

The main purpose of this study was to test the worth of using methods of timing investment decisions in the stock market. The writer investigated the use of economic and technical indicators in forecasting the most advantageous times for investing and disinvesting in the stock market. Recognition was given to the importance of fundamental analysis in the choice of stocks, and the balance of the appraisal was devoted to the timing decision, or, "When to buy?". A null hypothesis was formed to provide the basis for a test on the timing decision. The hypothesis was tested by the use of a model, consisting of economic and technical indicators, and criteria that are developed for the performance of the model.

The statistical method in this appraisal comprises of the formation of indexes for forecasting the investment decisions. Some of the leading economic indicators that were developed by the National Bureau of Economic Research, and the Index of Consumer Sentiment of the University of Michigan were formed into a diffusion index, which was tested for the purpose of assigning a weight to its performance. A group of eight currently used technical indicators were then individually tested for their effectiveness in a market forecast. Of these, six were found suitable, and were then incorporated into a composite index. The composite index was then tested for the purpose of assigning a weight to its performance. On the basis of their weighting, the diffusion index and the composite index were then incorporated into the model. By means of tests, suitable criteria were

developed for the performance of the model. The model was then used to test the null hypothesis that was formed for this appraisal.

The results indicated that there was a significant difference between a buy and hold investment decision, and one that was timed to the indications of the chosen economic and technical indicators.

TABLE OF CONTENTS

CHAPTER PAGE

# LIST OF TABLES

# LIST OF CHARTS

# LIST OF APPENDICES

ACKNOWLEDGEMENTS

I would like to express my appreciation for assistance in this study to the Chairmen of my thesis committee, Dr. W. Winiata and Dr. L. Wong, and also to Dr. H. Purdy who assisted them in their efforts. Dr. Wong's patience and guidance, in my search for, and isolation of, the topic for this study, were of significant assistance. Particular gratitude is expressed to Dr. W. Winiata who spent many hours of his valuable time in counselling and guiding. His enthusiasm and interest in this study were so contagious that the effort expended by the writer was a very pleasant experience. Dr. Purdy's knowledge of thesis structure and wealth of experience in research reports were of particular assistance and are gratefully acknowledged. My appreciation is also expressed to the Faculty of the Department of Business Administration and the University of British Columbia in making my academic training possible. Last and not least, a bouquet to my wife and family, whose patience and understanding made the past few years a rewarding experience.

# CHAPTER I

## INTRODUCTION

This study investigates methods currently used to predict the turning point of prices in the stock market. It is an attempt to test the validity of a contention made by some stock market analysts that, it is not possible to make predictions about turning points of prices in the stock market averages with a better than chance probability of being accurate.(1) In a subsequent effort to test this statement, the writer has made two assumptions: that chance probability refers to a .50 probability; and that accurate refers to an improvement in the investment performance by the use of timing over a buy and hold policy, which completely negates timing.

Cohen and Zinbarg identify a classification of investment decisions under two main headings: selection and timing.(2) Selection deals with the question: What do we buy? Timing deals with the question: When do we buy? They recognize the importance of selecting the right stock or bond on a value basis, but stress that possibly not enough importance is placed on the timing function. However, the value analyst expresses his doubt about the importance and feasibility of the timing approach for the following reasons:

1. It is not possible to make predictions about turning points of prices with a better than chance probability of being accurate.

---

(1)Cohen, J.B. and Zinbarg, E.D. Investment Analysis and Portfolio Management, p. 455.

(2)Ibid., p. 455.

2. Investors confront a market of stocks, rather than a stock market.

3. Recent swings in the market have amounted to only 10 to 20 per cent and have therefore not been great enough to warrant the effort.

These arguments are to be found in Cohen and Zinbarg's book, Investment Analysis and Portfolio Management. It is a position, however, with which the authors disagree.

As previously stated, this study challenges the first reason. The validity of the second and third statements is tested by the evidence in Figure 1.

**Industry Group Price Changes during Bull and Bear Markets**

| | *Bear Market Dates* | | | | |
|---|---|---|---|---|---|
| *Peak Month* | *6/48* | *1/53* | *7/56* | *7/59* | *12/61* |
| *Trough Month* | *6/49* | *9/53* | *12/57* | *10/60* | *6/62* |
| % Change S & P 500 | −17 | −11 | −17 | −10 | −23 |
| % Change S & P 425 | −18 | −12 | −17 | −11 | −23 |
| No. of groups with price changes of: | | | | | |
| +10.1% and over | 2 | 1 | 8 | 18 | 0 |
| + .1 to +10.0% | 4 | 6 | 9 | 13 | 0 |
| 0 to −10.0 | 20 | 37 | 13 | 12 | 8 |
| −10.1 to −20.0 | 18 | 29 | 24 | 12 | 23 |
| −20.1 and over | 39 | 10 | 31 | 33 | 57 |
| | *Bull Market Dates* | | | | |
| *Trough Month* | *6/49* | *9/53* | *12/57* | *10/60* | *6/62* |
| *Peak Month* | *1/53* | *7/56* | *7/59* | *12/61* | *1/66* |
| % Change S & P 500 | +87 | +110 | +48 | +34 | +68 |
| % Change S & P 425 | +93 | +125 | +48 | +33 | +70 |
| No. of groups with price changes of: | | | | | |
| +100.1% and over | 21 | 29 | 11 | 4 | 24 |
| + 50.1 to +100.0% | 26 | 20 | 38 | 21 | 29 |
| + 25.1 to + 50.0 | 20 | 21 | 29 | 32 | 19 |
| 0 to + 25.0 | 14 | 12 | 8 | 27 | 12 |
| − .1 to − 10.0 | 2 | 1 | 1 | 4 | 0 |
| − 10.1 to − 20.0 | 0 | 1 | 0 | 0 | 1 |
| − 20.0 and over | 0 | 0 | 0 | 0 | 2 |

Source: Investment Analysis and Portfolio Management, Cohen and Zinbarg

It is recognized by Cohen and Zinbarg, that while there appears to be a degree of selectivity of stocks in the market, there is also an overall tone that is related to the upward and downward swings of the averages. When the averages fall, stocks in most industries fall also, and likewise when averages rise, the majority of groups rise also. The third statement might be questioned in view of the severity of the downswings and upswings of some stock groups as related to the averages. Of the 88 stocks in Figure 1, during bear markets, the stocks fell by more than 10 per cent on 289 out of 440 occasions or 65.7 per cent of the time, and during bull markets the stocks rose by more than 25 per cent on 355 out of 440 occasions, or 80.7 per cent of the time. One would conclude that these swings are of sufficient magnitude to contradict the argument that swings in the market averages have not been great enough to warrant making efforts to identify them.

## FUTURE IMPORTANCE OF TIMING

The rate of return from buying and holding stocks, has, in recent years (1957-1967), been from 8 - 9 per cent as compared to 12 - 15 per cent in much of the postwar period (1945-1957). The higher return in the postwar period as a whole was due to the growth of stock prices in the early 50's. These have been the result of growth in earnings and dividends, and higher prices that the public has been prepared to pay for each dollar of earnings. The latter point is exemplified by the present P/E ratios of 15 to 20 as compared to 10 to 15 in the early 1950's.(3)

---

(3)Cohen and Zinbarg, op.cit. p. 458

Continued growth of earnings and dividends can be expected, but can one expect a continued growth in P/E ratios? Cohen and Zinbarg think that the growth in P/E ratios will slacken and P/E norms of 15 to 20 will be acceptable. As the prognosis for stock investments on a buy and hold basis is for a lower rate of return, than that of the 50's, a method to increase the rate or maintain it should be welcomed. One method would be to time buying and selling decisions at low and high points, respectively, by anticipating the turning points in market prices. If decisions can be made at turning points, the following simple illustration indicates the substantial benefits to be forthcoming. The data from Figure 1 are used, and the time period studied is from October 10th, 1960 to January 1st, 1966. A $1,000 stock purchase of the S. & P. averages is made in each case.(4)

Case I: Buy and hold - $1,000 of the averages bought at the trough of October/1960 and held to the peak of January 1966 and then sold.

Case II: $1,000 of S. & P. averages bought at the trough of October/1960--sold at the peak December 31st, 1961--bought again at the trough of June 30th, 1962 and sold at the peak January 31st, 1966.

---

(4) A comparison of return on price appreciation only is made; dividends are excluded. The loss of dividends in Case II for the period from December 31st, 1961 to June 30th, 1962, would have been offset, to some extent, by interest earnings from short term instruments.

| | | Trough 10/60 | Peak 12/61 | Trough 6/62 | Peak 1/66 | Time Total 62 months |
|---|---|---|---|---|---|---|
| S. & Poor 500 | | | | | | |
| | % change | | + 34% | - 23% | + 68% | |
| Case I | | | | | | |
| | Price | $1,000 | $1,340 | $1,032 | $1,734 | |
| Case II | | | | | | |
| | Price Appreciation | $1,000 | $1,340 | $1,648 | $2,769 | |

| | 5 year return on investment | Average Annual Rate of Return |
|---|---|---|
| Case I | $734 | $\frac{734}{1367} \times \frac{1}{5} \times 100 = 10.7\%$ |
| Case II | $1,769 | $\frac{1769}{1884} \times \frac{1}{5} \times 100 = 18.7\%$ |

The return in Case II was 241 per cent that of Case I where no buy and sell decisions were made. It can be seen, that, if on the average the buy and sell decisions were correct 50 per cent of the time, the effort to time decisions would be justified provided the costs of making the timing decisions did not exceed the profits they generated. Other costs to be considered would be the opportunity cost of the capital when it is not invested, and also the costs of brokerage in buying and selling. In our analysis, opportunity costs will be considered by recognizing earnings on the funds when they are not invested in the market, as they would be capable of earning short term interest. Also, the dividends that are earned by the investments when they are in the market will be considered in the calculations of the return, but for simplicity sake, it will be assumed that they are not reinvested, but taken as income. Brokerage costs will also be considered, by making an allowance of 1% for either a buy or sell is made in all the investment transactions. The Commission was deemed adequate, as it approximated the round lot commission for a $100 stock purchase or sale on the New York Stock Commission.

## APPROACHES TO THE TIMING ISSUE

Edwards and Magee[5] in their study of market indicators have classified the schools of market study into three methods of arriving at the problem of what? and when? These methods are:

1. Fundamental 2. Technical 3. Cyclical

The description of the fundamentalist's method is the familiar, "He evaluates his stock as to intrinsic value; if it was selling below its appraisal, he regarded it as a buy."[6] No further decision regarding timing is contemplated.

The technical and cyclical approach are regarded by Edwards and Magee as methods of timing the movements of the averages to forecast the turning points of prices. They defined the technical approach as the study of the action of the market itself as opposed to the study of the goods in which the market deals.

Cohen and Zinbarg express essentially the same idea by saying that the business cycle approach deals with factors outside the market itself, such as industrial production and interest rates; whereas the technical approach is concerned only with market phenomena such as prices and volume of trading.[7]

The approach of the technical analyst is to search for recurring patterns of price movements and other market data, and attempt to establish criteria for judging future price movements. The underlying

---

(5) Edwards, R.D. and Magee, J. Technical Analysis of Stock Trends, 5th Ed., p. 3.

(6) Ibid., p. 3.

(7) Cohen and Zinbarg, op.cit. p. 503.

relationships are not explained and the strength of the analysis is supported only by the recurring interrelationships.(8) Some of the typical measures used are: Short Selling, Volume of Trading, Odd Lot Indexes, Breadth of Market.

It might be argued that the cyclical approach is similar in that past patterns are used to make statements about the future without strong explanations, about the fundamental economic processes that are at work. The indicators, however, are quite different from those listed above, and one must concede that they seemingly do possess some economic rationale. The indicators which include Average Hours Worked, New Orders for Durables, Index of Consumer Sentiment, Change in Money Supply, are divided into three groups; leading, coincident and lagging. The main relationship with which we are concerned, in the business cycle approach, is that of the leading indicators to the stock market averages, which are themselves a leading indicator to the business cycle.

## PURPOSE AND HYPOTHESIS

As stated earlier, this study investigates methods currently used to predict the turning point of prices in the stock market. The two methods that are being currently used are the Business Cycle Approach, and the Technical Approach.

To establish an objective to this study, a null hypothesis has been formed, and will be tested. The null hypothesis is, "It is not possible to make predictions about turning points of prices in the stock market averages

---

(8) Ibid., p. 503.

with a better than .50 probability that would improve investment performance over what you would have achieved by a buy and hold decision of the averages."

The method of testing the hypothesis will be as follows; A model to forecast the turning points of prices in the stock market averages will be formed. This model consists of the following:

1. A diffusion index of Business Cycle Indicators with criteria for prediction.
2. A composite index of Technical Indicators with criteria for prediction.
3. Criteria combining the judgement criteria of the diffusion and composite indexes to establish whether the null hypothesis should be accepted or rejected.

If we accept the null hypothesis we substantiate the observation of the value analysts.(9) If we reject the null hypothesis, we uphold our belief that the turning points of prices in the stock market averages can be predicted with a better than chance probability of being accurate, and state that the Business Cycle and the Technical methods of approach are effective beyond the probability of chance, in their prediction.

Components of the Model:

1. The diffusion index is essentially a summarizing device of the consensus of opinion given by the individual business cycle and other indicators in its structure. The nature of its action is to provide a forecast of the movement of stock indexes by virtue of

---

(9)That it is not possible to predict the turning points of stock market prices.

its lead on the stock indexes and the business cycle. Judgement criteria are established to make buy and sell decisions on a hypothetical investment in the stock price averages. The performance of the forecast decisions for investment timing is judged by the capital appreciation of the investment in the stock averages.

2. The composite index is a device slightly dissimilar to the diffusion index. One difference being that its components are technical indicators rather than business cycle, another is that, for constructing the index, a system of weights is used to vary the influence of the individual components. The system of weighting is based on the performance of the buy and sell decisions of the individual indicators as related to a decision of perfect timing on a buy and sell decision of the stock averages. Criteria are also developed for investing and disinvesting, on the basis of four market breaks in the ten year time span from 1956 to 1966.

3. The null hypothesis will be either accepted or rejected by the use of judgement criteria developed for the decision making process of the two indexes and their individual criteria. The judgement criteria consists of a system of weighting the decisions of the two indexes on the basis of their past performances relating to investment decisions of buying the averages under perfect timing. Separate criteria for weighting the indexes are similarly formed for selling decisions of an investment in the stock averages. Finally, judgement criteria states that if the investment performance of the model does not exceed that of a buy and hold decision of the stock market averages we accept the null hypothesis and state that it is not possible to make predictions about turning points of prices in the

stock market averages with a better than .50 probability that this would improve investment performance over what you would have achieved by a buy and hold decision of the averages; also, if the performance of the model does exceed that of a buy and hold position, we reject the null hypothesis and state the converse.

# CHAPTER II

## THEORY OF BUSINESS CYCLE INDICATORS

In this chapter we will discuss what the business cycle is and its use in forecasting. The indicators that are used in forecasting, their nature of use, and their merits and limitations, will then be examined. Three other indicators; consumer sentiment, change in money supply and change in bank loans are used in conjunction with the business cycle indicators, and the theory and logic of their use is then evaluated.

## THE BUSINESS CYCLE

In order that one may better understand the techniques that are used for measuring economic fluctuations and identifying major turning points of overall economic activity, an explanation of the theory of the business cycle is undertaken.

Julius Shiskin gives a general explanation of the concept of a business cycle.(1) "The business cycle concept has been developed from the sequence of events discerned in the historical study of movements of economic activity. Though there are many crosscurrents and variations in the pace of business activity, periods of business expansion appear to cumulate to peaks. As they cumulate, contrary forces tend to gain strength, bringing about a reversal in business activity and the onset of a recession. As a recession continues, forces making for expansion gradually emerge until

---

(1) Shiskin, Julius - "The Known and the Unknown", paper presented on Aug. 24, 1963, published in Business Cycle Developments, Sept. 1963.

they become dominant and a recovery begins."

The mechanics of the movements in the cycle are explained by Shiskin in this description, but he does not attempt to develop a theory to explain the movements of economic activity in the cycle. Some writers lay primary stress on the role of investments in inventory and fixed capital; others give the central role to the supply of money and credit and the interest rate; still others look for clues in the relations among prices, costs and profits. It has been said that many of these factors influence the course of business activity, and some are more important at times than others, but there is no general agreement as to which are more crucial to the process.(2)

A fairly standard explanation of the business cycle rests on interactions of capital investment and consumption. It provides possible insights of the action of economic processes in the cycle and rationale for the use of certain indicators for predictive purposes. Professor Alvin Hansen has illustrated the interaction of capital investment and consumption with a simple model.(3) We are given that $K\Delta I = \Delta Y$, where K is the investment multiplier, $\Delta I$ and $\Delta Y$ are respectively a change in investment and a change in income and $\Delta I + \Delta C = \Delta Y$, where $\Delta C$ is a change in consumption. The process is said to go something like this. An increase in investment raises incomes in the capital goods industries and this induces an increase of consumption expenditures. Thus an increment of investment induces several, though diminishing rounds of increments of consumption. Finally, a one shot increase in investment will lead to an increase in income equal to $K\Delta I$. But the induced rise in income may in turn lead to a further rise

---

(2) Ibid.

(3) Hansen, A.H. Business Cycles and National Income, p.171.

in investment--the multiplier effect--and so on.

However, an upward shift in the consumption function can also raise income by a magnified amount, precisely in the same manner as in the case of an increase in investment. It may also be seen that a change in the marginal propensity to consume can also have an effect on the consumption function. But these upswings have always reversed themselves, and Professor Hansen states two reasons why this cumulative process comes to an end:(4)

1. The marginal propensity to save calls a halt to the expansion.
2. The autonomous volume of investment runs out by reason of the declining marginal efficiency of investment.

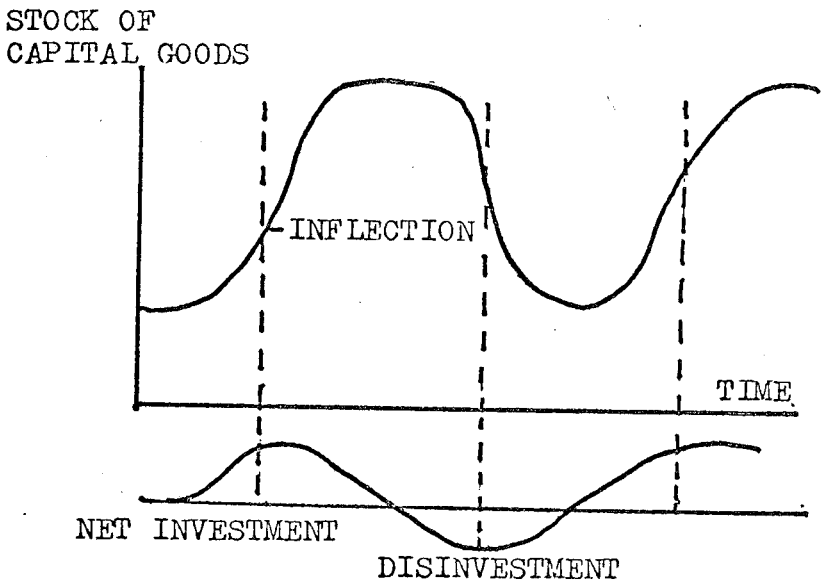



Figure 1

In Figure 2, we assume that a change in the stock of capital goods is induced by a movement in final demand. The action of net investment is at a peak when the rate of growth of capital goods is greatest, and is at

---

(4)Ibid., p. 179.

its peak of disinvestment when the rate of contraction of capital goods is greatest. The action of contracting and expanding waves can thus be seen between such items as capital goods, net investment and final demand. If this is a reliable statement of the underlying processes, and if the stock market moves with the business cycle, then for our purpose, we would want to have indicators that would forecast the business cycle.

## BUSINESS CYCLE FORECASTING

The basic concept underlying the business cycle indicators approach, is that various economic processes tend to move through the course of the business cycle in consistent but different time sequences. Measures of the variables involved in these economic processes are referred to as indicators. Indicators are used as signals or early warning, or confirmation of a change in an economic process in the cycle.

The National Bureau of Economic Research (N.B.E.R.) is the body that has conducted the major research on Business Cycle Indicators. It has compiled a list of indicators of economic activity, and has classified these indicators according to whether they usually lead, roughly coincide, or lag behind the cyclical movements of aggregate activity.

### Roughly Coincident

These time series relate primarily to the aggregate economic activity. These activities tend to coincide with, and in a sense define, the business cycle. This group includes such measures as G.N.P., industrial production, employment, income, bank debits, retail sales, and wholesale prices.

Leading Indicators

These series usually reach peaks or troughs before those in aggregate economic activity. They are generally measures of activities which reflect future production and employment. In a manner they are signals of things to come. They include such series as average work-week in manufacturing, non-agricultural placements, Index of net business formation, New Orders for Durables, Contracts and orders for plant and equipment, Industrial materials prices, Stock Prices and Corporate profits after taxes.

Lagging Indicators

These series such as new plant and equipment expenditures, and manufacturer's inventories usually reach turning points after they are reached in aggregate economic activity.

## WHAT INDICATORS ARE USED?

In a recent paper published by the N.B.E.R. a 1966 list of indicators was released along with a scoring plan to ascertain the quality of performance of an indicator.(5) The scoring plan stresses six factors that contribute to accepting a statistical series as an indicator.

1. Economic significance
2. Statistical adequacy
3. Conformity to major swings in business
4. Consistency of timing at turning points in business

---

(5) Moore, G.H. - Shiskin, J. N.B.E.R. Occasional Paper #103
Dr. G.H. Moore is a director of the National Bureau of Economic Research. He has carried on the earlier work of W.C. Mitchell on business indicators. Dr. Moore revised the N.B.E.R. 1938 list of business indicators, with the revision appearing in 1950. His subsequent revisions were in 1960 and 1967. He has been recently recognized as one of the foremost authorities in his field.

5. Smoothness

6. Currency

An explanation of these factors was made by L.H. Lempert in a recent article, and it is summarized by the writer as follows:(6)

1. Economic significance

   This implies that the behaviour of a particular activity is understood, and important in the theory of business cycles, or that the indicator's performance has a rational explanation.

2. Statistical adequacy

   This is concerned with the adequacy of the economic process as a measure in future business cycles. Such considerations are mentioned:

   (a) The reporting system based on direct information rather than estimates is ideal

   (b) The coverage of a sample should be statistically adequate

   (c) The frequency and magnitude of revisions in data should not be such as to alter the validity of its use.

3. Conformity

   The conformity of an indicator as regarded by the N.B.E.R. is subject to the following criteria:

   (a) During the intervening months between the peak and trough of a major business turn, an indicator may have

---

(6) Lempert, L.H. "Do the leading business indicators lead?" The Financial Analysts Journal Nov/Dec 1967, p. 22.

experienced one or minor upturns of its own. At the time, any one of the interim upturns might have been considered the beginning of a major business upswing. This reduces the performance score of the indicator.

(b) A series which reveals a cycle clearly and decisively is more useful, other things being equal, than one whose cyclical movements are mild and difficult to distinguish from other types of fluctuation.

4. Timing

A leader is an indicator whose timing comparisons show that it turns by an average lead of two months or more before the economy as a whole; a lagger turns by an average of two months or more after the overall economy; a roughly coincident indicator coincides with the movement of the economy. The timing at peaks and troughs is usually a measure of whether the indicator is more reliable in detecting downswings or upswings in the cycle. An example is the index of industrial materials prices, which has an average lead of six months at the peak, and no average lead at all at troughs. It therefore has a lead at peaks, and is roughly coincident at troughs. Its score would therefore not rate too high as a leading indicator, as it leads only at the peaks.

5. Smoothness

Indicators unfortunately do not move smoothly up or down during a business upswing or downswing. The challenge to interpretation is whether the movement is merely erratic or whether

it is significant. The smoother the series from month to month, the more weight one may give to a change in direction.

6. Currency

Indicators with consistent leads of, say, three months, are not equally valuable if information for one is available weeks or even months before the other. For this reason, some indicators are rated more highly, as they are more valuable in a forecast than others.

From the 1966 list of choice indicators, the N.B.E.R. has further derived a short list of 25 indicators which they consider to have best met the various tests to which they were subjected. This short list included 12 leading, 7 coincident, and 6 lagging indicators. In the N.B.E.R. occasional paper a classification was made of these indicators by the scoring plan, and also by a measure of their timing at peaks and troughs.(7) This is indicated in Tables II, III & IV which are derived from data in the N.B.E.R. paper.

In this appraisal, the turning point of the stock market indexes, is the dependent variable that was to have been forecast. The business cycle approach in this case, is to utilize the leading economic indicators to signal a lead on the stock indexes. The stock indexes themselves are a lead indicator, so lead indicators to a leading indicator are required. The model used in the forecast would therefore utilize lead indicators to the stock indexes as independent variables.

---

(7) Moore, G.H. - Shiskin, J., op.cit.

## TABLE II

| Indicator | Econ. Signif. | Stat. Adequ. | Conformity | Timing | Smoothness | Currency | Final Score |
|---|---|---|---|---|---|---|---|
| **Employment & Unemployment** | | | | | | | |
| Avg. workweek in mfg. | 50 | 65 | 81 | 66 | 60 | 80 | 66 |
| Nonagri. placements | 75 | 63 | 63 | 58 | 80 | 80 | 68 |
| **Fixed Capital Investment** | | | | | | | |
| Net business formation | 75 | 58 | 81 | 67 | 80 | 40 | 68 |
| New orders, dur. goods | 75 | 72 | 88 | 84 | 60 | 80 | 78 |
| Contracts & orders plant & equipment | 75 | 63 | 92 | 50 | 40 | 40 | 64 |
| Housing permits | 50 | 60 | 76 | 80 | 60 | 80 | 67 |
| **Inventories & Inv. Invest.** | | | | | | | |
| Mfg. & trade inv. change | 75 | 67 | 77 | 78 | 20 | 40 | 65 |
| **Prices, Costs & Profits** | | | | | | | |
| Indust. materials prices | 50 | 72 | 79 | 44 | 80 | 100 | 67 |
| Common-stock prices | 75 | 74 | 77 | 87 | 80 | 100 | 81 |
| Corporate profits, net | 75 | 70 | 79 | 76 | 60 | 25 | 68 |
| Price/unit labor cost | 50 | 67 | 84 | 72 | 60 | 80 | 69 |
| **Money & Credit** | | | | | | | |
| Consumer debt change | 50 | 79 | 77 | 60 | 60 | 40 | 63 |

## TABLE III

Timing at Peaks

| Leading Indicator | Peaks Covered | Leads | Rough Coin.* | Lags | Peaks Skipped | Extra Peaks | Median Lead |
|---|---|---|---|---|---|---|---|
| **Employment & Unemployment** | | | | | | | |
| Avg. workweek in mfg. | 9 | 7 | 1(0) | 1 | 1 | 1 | 6 |
| Nonagri. placements | 5 | 4 | 0(0) | 0 | 1 | 2 | 11 |
| **Fixed Capital Investment** | | | | | | | |
| Net business formation | 5 | 4 | 0(0) | 0 | 1 | 0 | 20 |
| New orders, dur. goods | 10 | 8 | 1(0) | 0 | 2 | 1 | 8 |
| Contracts & orders plant & equipment | 4 | 4 | 0(0) | 0 | 0 | 0 | 8 |
| Housing permits | 11 | 8 | 1(0) | 1 | 2 | 4 | 13 |
| **Inventories & Inv. Invest.** | | | | | | | |
| Mfg. & trade inv. change | 5 | 5 | 0(0) | 0 | 0 | 2 | 14 |
| **Prices, Costs & Profits** | | | | | | | |
| Indust. materials prices | 10 | 8 | 3(0) | 1 | 1 | 2 | 6 |
| Common-stock prices | 22 | 17 | 9(1) | 2 | 2 | 4 | 4 |
| Corporate profits, net | 10 | 7 | 4(2) | 0 | 1 | 2 | 6 |
| Price/unit labor cost | 10 | 9 | 4(0) | 1 | 0 | 1 | 11 |
| **Money & Credit** | | | | | | | |
| Consumer debt change | 7 | 6 | 1(0) | 0 | 1 | 2 | 12 |
| Totals | 108 | 87 | 24(3) | 6 | 12 | 21 | 10† |

## TABLE IV

Timing at Troughs

| Leading Indicator | Troughs Covered | Leads | Rough Coin.* | Lags | Troughs Skipped | Extra Troughs | Median Lead |
|---|---|---|---|---|---|---|---|
| **Employment & Unemployment** | | | | | | | |
| Avg. workweek in mfg. | 10 | 6 | 3(2) | 1 | 1 | 1 | 4 |
| Nonagri. placements | 5 | 4 | 4(0) | 1 | 0 | 2 | 1 |
| **Fixed Capital Investment** | | | | | | | |
| Net business formation | 5 | 4 | 2(1) | 0 | 0 | 0 | 3 |
| New orders, dur. goods | 10 | 8 | 6(1) | 0 | 1 | 1 | 2 |
| Contracts & orders, plant & equipment | 4 | 3 | 2(0) | 1 | 0 | 0 | 3 |
| Housing permits | 11 | 9 | 4(1) | 0 | 1 | 4 | 5 |
| **Inventories & Inv. Invest.** | | | | | | | |
| Mfg. & trade inv. change | 5 | 4 | 2(1) | 0 | 0 | 2 | 6 |
| **Prices, Costs & Profits** | | | | | | | |
| Indust. materials prices | 11 | 5 | 6(4) | 1 | 1 | 2 | 0 |
| Common-stock prices | 22 | 16 | 5(1) | 3 | 2 | 4 | 4 |
| Corporate profits, net | 10 | 6 | 7(2) | 2 | 0 | 2 | 2 |
| Price/unit labor cost | 11 | 8 | 6(1) | 2 | 0 | 1 | 3 |
| **Money & Credit** | | | | | | | |
| Consumer debt change | 7 | 5 | 3(0) | 1 | 1 | 2 | 4 |
| Totals | 111 | 78 | 50(14) | 12 | 7 | 21 | 3† |

*The number of exact coincidences are shown in parentheses. The other number represents rough coincidences, which means a lead or lag of 3 months or less. For example, a lead of 1 month at a turn is counted as both a lead and as a rough coincidence.

† = mean.

Source: Financial Analysts' Journal Nov/Dec 1967, page 19

On the basis of data from tables II, III and IV, basic criteria established by the N.B.E.R., and other criteria selected by the writer, a selection of business cycle indicators to be used in this appraisal was made.

The criteria for the choice of business cycle indicators is indicated as follows:

1. The data should be readily available. They should be in the scoring range of between 80 to 100 points.(8)
2. The timing at peaks and troughs had to lead the stock index. (This criterion was established by the writer for this appraisal.) (9)
3. An explainable economic relationship should exist between the indicators and the business cycle.
4. The scoring of the indicators for smoothness and timing should be reasonably high.(8)
5. The indicator should conform to patterns that identify major changes in the cycle.

The series should also reveal the cycle clearly and decisively, such that indications may be referred from its movement. The indicators are #1, 30, 6, 29, 23, 17. Another indicator #14, Business Failures from the 1960 list of the N.B.E.R. leading indicators was also chosen. The past performance of leads, that exemplified a 3 month lead on the stock indexes at peaks and troughs, as well as conformity to the other criteria, were the basis for its selection.

---

(8) Scoring system developed by G.H. Moore in N.B.E.R. Occasional Paper #103. The highest score, being 100 points, is assigned to data that is ideal for the characteristic being tested.

(9) The indicator should lead the stock market indexes if it is to have forecast value.

Three other indicators; Change in Money Supply, Change in Bank Loans, and the Index of Consumer Sentiment, were also added to more adequately cover the processes that are related to the forecast in this model. The economic rationale of these indicators are Money and Credit, and Consumption. The logic of use of these three indicators in the forecast, and their relationship to the processes associated with the stock market are reviewed in the latter part of this Chapter.

The indicators that have been selected are arranged, in table V, on the basis of their economic rationale.

TABLE V

| Economic Rationale | N.B.E.R. # | Indicator | Lead (-) Lag (+) in months: Period of Moving Average | Peaks | Troughs |
|---|---|---|---|---|---|
| Employment and Unemployment | 1 | Average hours worked per week in mfg. | 4 | - 7 | - 4 |
| | 30 | Non Agricultural placements | -- | - 11 | - 1 |
| Fixed Capital Investment | 6 | New Orders for Durables | 6 | - 8 | - 2 |
| | 29 | Housing Permits | 6 | - 13 | - 5 |
| Prices, Costs and Profits | 23 | Industrial Materials Prices | 3 | - 6 | 0 |
| | 17 | Price/Unit Labour Cost | 4 | - 11 | - 3 |
| Money and Credit | 14 | Business Failures | 6 | - 7 | - 7 |
| | 85 | Change in Money Supply | 6 | - 20 | - 10 |
| | 112 | Change in Bank Loans | 5 | - 22 | 0 |
| | U. of Mich. | Index of Consumer Sentiment | | - 9 | - 3 |
| | | Mean of Lead & Lags (Medians) as related to Business Cycle | | - 12 | - 3.6 |
| | | Stock Index Median Lead & Lag | | - 4 | - 4 |

As seen in Table V, the stock index has a median lead and lag on the business cycle of 4 months at peaks and troughs. The average leads and average lags of all the indicators have a lead on the cycle of 12 months at peaks and 3.6 months at troughs. There is thus an average lead advantage of 8 months at peaks, and an average lag disadvantage of 4 months at troughs for the indicators as a group. One might assume that this criterion of leads and lags should be the only important basis for selection, but the writer chose to satisfy the general criteria as evenly as possible by making sacrifices on certain issues. On this basis, the average performance of the group at troughs is almost coincident with the stock indexes. Thus a weakness of a forecast with this group of indicators can be detected at the trough of the stock index.

## HOW ARE THEY USED

Having chosen ten indicators to lead the stock index, the problem arises; How to utilize them in the forecast? The condition of variability amongst indexes has created difficulty in interpreting their significance. G.H. Moore in earlier studies utilized a summarizing device to consider broad groups rather than the individual index.(10) His thoughts were based on the observation that the individual is more variable than the group. This device is referred to as a diffusion index. It consists of a measure of the percentage of indexes that are expanding in a group, and this measure produces a consensus among the movements of a group. The percentage is computed by relating how many series rose this month to the total? The

---

(10)Moore, G.H. "Analyzing Business Cycles", p. 15 The American Statistician, April-May 1954.

construction of a diffusion index with the chosen indicators is shown in Chapter III, hence, only a brief outline of the mechanics of the index is made here.

The nature of diffusion indexes is not smooth due to the erratic movements of the component series. The more erratic the components, usually the more erratic the combined series. To smoothen out the erratic swings in a diffusion index, Moore recommended the use of moving averages. He had experimented with the various series of leading indicators and found certain periods of moving averages more ideal for some series than others.(11) Utilizing moving averages, he smoothed the series individually, then formed the resulting monthly data into a diffusion index of moving averages. A diffusion index of the unadjusted data was also formed, and its movements were plotted alongside that of the adjusted data. The unadjusted index he regarded as the underlying trend, and a basis for extrapolating the data of the moving average diffusion index.(12) Moore established certain criteria for the particular index he constructed, and the writer used this as a basis for the criteria formed for the diffusion index in Chapter III.(13) The criteria that was used by Moore, for an index of leading indicators is summarized as follows:

1. The average level of the leading curve has been where 50 per cent of the indicators are expanding.(14)

---

(11) Ibid., p. 15.

(12) Ibid.

(13) Ibid.

(14) Dr. Moore in his experience with a particular diffusion series, found that the 50% level of the index was indicative of a change. Moore, G.H. Analyzing Business Cycles - American Statistician April-May 1954.

2. The leading curve usually reaches this point a few months earlier than the peak or trough of the business cycle.
3. Genuiness is indicated by the depth or height of the curves.
4. The percentage expanding curves are mechanical summaries of economic actualities represented by the series upon which they are based. This is one of the strong points, but it is also a weakness. These curves are intended as aids to and not substitutes for careful study and analysis of the underlying data.

## MERITS AND LIMITATIONS OF THE USE OF INDICATORS

Shiskin in an earlier paper felt that short term forecasts from 6 to 12 months were possible with business cycle indicators.(15) The knowledge of past cycles, with due allowance for governmental fiscal and monetary policies and other related economic, political and international events, he thought were sufficient to form a short term forecast. An observation he also made was that after mild recession, the first year of expansion was also mild. Severe contractions are likely to be followed by more vigorous upsurges. The historical pattern of analysis followed by Shiskin might be summarized in three stages:(16)

1. Downturn

   The signals for such are usually detected by the leading indicators and diffusion index of leaders. Verification is sought from a downturn of the coincident indicators or diffusion index, which would occur about 4 to 6 months later.

---

(15) Shiskin, Julius - op.cit. p. 77.

(16) Ibid.

2. Severity of Decline

   If after 4 or 5 months of recession, the rate of decline in the leading series is severe compared with the rate of decline in previous recessions, there is reason to believe that the ultimate decline will be relatively large, in the absence of measures to combat recession.

3. Upturn

   This usually is signalled by an upturn in the leading series and diffusion indexes and is confirmed by a downturn in the lagging series. The cycle is now completed and a new one begins.

Limitations of the indicators are recognized by Shiskin, and he stresses that a mechanical forecast with these indicators should be avoided.(17) Some of the limitations are listed:

1. Some of the indicators give signals that lead to misinterpretation, and the reason should be rationalized for validity, e.g. When the expansion of activity in defense industries offset declines in others.
2. The variability of leads among series during a cycle is a source of difficulty.
3. There are periods of hesitancy in the middle of stages of expansion which are difficult to interpret. This can produce double peaks in the expansion.

---

(17) Ibid.

4. Inability to incorporate certain political, international and financial developments into a statistical forecasting system.

5. Difficulty of applying moving averages to data at the crucial turning points that should be forecast by the latest figures. Data for several months beyond is required for a completely adjusted statistic and this creates a weakness when the greatest accuracy is required.

Shiskin fully recognized the merits and limitations of the business cycle approach when he stated[18] "For purposes of forecasting future short term trends it cannot be stressed too much that the business cycle indicators must be used with other data, such as the national income accounts--findings from contemporary studies, industry, consumer and government trends."

Shiskin has thus stressed the use of other data to increase the number of independent variables used in the forecast and to use data that has an underlying relationship to the business cycle. For this reason, the writer desired to incorporate consumer and monetary trends to provide a wider economic coverage. It can thus be seen in Table V that our economic rationale covers measures of employment, fixed capital investment, prices, costs and profits, consumer trends and money and credit.

An index of consumer sentiment was used as a measure of consumer trends, and two index series, changes in total U.S. money supply and the rate of change of business loans by banks in the Federal Reserve System were used for measuring monetary trends.

---

[18] Ibid., p. 78.

## CONSUMER SENTIMENT

Professor Alvin Hansen further strengthens the rationale for inclusion of consumer influence in a business cycle forecast when he argues that consumer goods resemble producers equipment or capital investment in their influence on the cycle.(19) Thus consumption, particularly that of durables, might have predictive qualities.

To provide what one might call a lead, on a leading indicator, the author used a measure of consumer sentiment as a leading indicator on consumption and possibly other processes in the cycle.

The Index of Consumer Sentiment of the Survey Centre of the University of Michigan was used to provide the leading series. The author of the theory and uses of this index is Professor G. Katona of the Survey Centre, University of Michigan. Professor Katona in his studies, related the importance of consumer wants and the psychological motivation of these wants to the study of the business cycle.(20) He recognized that an increase in consumption was not only a function of a change in income, but also a function of increased optimism or confidence in the economy. This he substantiated by means of national consumer surveys. He classified a high degree of uncertainty and a lack of confidence in the outlook of the economy as adverse, whereas, a high degree of optimism was favourable to personal consumption. He devised questionnaires to detect the degree of sentiment amongst consumers, and produced an Index of Consumer Sentiment.

---

(19) Hansen, A.H. op.cit. p. 78.

(20) Katona, G. The Mass Consumption Society, p. 76 Publ. McGraw Hill - 1964.

The performance and predictive value of this index was tested by a companion researcher, Eva Mueller.(21) A correlation was done between fluctuation in consumer durables expenditures and personal income taken from a period 6 months earlier.

$D$ = Fluctuations in Expenses on Consumer Durables

$Y_{-1}$ = Disposable Personal Income

$D = 0.13\ Y_{-1} + 3.7$ $r^2 = .29$

This shows that Disposable Personal Income of prior periods accounts for only 29 per cent of the fluctuation. However, a second correlation was done using the Index of Consumer Sentiment as an additional independent variable.

$S$ = Index of period of $Y_{-1}$

$D = 0.18\ Y_{-1} + 0.405S - 48$ $r^2 = .76$

This indicated that by combining the use of Consumer Sentiment 76 per cent of the fluctuation in durable goods expenditures are explained. The past performance of the index as indicated by the Research Centre is that it leads expenditures on consumer durables by six to nine months. It also has predicted the trough of the 1954, the 1958 and 1961 recessions in the economy with leads of about 6 months.(22)

The predictive value is decreased by extraneous events that occur after the measurements have been taken. Such events as the outbreak of war, or new legislation, or Government corrective fiscal or monetary action have been listed as disrupting occurrences.

The importance of consumers attitudes to the changing level of business activity is fortified by Katona's study on consumers and the

---

(21) Mueller, Eva "Ten Years of Consumer Attitude Surveys" Journal of the American Statistical Assoc. 1963, p. 899.

(22) Katona, G. op.cit. p. 80.

economy. The growth of discretionary income since World War II is one of the measures he gives to emphasize the growing importance of the consumer sector. For convenience, he has described discretionary income as that portion of income that is available for purchases beyond the usual needs. To measure its growth, he formulated a representative income group as being one with pretax earnings from 6,000 to 15,000, and the group head being in the maximum earning age range from 35 to 54 years. The growth of this group from 1951 to 1961 had almost doubled, whereas national income had grown by 60 per cent. He concluded that we are faced with a growing mass consumption society that is capable of making purchases as sentiment dictates, and is thus an important influence on the behaviour of the economy.(23)

The Index of Consumer Sentiment may therefore be summarized as a measure, of the optimistic or pessimistic views of personal financial prospects and of the general business outlook, which contribute to willingness to embark on a discretionary purchase.(24) Having established the relationship, of consumption to the processes of the business cycle, the lead qualities of the Index of Consumer Sentiment, and its predictability of consumption, the writer incorporated the Index of Consumer Sentiment into the diffusion index.

## MONETARY INDICATORS

In Shiskin's explanation of the business cycle, he related the nature of the causative factors to a variety of theories expounded by economists.

---

(23)Ibid., p. 13.

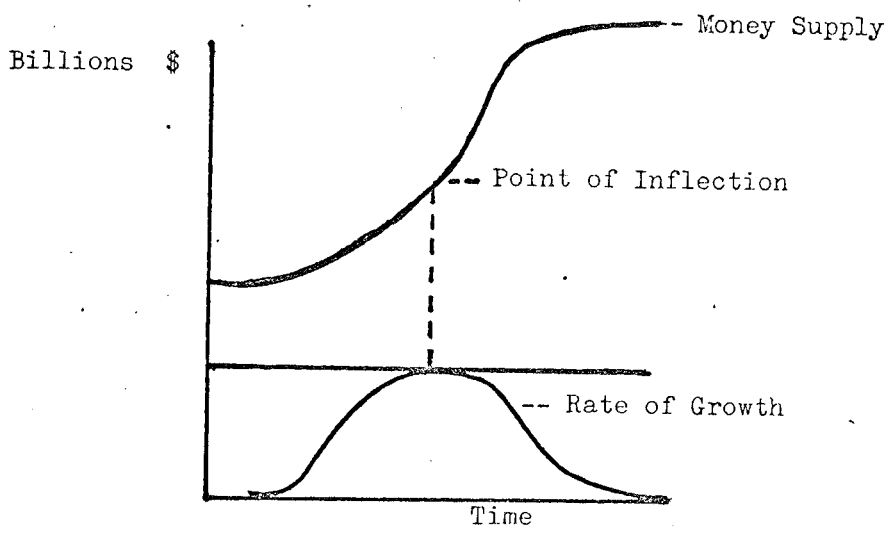
(24)Ibid., p. 88.

One of the causative factors he mentioned was "Money and Credit."(25)

Money Supply:

Hamilton Bolton in his recent publication, made a concise statement which seemed to summarize the importance of money and credit; "If money and credit are not the only causes of the business cycle, it is still clear that movements in business must be transmitted through the medium of exchange, which is money in one form or other--money is the link between all economic activities."(26) Bolton associated the rate of change of money supply to an explanation of movement within the business cycle. At the peak of rate of expansion, the point of inflection in money supply occurred, and its quantity levelled off, as the rate of growth diminished.

Figure 3




(25) Shiskin, Julius Business Cycle Developments, September 1963

(26) Bolton, A. Hamilton "Money and Investments", Publ. Irwin 1967, p. 57.

An explanation of this movement as related to the quantity theory of money is given by Sprinkel.(27) He takes a more refined view of the theory that MV = PT, where M = total money supply, V = velocity of turnover, P = average price level, T = real national product, and contends that V shows relatively little reaction to M, other than at turning points in the rate of Monetary growth. The regular formula for all practical purposes considers V constant and assumes that M is an independent variable. Hence, PT = f(M), where PT is the average price level X volume of transactions, or assumed as being G.N.P. He contends that changes in M, affect total spending. Sprinkel also shows long term evidence that the average annual rate of rise in money supply (5.9%) has closely approximated that of spending (5.9%) in the 50 year period 1909 - 1958. He points out two things:

1. All business cycle declines since 1909 were preceded by a reduction in the rate of monetary growth, or a decline in the rate of change of money supply.
2. All recoveries since 1909 were consistently preceded by a rise in the rate of monetary growth.

However, as a weakness to this method of forecast, he indicates that the degree of liquidity that is existing at points of change in rate of growth of money supply can have a misleading effect. For example, in the declining post War II period, a period of high liquidity, a declining rate of money supply increase may not herald a recession.

A. Hamilton Bolton has recognized the value and the weaknesses of this forecasting tool, but is rather definite when he states that when the increase in rate of monetary supply is zero or negative, then it is no time

---

(27) Sprinkel, Beryl W. Money and Stock Prices, Publ. Irwin 1964, p. 139.

to be in the stock market.(28) He cited 5 periods that had occurred since 1909.

1. First and Second quarter of 1921
2. Last half of 1931
3. Last half of 1937
4. First quarter of 1949
5. First half of 1960

Conversely he mentioned that the moment the downward trend of these rates was broken on the upside, a major buying opportunity for common stocks appeared.

As a measure of the rate of change of money supply, the writer chose the N.B.E.R. leading indicator #85 change in total U.S. money supply. This measure consists of changes in demand deposits and currency. The raw data are derived from the Federal Reserve system. On the N.B.E.R. scoring plan, the median lead to the peak of the business cycle is 20 months and 10 months to the trough. It is currently available, and has missed only about 9 per cent in the last eleven cycles covered.

Business Loans:

As an adjunct to an increase in money supply as measured by demand deposits, Hamilton recommended a breakdown within to ascertain which portion is demand oriented in the form of loans, and which is supply, in the form of increased bank investments due to monetary expansion.(29) These Bank investments are a residual that tend to move up and down with the supply of loanable funds. As the demand for loans, which are stimulating to the

---

(28) Bolton, A. Hamilton op.cit., p. 144.

(29) Bolton, A. Hamilton op.cit., p. 145.

economy, increases, banks tend to run down their supply of funds which have been in the form of investments as Government and Municipal Bonds. As a measure of bank loans to businesses, the author has chosen the N.B.E.R. series of #112 which is the rate of change of Business loans by banks in the Federal Reserve System. This series was started in 1959 and was incorporated into the model from that period on. It is recognized as one of the leading series by the N.B.E.R. and has missed only 20 per cent of the last 5 cycle turns measured.

## Summary of Indicators

Moore and Shiskin listed six major economic process groupings that are directly responsible for cyclical fluctuations in the business cycle.(30) The author has summarized these processes along with the indicators that have been chosen for use in the model.

| Economic Rationale | Indicators Chosen |
|---|---|
| 1. Employment and unemployment | #1 Average Hours Worked<br>#30 Non Agricultural Placements |
| 2. Production, Income, Consumption and Trade | Index of Consumer Sentiment - U. of Mich. |
| 3. Fixed Capital Investment | #6 New orders for durables<br>#29 Housing Permits |
| 4. Prices, Costs and Profits | #23 Industrial Materials Prices |
| 5. Money and Credit | #14 Business Failures<br>#85 Change in Money Supply<br>#112 Change in Business Loans |

(30) Lempert, L.H. op.cit., p. 26.

# CHAPTER III

## A DIFFUSION INDEX

In this chapter we will discuss the description and methodology of a diffusion index constructed from the component indicators that were described in Table V of Chapter II. The establishment of criteria for predictions from the index will next be considered. The index is then tested with the Standard and Poor 500 Index and a judgement is made on its performance. The results are then interpreted to establish a basis for weighting the forecast of the diffusion index in the model to be tested.

## DESCRIPTION

A diffusion index is a summarizing device used to accumulate a consensus of opinion that is expressed by a group of indicators. It consists of a measure by percentage of the series that are undergoing expansion. When the value is over 50 per cent more series are expanding than contracting, conversely, when the value is under 50 per cent more series are contracting than expanding. For our purpose, the diffusion index we utilize, will consist of the following indicators:

| N.B.E.R. Number | Indicator | Period of Moving Averages |
|---|---|---|
| #1 | Average hours worked per week in mfg. | 4 |
| #30 | Non Agricultural placements | - |
| #6 | New Orders for durables | 6 |
| #29 | Housing permits | 6 |
| #23 | Industrial materials prices | 3 |
| #17 | Price/unit labour cost | 4 |
| #14 | Business failures | 6 |
| #85 | Change in money supply | 6 |
| #112 | Change in bank loans | 5 |
| | Index of consumer sentiment | - |

# METHODOLOGY

## Source of Data:

The data used for the diffusion index is derived from Business Cycle Developments with the exception of the Index of Consumer Sentiment which is compiled by the University of Michigan. Business Cycle Developments is a monthly publication of the National Bureau of Economic Research in association with the U.S. Bureau of the Census. The data required for our diffusion index are published monthly in this journal.

The index is constructed by measuring the number of the series that has risen in each month, and expressing it as a percentage of the total. These monthly values are formed into an index, that represents the direction of movement of the majority of indicators in the series.

Two indexes were calculated for our appraisal; one that is not smoothed, (moving averages not taken). We will refer to this as the Diffusion Index (unaveraged). The other is smoothed (moving averages are taken) and we will refer to this as the Diffusion Index. As stated earlier, the unaveraged index will serve as the underlying trend from which data can be extrapolated to bring the Diffusion Index up to date.

## Moving Averages:

The series calculated in this method is choppy, and produces a very erratic pattern. It can be smoothed by the use of moving averages. The writer used a method which G.H. Moore recommended for smoothing economic series used in diffusion indexes, and it is described as follows.(1) A statistical calculation of a moving average requires that the average be centred, and therefore the central point is interpolated when even years are

---

(1) Moore, G.H. "Analyzing Business Cycles", p. 16, The American Statistician April, 1964.

used, and is more easily located with odd years. However, Moore stated that in practice, none of the moving averages need be computed since the only information required is their direction of change, and this may be inferred by comparing appropriate months of original data, as shown in the following scheme.

| Period of Mov. Average Months | Months Compared | Month in Which Direction of Change is Entered |
|---|---|---|
| 1 | 1st & 2nd | 2nd |
| 2 | 1st & 3rd | 2nd |
| 3 | 1st & 4th | 3rd |
| 4 | 1st & 5th | 3rd |
| 5 | 1st & 6th | 4th |
| 6 | 1st & 7th | 4th |

The choice of period of moving averages was another decision that was made, based on G.H. Moore's experience with leading indicators.(2) In a diffusion index of leading indicators covering from 1946 to 1953, he found that the following periods of moving averages were appropriate; a six month period for business failures, new orders, residential contracts, commercial contracts and incorporations; a four month period for stock prices and work week; a three month period for basic prices. By the use of this data, periods were assigned to all of the leading indicators with the exception of change in money supply, change in bank loans, Index of Consumer Sentiment and non agricultural placements. The statistics for the Index of Consumer Sentiment were smoothed by the use of a graph. The index has been available on a quarterly and somewhat irregular basis, particularly in its earlier years. The writer required monthly data for the diffusion index, so

---

(2) Ibid., p. 16

a method of plotting the available data on a graph and joining the points by a smooth curve was utilized.(3) In this manner, monthly data were available from a series that did not require smoothing by the use of moving averages. The direction of change was the measure desired, so this method was considered as being accurate.

Non agricultural placements as presented in index form in Business Cycle Developments is a smooth series, and it was the writer's judgement that no adjustments be made to the data as presented in the journal. Change in money supply and change in bank loans were subjected to six month and five month moving averages respectively by the Bureau of the Census, in their construction of individual indexes of these indicators, so the writer chose to use the same periods of averages in his data.(4)

Continuity of Data:

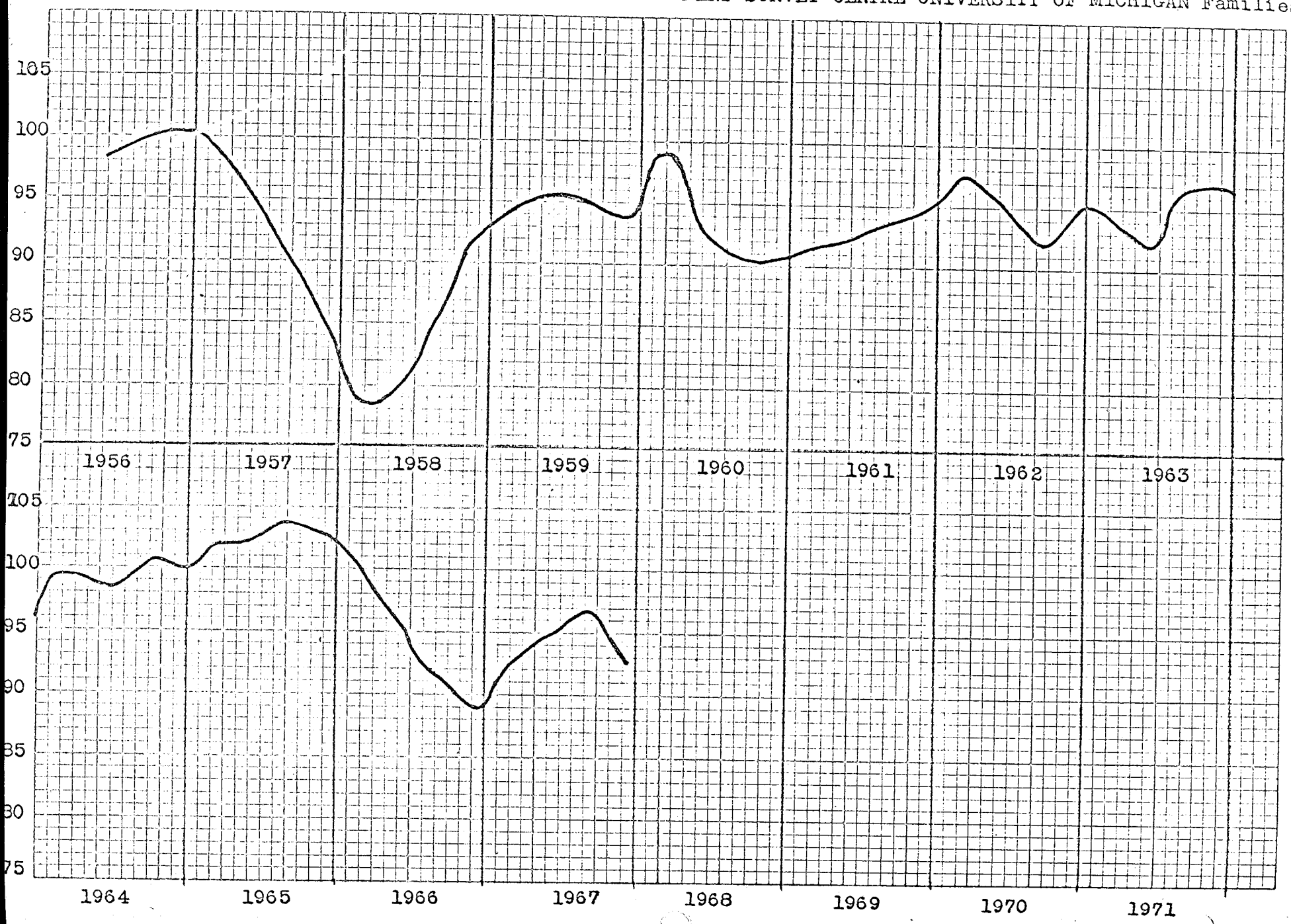
The data for all of the indexes were not available from 1956 on. The Index of Consumer Sentiment data were available from June 1956 thereafter. The series, change in business loans, commenced in September 1959 and has been available since. Also, the series, change in money supply, was revised back to January 1960 by the Bureau of the Census, so its inception was taken as of January 1st, 1960. Therefore, as will be noted in Appendix I, the Diffusion Index data consists of the full slate of ten indicators from 1960 on. The period from 1956 to 1960 consists of the consensus of opinion of from six to ten indicators. It could be therefore considered that the earlier periods did not reflect the same scope of coverage as that period from 1960 on.

---

(3) Monthly data for Consumer Sentiment is presented in Table IX and the graph is on Chart I.

(4) Business Cycle Developments - Bureau of the Census

% from smooth line of series INDEX OF CONSUMER SENTIMENT-SURVEY CENTRE UNIVERSITY OF MICHIGAN (All Families)



The data for the indicators used in the construction of the diffusion indexes are located in Tables VI to XI inclusive, with the Standard and Poor 500 Index data in Table XII. The construction and handling of data of the Diffusion Index are indicated in Appendix I, parts (a) and (b), and for the Diffusion Index (non averaged), part (c) of Appendix I contains the relevant material.

## METHOD OF ANALYSIS

The dependent variable in this appraisal is the stock market index. For this purpose we selected the Standard and Poor Composite of 500 stocks, as it represents one of the broader and popular measures of the stock market, and is also a select leading indicator of the N.B.E.R. The period covered is from 1956 to 1967. It was considered adequate for appraisal purposes, as in this span, there have been four significant market breaks, two of which just preceded periods that were classified as recessions by the N.B.E.R.

The purpose for testing this index is to ascertain its predictability for timing investment decisions in order that a standard of weights may be established for its use in our model to be appraised. This will be done by comparing the movement of the diffusion index with that of the Standard and Poor 500 Index, and by so doing establish dates on which buying and selling decisions should be made. We will thus have to establish criteria as to when the diffusion index indicates buy, and when it indicates sell, keeping in mind that the perfect decision would be, to sell at the peak and buy at the trough of the averages for the greatest return on investment.

## A CURRENCY PROBLEM

The currency of the Diffusion Index appeared to create a problem when attempting to forecast the stock averages. The lead time of the index was diminished, by the loss of about two months due to the calculation of the moving average, and also by about a month due to the currency of data, making a total loss of about three months of lead time.

This difficulty was partly overcome by extrapolating the moving averages, using the last month of data available, to cover the same period as that of the monthly diffusion index. The remaining one month lag was accounted for by lagging the indicator one month on the period signal given by the indicators. These points are designated as buy and sell on Charts II and III.

## CRITERIA FOR BUY AND SELL INDICATIONS

This criterion is developed for the moving average diffusion index only, which is referred to as the Diffusion Index. A brief reminder is made at this point, of the criteria Moore developed for his diffusion index of leading indicators, in order that our own criteria may be so directed.(5)

1. The index usually reaches the 50 per cent point a few months earlier than a general reversal of business tide.
2. The percentage expanding curves designate the number only of indicators that are expanding, and are aids to, not substitutes for careful study.

The first criterion for performance can be stated from the evidence under, A Currency Problem, described earlier.

---

(5) Moore, G.H. op.cit., p. 16.

1. Extrapolate the Diffusion Index data to the current month, and deduct one month from the lead time at the point of indication given.

Criterion number 2 is stated from G.H. Moore's criteria and also common sense:

2. The perfect decision would be to sell at the peak and buy at the trough of the averages for the greatest return on investment.

On the basis of these criteria, points are examined on the Diffusion Index for both the downside and upside to ascertain if the 50 per cent level used by Moore is the central point for indication on the Diffusion Index. The Diffusion Index and Standard and Poor 500 Index are plotted on Charts II and III.

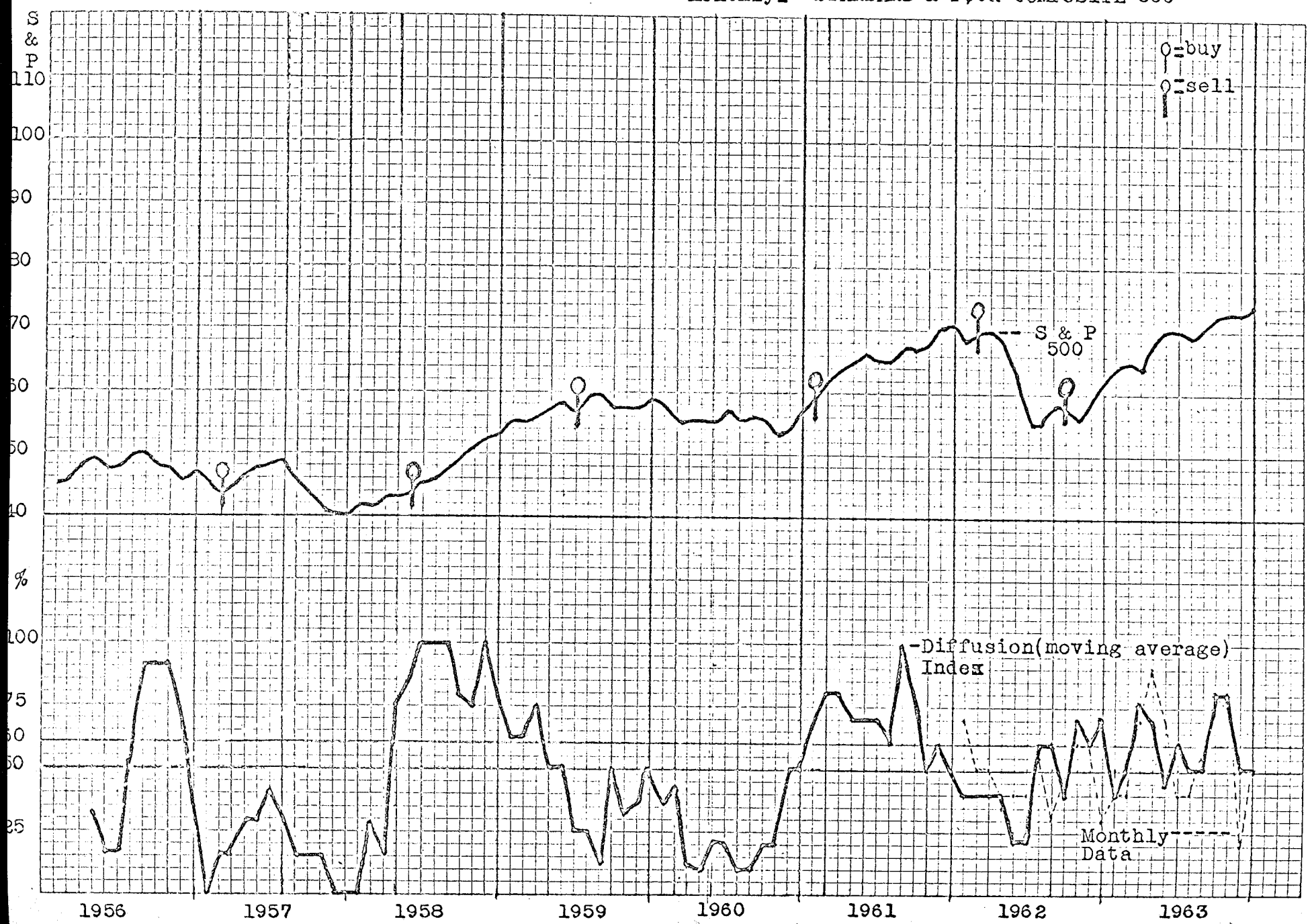
## TESTING FOR INDICATOR LEVELS

The Diffusion Index is subjected to a series of tests to measure its ability to give buy and sell signals close to the ideal buy and sell signals. The method used in this test will be used in other parts of this study, where technical indicators are tested for their ability to give buy and sell signals which approach the ideal. The test is described as follows:

A control measure is selected as a standard for the experiment. Hypothetical buy and sell investment decisions are then formulated on certain indications from the index being tested. The results of each of these decisions is then measured against the standard, to gauge the effectiveness of the index performance under the specified conditions. The time period covered is eleven years, from January 1st, 1956 to December 31st, 1966.

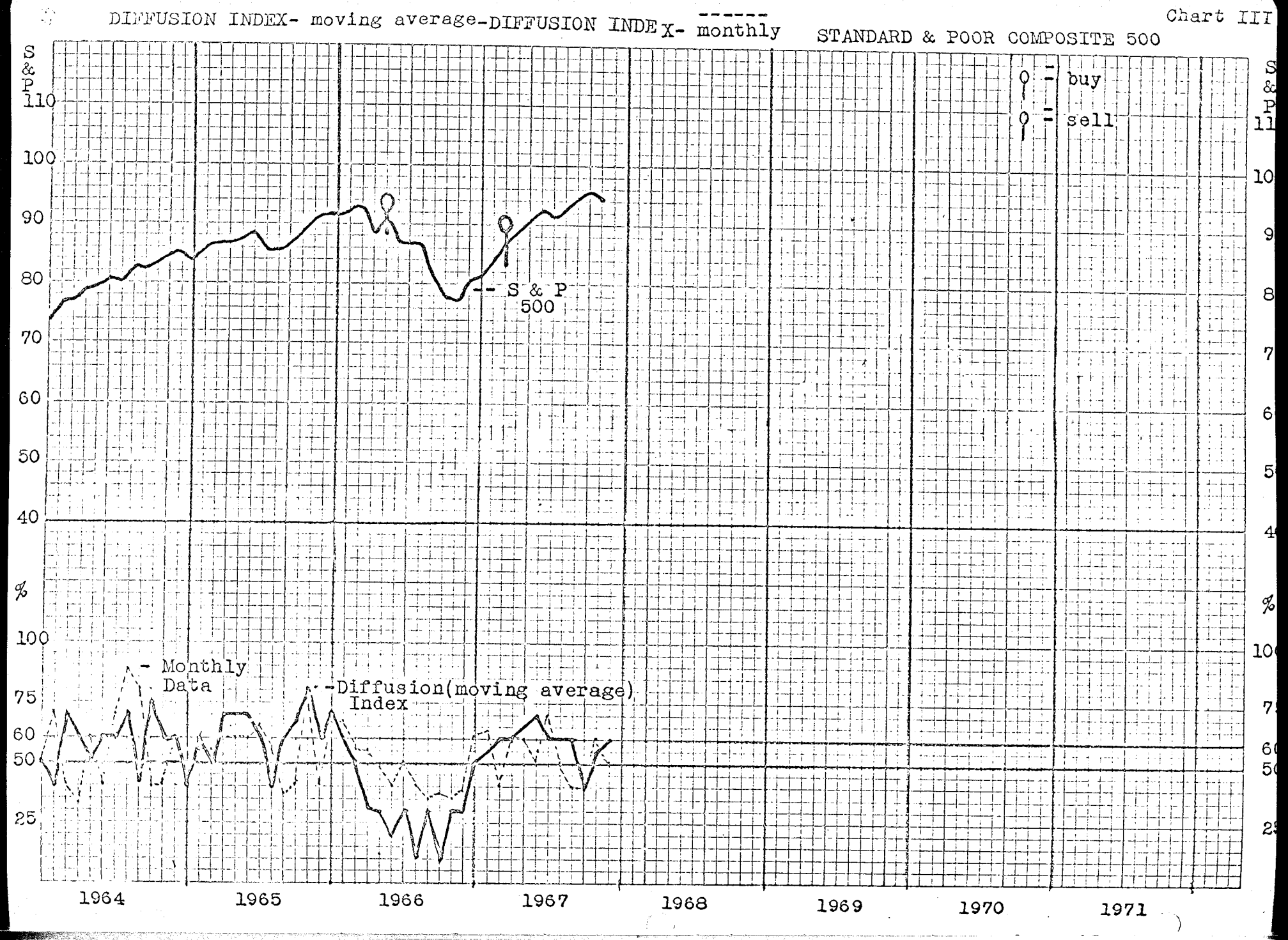
DIFFUSION INDEX-moving average_DIFFUSION INDEX--monthly_ STANDARD & POOR COMPOSITE 500

Chart II



DIFFUSION INDEX- moving average-DIFFUSION INDEX- monthly

STANDARD & POOR COMPOSITE 500



Dividends during the period in which our "buy and sell" investor would be out of the stock market pose a problem. There are two methods of handling this problem, and in both of these methods we observe the following conditions:

1. In the period that an investment is in the market, dividends are treated as a gain, and are not reinvested. The gain is calculated from the average, of the dividend yields of the Standard and Poor 500, for the period under consideration.
2. When an investment is not in the stock market, it will be invested in high grade industrial bonds, the yields of which are quoted in the Federal Reserve Bulletin. The yields used are an average for the period concerned, and the dividends will be treated as not being reinvested.

One method is to calculate dividends over the full period of the test, for both investment decisions when they are in the market, and then the interest earned when the investment is out of the market.

The other method, which is the one that was used, produces similar results. It considers the dividend calculation only when the funds are not in the market. This was achieved by deducting the dividend yield from the bond yield when the funds were out of the market, and omitting dividends from all other calculations.

This is conceived as follows:

Consider two investments in the market, investment A, as a buy and hold, and investment B, as one subjected to buy and sell decisions. Let D represent dividends, and Int., bond interest. Also assume that dividends and bond interest are not compounded, and that investment B is in the

market for the first 9 years and in bonds for the last year, and that investment A is in the market for 10 years.

Then:

$$\text{Total benefits from A is } A + \sum_{i=1}^{n=10} D$$

$$\text{and total benefits from B is } B + \sum_{i=1}^{n=9} D + \sum_{i=9}^{n=10} \text{Int.}$$

$$\text{Subtract } \sum_{i=1}^{n=10} D \text{ from both sets of benefits,}$$

$$\text{then Total benefits from A is } A$$

$$\text{and total benefits from B is } B + \sum_{i=9}^{n=10} \text{Int.} - \sum_{i=9}^{n=10} D$$

Recapitulation:

Our test consists of the following:

1. Setting up a control measure.
2. Selecting various indicator situations.
3. Establishing buy and sell points for each.
4. Measuring the benefits under the standard, and under the various index situations.
5. Comparing the results as a difference from the standard, by a percentage.

## TESTING THE DIFFUSION INDEX

The control measure for this text is a buy and hold investment in the Standard and Poor 500 (S. and P. 500), for the period December 31, 1955 to December 31, 1966. As no dividends are computed on this investment, the results of the investment are:

S. & P. 500 Index Value Dec. 31, 1966 . . 81.33 pts
less S. & P. 500 Index Value Dec. 31, 1955 . . 45.48 pts

Profit on Investment = 35.85 pts

Four situations are tested against this control:

Situation I: As suggested by G.H. Moore, the 50 per cent level is the critical point at which an indication is given. Therefore, as the indicator proceeds through 50 per cent on the downside, a sell signal is given, and as it proceeds through 50 per cent on the upside, a buy signal is given.

Situation II: Same as Situation I, except that one extra month of movement is required for confirmation, and then the decision is made.

Situation III: The Diffusion Index proceeds through the 60 per cent level on the downside, and selling is indicated. Also when the index proceeds through 50 per cent on the upside, buying is indicated.(6)

Situation IV: Same as situation III, except that one extra month is required to confirm the signal of the indicator.

(6)These levels were tested by visual means, and appeared to provide good results.

SITUATION I (50% level with 1 month lag)

A - Investment in the Stock Market

Dates are End of Month

| Date | Purchase - Commission | Date | Sales - Commission | Profit (Pts) |
|---|---|---|---|---|
| May 58 | 43.71 + .44 = 44.15 | July 59 | 59.74 - .60 = 59.14 | 15.00 |
| Oct 59 | 57.00 + .57 = 57.57 | Nov 59 | 57.23 - .57 = 56.66 | (.91) |
| Jan 60 | 58.03 + .58 = 58.61 | Feb 60 | 55.78 - .56 = 55.22 | (3.39) |
| Dec 61 | 71.74 + .72 = 72.46 | Feb 62 | 70.22 - .70 = 69.52 | (2.94) |
| Aug 62 | 58.52 + .59 = 59.11 | Oct 62 | 56.17 - .56 = 55.61 | (3.50) |
| Nov 62 | 60.04 + .60 = 60.64 | Feb 63 | 65.92 - .66 = 64.26 | 3.62 |
| Mar 63 | 65.67 + .66 = 66.33 | June 63 | 70.11 - .70 = 69.41 | 3.08 |
| July 63 | 69.07 + .69 = 69.76 | Feb 64 | 77.39 - .77 = 76.62 | 6.86 |
| Mar 64 | 78.80 + .79 = 79.59 | Sept 64 | 83.41 - .83 = 82.58 | 2.99 |
| Oct 64 | 84.85 + .85 = 85.70 | Jan 65 | 86.12 - .86 = 85.26 | (.44) |
| Feb 65 | 86.75 + .87 = 87.62 | Aug 65 | 86.49 - .86 = 85.63 | (1.99) |
| Sept 65 | 89.38 + .89 = 90.27 | Apr 66 | 91.60 - .92 = 90.68 | .41 |
| | | | Total | 18.79 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. - Av.Dividend - | Rate (%) | Return (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to May 58 | 29/12 | 45.48 | 3.50 - 3.70 = | (.20) | (22) |
| July 59 to Oct. 59 | 3/12 | 59.74 | 4.77 - 3.26 = | 1.51 | .24 |
| Nov. 59 to Jan. 60 | 2/12 | 56.66 | 4.71 - 3.28 = | 1.43 | .17 |
| Feb. 60 to Dec. 61 | 22/12 | 55.22 | 4.66 - 3.05 = | 1.61 | 1.60 |
| Feb. 62 to Aug. 62 | 6/12 | 69.52 | 4.54 - 2.93 = | 1.61 | .56 |
| Oct. 62 to Nov. 62 | 1/12 | 55.61 | 4.40 - 3.53 = | .87 | .04 |
| Feb. 63 to Mar. 63 | 1/12 | 64.26 | 4.38 - 3.22 = | 1.16 | .06 |
| June 63 to July 63 | 1/12 | 69.41 | 4.40 - 2.95 = | 1.45 | .07 |
| Feb. 64 to Mar. 64 | 1/12 | 76.62 | 4.48 - 2.95 = | 1.53 | .08 |
| Sept.64 to Oct. 64 | 1/12 | 82.58 | 4.52 - 2.92 = | 1.60 | .08 |
| Jan. 65 to Feb. 65 | 1/12 | 85.26 | 4.52 - 2.96 = | 1.56 | .09 |
| Aug. 65 to Sept.65 | 1/12 | 85.63 | 4.64 - 2.95 = | 1.69 | .09 |
| Apr. 66 to Dec. 66 | 8/12 | 90.68 | 5.36 - 3.68 = | 1.68 | 1.00 |
| | | | | Total | 3.86 |

Therefore total profit is A + B 22.65

SITUATION II (50% level with 1 month lag and 1 month confirmation)

A - Investment in the Stock Market

| Date | Purchase - Commission | Date | Sales - Commission | Profit (Pts) |
|---|---|---|---|---|
| June 58 | 44.75 + .45 = 44.30 | July 59 | 59.74 - .60 = 59.14 | 14.84 |
| Jan. 61 | 59.72 + .60 = 60.32 | Mar. 62 | 70.29 - .70 = 69.59 | 9.27 |
| Sept.62 | 58.00 + .58 = 58.58 | May 66 | 86.78 - .87 = 85.91 | 27.33 |
| | | | Total | 51.14 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. - Av.Dividend - | Rate (%) | Return (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to June 58 | 30/12 | 45.48 | 3.50 - 3.70 = | (.20) | (23) |
| July 59 to Jan. 61 | 6/12 | 59.14 | 4.54 - 3.34 = | 1.20 | .35 |
| Mar. 62 to Sept.62 | 6/12 | 69.59 | 4.49 - 3.26 = | 1.23 | .41 |
| May 66 to Dec. 66 | 7/12 | 85.91 | 5.37 - 3.68 = | 1.69 | .86 |
| | | | | Total | 1.39 |

Total profit is A + B 52.53

SITUATION III (60% on downside and 50% on upside with 1 month lag)

A - Investment in the Market

Dates are End of Month

| Date | Purchase - Commission | Date | Sales - Commission | Profit (Pts) |
|---|---|---|---|---|
| Jan. 61 | 59.72 + .60 = 61.32 | Nov. 61 | 71.08 - .71 = 70.37 | 9.05 |
| Dec. 61 | 71.74 + .72 = 72.46 | Jan. 62 | 69.07 - .69 = 68.38 | (4.08) |
| Aug. 62 | 58.52 + .59 = 59.11 | Oct. 62 | 56.17 - .56 = 55.61 | (3.50) |
| Nov. 62 | 60.04 + .60 = 60.64 | Feb. 63 | 65.92 - .66 = 65.26 | 4.62 |
| Apr. 63 | 68.76 + .69 = 69.45 | June 63 | 70.11 - .70 = 69.41 | (.04) |
| July 63 | 69.07 + .69 = 69.76 | Aug. 63 | 70.98 - .71 = 70.27 | .51 |
| Sept.63 | 72.85 + .73 = 73.58 | Nov. 63 | 72.62 - .73 = 71.89 | (1.69) |
| Dec. 63 | 74.17 + .74 = 74.91 | Jan. 64 | 76.45 - .76 = 75.69 | .78 |
| May 64 | 80.72 + .81 = 81.53 | Sept.64 | 83.41 - .83 = 82.58 | 1.05 |
| Oct. 64 | 84.85 + .85 = 85.70 | Jan. 65 | 86.12 - .86 = 85.26 | (.44) |
| Feb. 65 | 86.75 + .87 = 87.62 | Mar. 65 | 86.83 - .87 = 85.96 | (1.66) |
| Apr. 65 | 87.97 + .88 = 88.85 | Aug. 65 | 86.49 - .86 = 85.63 | (3.22) |
| Sept.65 | 89.38 + .89 = 90.27 | Mar. 66 | 88.88 - .89 = 88.99 | (1.28) |
| | | | Total | .10 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. - Av.Dividend - | Rate (%) | Return (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Jan. 61 | 61/12 | 45.48 | 3.89 - 3.31 = | .58 | 1.30 |
| Nov. 61 to Dec. 61 | 1/12 | 70.37 | 4.59 - 2.59 = | 2.00 | .14 |
| Jan. 62 to Aug. 62 | 7/12 | 68.38 | 4.54 - 3.36 = | 1.18 | .48 |
| Oct. 62 to Nov. 62 | 1/12 | 55.61 | 4.39 - 3.37 = | 1.02 | .05 |
| Feb. 63 to Apr. 63 | 2/12 | 65.26 | 4.38 - 3.20 = | 1.18 | .13 |
| June 63 to July 63 | 1/12 | 69.41 | 4.40 - 2.70 = | 1.70 | .07 |
| Aug. 63 to Sept.63 | 1/12 | 70.27 | 4.44 - 2.86 = | 1.58 | .07 |
| Nov. 63 to Dec. 63 | 1/12 | 71.89 | 4.47 - 3.03 = | 1.44 | .07 |
| Jan. 64 to May 64 | 4/12 | 75.69 | 4.49 - 2.93 = | 1.56 | .38 |
| Sept. 64 to Oct. 64 | 1/12 | 82.58 | 4.52 - 2.89 = | 1.63 | .08 |
| Jan. 65 to Feb. 65 | 1/12 | 85.26 | 4.52 - 2.96 = | 1.56 | .09 |
| Mar. 65 to Apr. 65 | 1/12 | 85.96 | 4.53 - 3.03 = | 1.50 | .09 |
| Aug. 65 to Sept.65 | 1/12 | 85.63 | 4.64 - 2.95 = | 1.69 | .09 |
| Mar. 66 to Dec. 66 | 9/12 | 88.99 | 5.29 - 3.69 = | 1.60 | 1.07 |
| | | | | Total | 4.11 |

Therefore total profit is A + B 4.21

SITUATION IV (60% on downside and 50% on upside with 1 month lag and 1 month confirmation)

A - Investment in the Stock Market

| Date | Purchase - Commission | Date | Sales - Commission | Profit (Pts) |
|---|---|---|---|---|
| May 58 | 43.70 + .44 = 44.14 | June 59 | 57.46 - .57 = 56.89 | 12.75 |
| Jan. 61 | 59.72 + .60 = 60.32 | Feb. 62 | 70.22 - .70 = 69.52 | 9.20 |
| Sept.62 | 58.00 + .58 = 58.58 | Apr. 66 | 91.60 - .92 = 90.68 | 32.10 |
| | | | Total | 54.05 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. - Av.Dividend - | Rate (%) | Return (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to May 58 | 29/12 | 45.48 | 3.53 - 3.70 = | (.23) | (.22) |
| June 59 to Jan. 61 | 19/12 | 57.46 | 4.54 - 3.17 = | 1.37 | 1.26 |
| Feb. 62 to Sept.62 | 7/12 | 70.22 | 4.51 - 3.15 = | 1.36 | .56 |
| Apr. 66 to Dec. 66 | 8/12 | 91.60 | 5.36 - 3.69 = | 1.67 | 1.01 |
| | | | | Total | 2.61 |

Total profit is A + B 56.66

The control against which these situations were tested was a buy and hold investment in the S. and P. 500 averages. The profit from this was 35.85 index points. To complete the test, the profit from each of the four investment situations was compared to the control, and that with the best performance over the control was chosen as the ideal situation.

Situation I:

$$\frac{\text{Total Profit of Investment - Control}}{\text{Control Investment}} \times 100 = \text{Relative Performance}$$

$$\frac{22.65 - 35.85}{35.85} \times 100 = 36.8\% \text{ worse}$$

Situation II:

$$\frac{52.53 - 35.85}{35.85} \times 100 = 46.5\% \text{ better}$$

Situation III:

$$\frac{4.21 - 35.85}{35.85} \times 100 = 88.25\% \text{ worse}$$

Situation IV:

$$\frac{56.66 - 35.85}{35.85} \times 100 = 58.04\% \text{ better}$$

## INTERPRETATION OF RESULTS

On the basis of the tests performed, Situation IV has the best performance. To repeat the procedure followed: when the Diffusion Index proceeds through the 60 per cent level on the downside, selling is indicated; when it proceeds through 50 per cent on the upside, buying is indicated. One extra month is allowed for confirmation of the data, and allowance is made for a one month data lag.

To ascertain the performance of the index as related to perfect timing, the leads and lags of the Diffusion Index as a forecast of the peaks and troughs of the Standard and Poor 500 Index are exhibited in Figure 4. The qualifications of Situation IV are the basis for the Diffusion Index.

Also, as stated in earlier criteria for the Index, the perfect decision is to sell at the peaks and buy at the troughs of the S. and P. 500 Index, one can perceive that with a lead on the S. & P. 500 at peaks and troughs, this decision could be made.

Figure 4

Leads or Lags of the Indicator (-) = lead, (+) = lag

| Period | Peaks | Troughs |
|---|---|---|
| 1 | - 5 | + 5 |
| 2 | - 6 | + 2 |
| 3 | - 1 | + 3 |
| 4 | - 0 | + 3 |
| Average | - 3 | + 3.2 |

It is apparent that the Diffusion Index is particularly weak at the troughs. The indication to buy is given about 3.2 months past the trough, when prices are expanding. This could be improved somewhat if the data for the index were more current. As the recent trend in statistical compilation by government departments is to an improved currency of data, this would be rectified to some extent in the future. The weakness of the Diffusion Index at troughs is recognized. However, on the basis of the test being 58.04 per cent better than the control, one would have to accept the buy and sell performance as being good.

## SUMMARY OF CRITERIA FOR THE DIFFUSION INDEX

In this chapter, the establishment of criteria for predictions from the Diffusion Index has been developed. The Index has also been tested for effective forecast decisions, and the proper choice of criteria has thus been substantiated. A summary of the criteria that was chosen for the forecast is given:

1. The data for the Index should be extrapolated to the current month. Also, one month should be deducted from the lead time at the point of indication, to allow for a data lag, when a historical review is made of the indicator performance.
2. The perfect decision would be, to sell at the peaks and buy at the troughs of the averages for the greatest return on investment.
3. Downside: When the Diffusion Index proceeds downward through the 60 per cent level on the downside, and this same movement is confirmed one month later, selling is indicated.
   Upside: When the Diffusion Index proceeds upward through the 50 per cent level on the upside, and this movement is confirmed one month later, buying is indicated.

Appendix I

## Diffusion Index Data Monthly - Moving Average

### 1956

| % rising | | | | 33 | 17 | 17 | 57 | 91 | 91 | 91 | 67 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| #1 | | | - | - | - | - | + | + | + | + | 0 | - |
| #30 | | - | + | - | - | - | - | + | + | + | - | - |
| #6 | | | | + | + | + | + | + | + | + | + | + |
| #29 | | | | - | - | - | - | - | - | - | - | - |
| #23 | | - | - | + | - | - | - | + | + | + | + | + |
| #17 | | | - | - | - | - | + | + | + | + | + | - |
| #14 | | | | | | | | | | | | |
| #85 | | | | | | | | | | | | |
| #112 | | | | | | | | | | | | |
| Cons. Sent | | | | | | | + | + | + | + | + | 0 |

### 1957

| % rising | 0 | 17 | 15 | 29 | 29 | 43 | 29 | 15 | 15 | 15 | 0 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| #1 | - | - | - | - | - | - | - | - | - | - | - | - |
| #30 | 0 | + | - | - | + | + | - | - | - | - | - | - |
| #6 | - | - | - | - | - | - | - | - | - | - | - | - |
| #29 | - | - | - | + | - | + | + | + | + | + | - | - |
| #23 | - | - | - | - | - | - | - | - | - | - | - | - |
| #17 | - | 0 | + | + | + | + | + | - | - | - | - | - |
| #14 | | | | | | | | | | | | |
| #85 | | | | | | | | | | | | |
| #112 | | | | | | | | | | | | |
| Cons. Sent | - | - | - | - | - | - | - | - | - | - | - | - |

### 1958

| % rising | 0 | 29 | 17 | 78 | 89 | 100 | 100 | 100 | 78 | 75 | 100 | 78 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| #1 | - | - | 0 | + | + | + | + | + | + | + | + | + |
| #30 | - | + | - | + | + | + | + | + | + | + | + | + |
| #6 | - | - | - | + | + | + | + | + | + | + | + | + |
| #29 | - | - | - | + | + | + | + | + | + | + | + | + |
| #23 | - | - | - | - | - | + | + | + | + | + | + | + |
| #17 | - | - | - | - | + | + | + | + | + | 0 | + | + |
| #14 | | | | + | + | + | + | + | - | - | + | - |
| #85 | | | | | | | | | | | | |
| #112 | | | | | | | | | | | | |
| Cons. Sent | - | + | + | + | + | + | + | + | + | + | + | + |

### 1959

| % rising | 63 | 63 | 75 | 50 | 50 | 25 | 25 | 15 | 25 | 33 | 37 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| #1 | + | + | + | 0 | - | - | - | - | - | + | + | + |
| #30 | + | + | + | + | + | + | - | - | - | - | - | - |
| #6 | + | + | + | - | - | - | - | - | + | + | + | - |
| #29 | - | - | - | - | - | - | - | - | - | - | - | - |
| #23 | - | - | + | + | + | + | + | + | + | + | + | + |
| #17 | - | - | - | - | + | - | - | - | - | - | 0 | + |
| #14 | + | + | + | + | - | - | + | - | - | - | - | 0 |
| #85 | | | | | | | | | | - | - | + |
| #112 | | | | | | | | | | | | |
| Cons. Sent | + | + | + | + | + | - | - | - | - | - | - | - |

### 1960

| % rising | 37 | 44 | 11 | 10 | 22 | 20 | 10 | 10 | 20 | 20 | 50 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| #1 | - | - | - | - | 0 | - | - | - | - | - | - | - |
| #30 | - | + | - | - | - | - | - | + | - | - | + | - |
| #6 | + | - | + | - | - | - | - | - | - | - | - | + |
| #29 | - | - | - | - | - | + | + | - | + | + | - | - |
| #23 | - | - | - | - | + | - | - | - | - | - | - | + |
| #17 | + | + | - | - | - | - | - | - | - | - | + | - |
| #14 | - | - | - | - | - | - | - | - | + | - | + | - |
| #85 | | | | + | + | + | - | - | - | + | + | + |
| #112 | + | + | - | - | - | - | - | - | - | - | - | + |
| Cons. Sent | + | + | - | - | - | - | - | - | - | - | + | + |

### 1961

| % rising | 67 | 80 | 80 | 70 | 70 | 70 | 60 | 100 | 80 | 50 | 60 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| #1 | 0 | + | + | + | + | + | - | + | + | + | + | - |
| #30 | - | + | + | - | + | + | - | + | - | + | + | - |
| #6 | + | + | + | + | + | + | + | + | + | + | + | + |
| #29 | - | + | + | + | + | + | + | + | + | - | + | + |
| #23 | + | + | + | + | - | - | - | + | + | - | - | + |
| #17 | - | + | + | + | + | + | + | + | + | - | - | - |
| #14 | + | - | - | - | - | - | - | + | - | - | + | + |
| #85 | + | - | - | - | + | + | + | + | + | - | - | - |
| #112 | + | + | + | + | - | - | + | + | + | + | + | + |
| Cons. Sent | + | + | + | + | + | + | + | + | + | + | + | - |

(a) Appendix I Cont'd

Appendix I

## Diffusion Index Data Monthly - Moving Average

### 1962

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % rising | 40 | 40 | 40 | 40 | 23 | 23 | 60 | 60 | 40 | 70 | 60 | 70 |
| #1 | - | + | + | + | 0 | - | - | - | - | + | - | + |
| #30 | + | - | + | + | + | - | + | + | - | + | - | - |
| #6 | - | - | - | - | - | - | + | + | + | + | + | + |
| #29 | - | + | + | + | - | + | + | + | + | + | + | + |
| #23 | + | - | - | - | - | - | - | - | + | + | + | + |
| #17 | - | - | - | - | - | 0 | + | + | - | - | - | - |
| #14 | - | + | - | - | - | - | - | - | - | - | + | + |
| #85 | - | - | - | - | - | - | + | + | + | + | + | + |
| #112 | + | + | + | + | + | + | + | + | - | - | - | - |
| Cons. Sent | + | - | - | - | - | - | - | - | - | + | + | + |

### 1963

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % rising | 44 | 50 | 78 | 70 | 45 | 60 | 50 | 50 | 80 | 80 | 50 | 50 |
| #1 | 0 | - | 0 | + | 0 | + | + | + | + | + | - | - |
| #30 | + | + | + | + | - | - | - | + | + | + | - | - |
| #6 | + | + | + | - | - | - | - | - | + | + | + | + |
| #29 | + | + | + | + | + | + | + | - | + | + | + | + |
| #23 | - | - | - | + | - | - | - | + | + | + | + | + |
| #17 | - | + | + | + | + | + | - | - | - | - | + | + |
| #14 | + | - | + | + | + | - | - | - | + | + | - | - |
| #85 | - | - | + | - | + | + | + | - | - | + | - | - |
| #112 | - | + | + | + | - | + | + | + | + | - | - | - |
| Cons. Sent | - | - | + | + | + | + | + | + | + | + | + | + |

### 1964

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % rising | 40 | 70 | 60 | 50 | 60 | 50 | 60 | 44 | 80 | 60 | 60 | 40 |
| #1 | - | + | + | + | + | 0 | 0 | 0 | + | + | + | + |
| #30 | + | - | - | - | + | - | + | - | + | - | + | - |
| #6 | + | + | + | + | - | + | - | - | + | + | + | + |
| #29 | - | - | - | - | - | - | - | - | - | - | - | - |
| #23 | - | + | + | + | + | + | + | + | + | + | + | - |
| #17 | + | + | + | - | - | - | + | - | + | + | + | + |
| #14 | - | + | - | - | + | - | + | - | + | + | - | - |
| #85 | - | 0 | + | + | + | + | + | + | - | - | - | - |
| #112 | - | + | + | + | + | + | - | + | + | + | + | + |
| Cons. Sent | + | + | - | - | - | + | + | + | + | - | - | - |

### 1965

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 60 | 50 | 70 | 70 | 70 | 60 | 40 | 60 | 66 | 80 | 60 | 70 |
| | + | - | - | - | - | 0 | - | + | 0 | + | + | + |
| | - | + | - | + | - | + | - | - | - | + | - | + |
| | + | + | - | + | + | + | + | + | + | + | + | + |
| | - | - | + | - | + | - | + | + | + | + | - | - |
| | - | + | + | + | + | - | - | - | + | + | + | + |
| | + | + | + | + | + | + | - | - | - | + | + | + |
| | + | - | + | - | - | + | - | + | + | + | + | + |
| | - | - | + | + | + | + | + | + | + | + | - | + |
| | + | - | + | + | + | - | - | - | - | - | + | - |
| | + | + | + | + | + | + | + | + | + | - | - | - |

### 1966

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % rising | 60 | 50 | 33 | 30 | 20 | 30 | 11 | 30 | 10 | 30 | 30 | 50 |
| #1 | + | + | 0 | - | - | - | 0 | 0 | + | - | - | - |
| #30 | + | + | - | - | - | + | - | + | - | + | - | - |
| #6 | + | + | + | + | - | + | + | - | - | - | - | - |
| #29 | - | - | - | - | - | - | - | - | - | + | + | + |
| #23 | + | + | + | - | - | - | - | - | - | - | - | + |
| #17 | - | + | - | - | + | + | - | + | - | - | - | - |
| #14 | - | - | + | + | - | - | - | - | - | - | + | + |
| #85 | + | - | - | - | - | - | - | + | - | + | - | + |
| #112 | + | - | - | + | + | - | - | - | - | - | + | - |
| Cons. Sent | - | - | - | - | - | - | - | - | - | - | - | + |

### 1967

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 55 | 60 | 60 | 66 | 70 | 60 | 60 | 60 | 40 | 60 | 70 | |
| | - | - | - | 0 | - | + | + | + | + | | | |
| | + | - | - | - | - | + | - | + | - | + | + | |
| | - | + | + | + | + | + | + | + | | | | |
| | + | + | + | + | + | + | + | + | | | | |
| | - | - | - | - | - | - | - | - | - | + | | |
| | - | - | - | - | - | - | - | - | - | | | |
| | + | + | + | + | + | + | + | + | | | | |
| | 0 | + | + | + | + | - | + | - | | | | |
| | + | + | + | + | + | - | - | - | - | | | |
| | + | + | + | + | + | + | + | + | - | - | - | |

(b) Appendix I Cont'd

## Diffusion Index Data Monthly

### 1962

| % rising | 70 | 50 | 50 | 30 | 40 | 40 | 55 | 33 | 45 | 60 | 60 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| #1 | + | + | + | + | - | - | 0 | - | + | - | + | .. |
| #30 | + | - | + | + | + | - | + | + | - | + | - | - |
| #6 | + | - | - | - | + | - | + | - | - | + | - | + |
| #29 | + | + | - | + | - | + | + | - | + | - | + | - |
| #23 | + | - | - | - | - | - | - | + | - | + | + | - |
| #17 | - | - | - | - | - | - | + | + | 0 | - | + | - |
| #14, inv. | - | + | + | - | + | + | - | - | + | - | + | - |
| #85 | + | + | + | - | - | + | - | - | - | + | - | + |
| #112 | + | + | + | - | + | + | + | - | + | + | - | - |
| Cons. Sent | - | - | - | - | - | - | - | - | - | + | + | + |

### 1963

| 40 | 40 | 70 | 90 | 70 | 40 | 40 | 55 | 80 | 70 | 20 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| + | - | + | - | + | + | - | 0 | + | + | - | + |
| + | + | + | + | - | - | - | + | + | + | - | - |
| + | - | + | + | - | - | + | - | + | + | - | - |
| - | - | + | + | + | - | - | - | + | + | - | + |
| - | - | + | + | + | - | + | 0 | - | + | + | + |
| - | + | + | + | + | + | - | - | + | + | - | 0 |
| - | + | - | + | - | + | - | + | - | - | - | + |
| + | - | - | + | + | + | - | + | + | - | - | - |
| - | + | - | + | + | - | + | + | + | - | - | - |
| - | - | + | + | + | + | + | + | + | + | + | + |

### 1964

| % rising | 70 | 40 | 33 | 60 | 40 | 70 | 88 | 80 | 40 | 40 | 60 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| #1 | - | + | 0 | + | - | + | 0 | + | - | + | + | + |
| #30 | + | - | - | - | + | - | + | - | + | - | + | - |
| #6 | + | - | - | + | - | + | + | - | + | - | - | + |
| #29 | - | + | - | - | - | + | - | + | - | - | + | - |
| #23 | + | 0 | + | + | - | + | + | + | + | + | + | - |
| #17 | + | + | - | + | - | + | + | + | - | - | + | + |
| #14, inv. | - | - | + | + | + | - | + | + | - | + | - | - |
| #85 | + | - | - | - | + | + | + | + | - | - | - | - |
| #112 | + | - | + | + | + | - | + | + | - | + | + | + |
| Cons. Sent | + | + | - | - | - | + | + | + | + | - | - | - |

### 1965

| 55 | 55 | 60 | 60 | 60 | 70 | 55 | 33 | 44 | 80 | 40 | 66 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 0 | 0 | + | - | + | - | 0 | 0 | - | + | + | 0 |
| - | + | - | + | - | + | - | - | - | + | - | + |
| + | - | + | + | - | + | + | - | + | + | - | + |
| + | - | + | - | + | + | - | - | - | + | + | + |
| - | + | + | + | + | - | - | + | - | + | + | + |
| + | - | + | - | + | + | + | - | - | + | - | + |
| + | - | - | + | - | + | + | - | + | + | + | - |
| - | + | - | + | - | + | - | + | 0 | + | - | + |
| - | + | - | - | + | - | + | - | + | - | - | - |
| + | + | + | + | + | + | + | + | + | - | - | - |

### 1966

| % rising | 66 | 55 | 55 | 11 | 40 | 50 | 40 | 30 | 33 | 30 | 33 | 60 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| #1 | 0 | + | - | 0 | - | - | - | + | 0 | - | 0 | - |
| #30 | + | + | - | - | - | + | - | + | - | + | - | - |
| #6 | + | + | + | - | + | + | - | - | + | - | - | + |
| #29 | - | - | + | - | - | - | - | - | - | - | + | + |
| #23 | + | + | + | - | - | + | + | - | - | - | - | + |
| #17 | + | 0 | 0 | - | + | - | + | - | - | - | - | + |
| #14, inv. | + | + | - | - | + | - | + | - | + | + | + | - |
| #85 | 0 | - | + | + | - | + | - | + | + | - | + | + |
| #112 | + | - | + | - | + | + | + | - | - | + | - | - |
| Cons. Sent | - | - | - | - | - | - | - | - | - | - | - | + |

### 1967

| 66 | 40 | 60 | 60 | 50 | 70 | 50 | 40 | 40 | 60 | 50 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 0 | - | + | + | - | 0 | + | + | 0 | - | + | |
| + | - | - | - | - | + | - | + | - | + | + | |
| - | + | - | + | + | + | - | - | + | + | + | |
| + | - | + | + | + | + | - | + | + | + | - | |
| + | - | - | - | - | + | - | - | 0 | - | + | |
| - | - | - | + | - | - | + | - | - | + | - | |
| + | + | + | - | + | + | + | - | + | - | + | |
| - | + | + | - | + | - | - | - | - | + | - | |
| + | - | + | + | - | + | + | - | - | + | - | |
| + | + | + | + | + | + | + | + | - | - | - | |

(c) Appendix I Cont'd

TABLE VI

| | #1 Average Hours Worked/Week Hours | | | | | | #30 Non Agric. Placements | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1956 | 1958 | 1960 | 1962 | 1964 | 1966 | 1956 | 1958 | 1960 | 1962 | 1964 | 1966 |
| Jan | 40.9 | 38.8 | 40.4 | 39.8 | 40.1 | 41.4 | 535 | 435 | 506 | 568 | 534 | 570 |
| Feb | 40.7 | 38.7 | 40.1 | 40.3 | 40.6 | 41.6 | 524 | 426 | 535 | 548 | 532 | 600 |
| Mar- | 40.5 | 38.6 | 39.9 | 40.5 | 40.6 | 41.5 | 532 | 400 | 513 | 575 | 523 | 589 |
| Apr | 40.3 | 38.6 | 39.8 | 40.8 | 40.8 | 41.5 | 529 | 412 | 504 | 576 | 522 | 522 |
| May | 40.2 | 38.8 | 40.1 | 40.6 | 40.6 | 41.4 | 526 | 418 | 494 | 602 | 529 | 513 |
| June- | 40.3 | 38.9 | 39.9 | 40.5 | 40.7 | 41.3 | 515 | 433 | 482 | 538 | 518 | 567 |
| July | 40.1 | 39.1 | 39.9 | 40.5 | 40.7 | 41.2 | 498 | 450 | 460 | 553 | 523 | 542 |
| Aug | 40.2 | 39.3 | 39.6 | 40.2 | 40.8 | 41.4 | 500 | 465 | 488 | 555 | 507 | 543 |
| Sept- | 40.5 | 39.6 | 39.4 | 40.5 | 40.6 | 41.4 | 509 | 465 | 473 | 534 | 518 | 509 |
| Oct | 40.5 | 39.5 | 39.5 | 40.1 | 40.7 | 41.3 | 517 | 470 | 460 | 579 | 514 | 533 |
| Nov | 40.4 | 39.8 | 39.3 | 40.4 | 40.9 | 41.3 | 515 | 480 | 475 | 573 | 533 | 530 |
| Dec- | 40.6 | 39.9 | 38.5 | 40.3 | 41.2 | 41.0 | 510 | 485 | 444 | 517 | 524 | 524 |
| | 1957 | 1959 | 1961 | 1963 | 1965 | 1967 | 1957 | 1959 | 1961 | 1963 | 1965 | 1967 |
| Jan | 40.5 | 40.0 | 39.0 | 40.4 | 41.2 | 41.0 | 510 | 490 | 443 | 552 | 522 | 534 |
| Feb | 40.4 | 40.1 | 39.3 | 40.3 | 41.2 | 40.3 | 512 | 500 | 444 | 554 | 549 | 519 |
| Mar- | 40.3 | 40.3 | 39.3 | 40.4 | 41.3 | 40.4 | 500 | 510 | 474 | 555 | 528 | 497 |
| Apr | 40.1 | 40.3 | 39.7 | 40.2 | 41.0 | 40.5 | 490 | 515 | 433 | 557 | 535 | 474 |
| May | 39.9 | 40.2 | 39.8 | 40.4 | 41.1 | 40.3 | 495 | 518 | 481 | 546 | 533 | 448 |
| June- | 39.9 | 40.1 | 39.9 | 40.5 | 41.0 | 40.3 | 500 | 522 | 494 | 545 | 548 | 487 |
| July | 39.8 | 40.2 | 40.0 | 40.4 | 41.0 | 40.5 | 491 | 520 | 470 | 541 | 541 | 484 |
| Aug | 39.7 | 40.1 | 40.0 | 40.4 | 41.0 | 40.7 | 486 | 510 | 529 | 543 | 537 | 487 |
| Sept- | 39.5 | 40.1 | 39.6 | 40.6 | 40.9 | 40.7 | 473 | 505 | 491 | 553 | 529 | 471 |
| Oct | 39.3 | 39.9 | 40.2 | 40.7 | 41.2 | 40.6 | 469 | 502 | 530 | 575 | 547 | 474 |
| Nov | 39.0 | 40.1 | 40.6 | 40.5 | 41.4 | 40.9 | 453 | 515 | 565 | 533 | 544 | 482 |
| Dec- | 38.9 | 40.2 | 40.4 | 40.6 | 41.4 | | 440 | 510 | 526 | 525 | 563 | |

# TABLE VII

| | #6 New Orders for Durables Billions $ | | | | | | #29 Housing Permits 1957/59 = 100 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1956 | 1958 | 1960 | 1962 | 1964 | 1966 | 1956 | 1958 | 1960 | 1962 | 1964 | 1966 |
| Jan | 16.63 | 11.10 | 17.00 | 17.43 | 19.74 | 23.58 | 111.0 | 90.1 | 98.3 | 104.2 | 116.8 | 110.7 |
| Feb | 14.48 | 11.20 | 16.20 | 17.19 | 19.50 | 23.74 | 111.1 | 79.1 | 97.9 | 113.5 | 124.6 | 105.6 |
| Mar- | 15.61 | 12.10 | 15.94 | 17.00 | 19.26 | 24.89 | 106.3 | 81.0 | 88.1 | 105.7 | 121.7 | 111.9 |
| Apr | 16.43 | 11.20 | 16.47 | 16.73 | 20.46 | 24.20 | 110.2 | 83.2 | 95.1 | 112.9 | 113.6 | 104.6 |
| May | 16.21 | 12.40 | 16.68 | 16.97 | 19.94 | 24.28 | 106.9 | 87.0 | 95.9 | 103.6 | 112.9 | 96.9 |
| June- | 15.93 | 12.80 | 17.14 | 16.44 | 20.02 | 24.59 | 103.6 | 94.1 | 89.5 | 104.4 | 115.1 | 84.2 |
| July | 15.12 | 13.15 | 16.44 | 16.97 | 21.25 | 24.37 | 101.2 | 101.2 | 91.0 | 108.7 | 111.5 | 81.3 |
| Aug | 18.10 | 13.21 | 15.91 | 16.59 | 19.34 | 23.51 | 96.7 | 110.0 | 91.3 | 107.1 | 113.4 | 74.5 |
| Sept- | 16.20 | 14.70 | 15.62 | 16.55 | 19.91 | 25.27 | 95.2 | 116.2 | 94.4 | 109.1 | 109.7 | 64.7 |
| Oct | 15.10 | 15.10 | 14.74 | 17.29 | 19.62 | 24.24 | 94.6 | 120.1 | 95.9 | 107.2 | 109.1 | 63.0 |
| Nov | 15.65 | 15.62 | 14.60 | 16.73 | 19.45 | 23.03 | 93.7 | 126.2 | 91.4 | 113.0 | 110.8 | 63.1 |
| Dec- | 15.69 | 15.20 | 14.92 | 17.33 | 20.72 | 23.96 | 92.3 | 123.1 | 93.1 | 112.0 | 105.4 | 67.0 |

| | 1957 | 1959 | 1961 | 1963 | 1965 | 1967 | 1957 | 1959 | 1961 | 1963 | 1965 | 1967 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan | 15.50 | 16.26 | 14.88 | 18.47 | 21.27 | 22.07 | 86.1 | 120.1 | 92.3 | 111.8 | 112.3 | 83.1 |
| Feb | 15.70 | 18.10 | 14.36 | 18.23 | 21.13 | 22.33 | 85.2 | 124.2 | 89.4 | 108.2 | 108.2 | 78.9 |
| Mar- | 14.70 | 17.30 | 14.82 | 18.78 | 21.71 | 22.06 | 86.8 | 119.6 | 92.3 | 112.9 | 119.9 | 81.9 |
| Apr | 14.80 | 17.90 | 15.38 | 19.04 | 22.04 | 22.23 | 87.2 | 117.6 | 93.5 | 113.6 | 106.2 | 90.7 |
| May | 14.30 | 17.28 | 15.79 | 18.74 | 20.99 | 23.86 | 84.3 | 115.3 | 95.0 | 120.0 | 109.7 | 91.1 |
| June- | 14.60 | 16.54 | 16.90 | 17.68 | 21.31 | 24.26 | 86.1 | 112.2 | 100.1 | 119.3 | 109.9 | 97.9 |
| July | 14.50 | 14.99 | 16.40 | 18.28 | 22.20 | 23.66 | 87.2 | 111.3 | 100.4 | 116.5 | 108.9 | 96.4 |
| Aug | 14.00 | 16.10 | 16.63 | 18.06 | 21.51 | 23.36 | 84.3 | 110.2 | 101.2 | 113.5 | 108.4 | 99.4 |
| Sept- | 14.10 | 16.26 | 16.74 | 18.24 | 22.16 | 22.61 | 88.2 | 106.1 | 100.4 | 121.0 | 104.1 | 102.3 |
| Oct | 13.00 | 15.30 | 17.07 | 18.62 | 22.42 | 23.36 | 88.1 | 100.0 | 103.1 | 123.6 | 109.8 | 106.9 |
| Nov | 13.20 | 16.80 | 17.10 | 18.11 | 22.39 | 24.11 | 87.1 | 105.1 | 102.7 | 119.9 | 112.9 | 102.5 |
| Dec- | 11.90 | 17.10 | 17.24 | 17.97 | 23.40 | | 88.6 | 101.2 | 103.6 | 123.7 | 114.0 | |

TABLE VIII

#23 Industrial Mat. Prices 1957-9 = 100

| | 1956 | 1958 | 1960 | 1962 | 1964 | 1966 |
|---|---|---|---|---|---|---|
| Jan | 111.6 | 94.1 | 105.7 | 102.9 | 98.5 | 120.5 |
| Feb | 110.4 | 93.4 | 104.3 | 100.6 | 98.5 | 122.9 |
| Mar- | 110.3 | 93.5 | 102.4 | 100.4 | 98.9 | 123.5 |
| Apr | 110.2 | 92.4 | 103.8 | 98.3 | 102.4 | 121.5 |
| May | 106.8 | 91.0 | 104.1 | 97.8 | 100.9 | 118.3 |
| June- | 105.2 | 91.2 | 102.7 | 95.4 | 101.4 | 118.4 |
| July | 103.9 | 93.2 | 101.6 | 94.2 | 102.5 | 118.8 |
| Aug | 104.2 | 94.5 | 102.1 | 94.5 | 105.7 | 111.7 |
| Sept- | 107.0 | 94.6 | 101.2 | 94.0 | 108.2 | 108.9 |
| Oct | 107.1 | 95.1 | 99.7 | 94.9 | 112.0 | 106.3 |
| Nov | 108.6 | 100.0 | 98.5 | 96.4 | 113.2 | 105.9 |
| Dec- | 110.0 | 101.2 | 96.8 | 95.8 | 112.5 | 105.8 |

| | 1957 | 1959 | 1961 | 1963 | 1965 | 1967 |
|---|---|---|---|---|---|---|
| Jan | 110.1 | 99.8 | 97.3 | 95.5 | 110.6 | 106.8 |
| Feb | 105.2 | 99.6 | 99.3 | 95.1 | 110.7 | 105.2 |
| Mar- | 104.5 | 100.1 | 103.1 | 94.4 | 113.2 | 102.5 |
| Apr | 103.3 | 100.4 | 104.1 | 94.5 | 116.7 | 100.1 |
| May | 102.9 | 100.7 | 104.4 | 95.2 | 116.9 | 99.6 |
| June- | 103.0 | 100.9 | 101.0 | 93.9 | 115.3 | 99.8 |
| July | 102.1 | 100.9 | 101.7 | 94.2 | 114.6 | 98.3 |
| Aug | 100.2 | 101.4 | 102.9 | 94.2 | 115.2 | 98.1 |
| Sept- | 99.6 | 102.5 | 102.9 | 94.1 | 114.8 | 98.1 |
| Oct | 98.3 | 103.2 | 102.3 | 96.3 | 115.0 | 97.7 |
| Nov | 95.1 | 104.3 | 98.9 | 97.3 | 115.5 | 99.0 |
| Dec- | 94.9 | 105.9 | 101.0 | 97.7 | 117.1 | |

#17 Price/Unit Labout Index 57-59 = 100

| | 1956 | 1958 | 1960 | 1962 | 1964 | 1966 |
|---|---|---|---|---|---|---|
| Jan | 102.4 | 99.1 | 102.0 | 101.7 | 101.6 | 105.1 |
| Feb | 102.3 | 98.7 | 102.1 | 101.6 | 101.9 | 105.1 |
| Mar- | 101.8 | 97.1 | 102.9 | 101.3 | 101.3 | 105.1 |
| Apr | 102.1 | 96.8 | 102.1 | 101.2 | 101.9 | 104.5 |
| May | 101.2 | 95.2 | 101.4 | 101.1 | 101.7 | 105.0 |
| June- | 100.8 | 96.0 | 101.5 | 100.5 | 100.8 | 104.7 |
| July | 98.7 | 99.1 | 101.6 | 100.9 | 101.2 | 105.2 |
| Aug | 101.0 | 100.0 | 101.2 | 101.2 | 101.6 | 104.6 |
| Sept- | 101.6 | 100.5 | 101.1 | 101.2 | 100.8 | 103.9 |
| Oct | 102.5 | 100.7 | 100.7 | 101.1 | 100.6 | 103.7 |
| Nov | 102.3 | 100.0 | 100.1 | 100.0 | 101.8 | 102.7 |
| Dec- | 101.9 | 101.0 | 100.2 | 99.9 | 102.6 | 102.8 |

| | 1957 | 1959 | 1961 | 1963 | 1965 | 1967 |
|---|---|---|---|---|---|---|
| Jan | 101.7 | 101.0 | 100.4 | 100.4 | 103.0 | 101.5 |
| Feb | 101.9 | 100.9 | 99.6 | 100.1 | 103.0 | 101.0 |
| Mar- | 102.1 | 102.1 | 99.8 | 100.5 | 103.1 | 100.6 |
| Apr | 101.9 | 104.1 | 100.6 | 100.8 | 103.5 | 100.8 |
| May | 102.0 | 104.5 | 101.0 | 101.3 | 103.7 | 100.3 |
| June- | 102.2 | 104.9 | 101.3 | 102.2 | 104.5 | 99.8 |
| July | 102.6 | 104.7 | 101.7 | 101.7 | 104.6 | 100.2 |
| Aug | 102.6 | 102.5 | 101.9 | 100.9 | 104.2 | 99.6 |
| Sept- | 102.1 | 102.0 | 102.1 | 101.0 | 103.5 | 99.1 |
| Oct | 101.1 | 101.2 | 102.2 | 101.5 | 103.2 | 99.4 |
| Nov | 100.0 | 100.9 | 101.6 | 100.8 | 103.6 | 99.0 |
| Dec- | 99.8 | 99.9 | 101.8 | 100.8 | 104.4 | |

TABLE IX

| | (Inverted) #14 Bus. Failures & Liabilities | | | | | Index of Consumer Sent - By Smoothing the Curve of Quarter Data | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1956 | 1958 | 1960 | 1962 | 1964 | 1966 | 1956 | 1958 | 1960 | 1962 | 1964 | 1966 |
| Jan | | 59.61 | 52.88 | 101.53 | 91.69 | 111.67 | | 78.5 | 98.0 | 97.2 | 99.0 | 101.0 |
| Feb | | 61.20 | 57.60 | 86.03 | 119.29 | 94.59 | | 78.5 | 98.9 | 97.2 | 99.0 | 99.8 |
| Mar- | | 54.61 | 61.57 | 74.89 | 110.67 | 98.73 | | 78.8 | 97.0 | 97.0 | 98.8 | 98.0 |
| Apr | | 58.12 | 63.71 | 108.58 | 107.10 | 106.93 | | 79.2 | 96.0 | 96.2 | 98.5 | 96.7 |
| May | | 61.20 | 76.52 | 94.54 | 97.92 | 92.41 | | 80.9 | 92.9 | 95.4 | 98.1 | 95.8 |
| June- | | 59.13 | 121.31 | 91.70 | 136.19 | 111.23 | 98.1 | 80.9 | 92.0 | 94.3 | 98.1 | 94.0 |
| July | | 52.10 | 71.04 | 107.98 | 125.14 | 62.84 | 98.7 | 84.0 | 91.2 | 93.0 | 98.8 | 92.2 |
| Aug | | 53.20 | 94.66 | 121.85 | 90.99 | 159.29 | 99.9 | 86.0 | 90.7 | 91.6 | 99.4 | 91.1 |
| Sept- | | 52.90 | 86.02 | 106.02 | 118.59 | 128.77 | 100.0 | 88.0 | 90.5 | 91.6 | 100.2 | 90.4 |
| Oct | | 56.10 | 85.98 | 129.87 | 97.98 | 128.02 | 100.1 | 90.8 | 90.1 | 92.8 | 100.0 | 89.3 |
| Nov | | 58.12 | 80.44 | 96.62 | 111.00 | 116.90 | 100.2 | 92.0 | 90.2 | 95.0 | 99.8 | 88.3 |
| Dec- | | 59.83 | 82.78 | 99.61 | 126.49 | 194.09 | 100.2 | 93.0 | 90.7 | 95.0 | 99.4 | 88.5 |
| | 1957 | 1959 | 1961 | 1963 | 1965 | 1967 | 1957 | 1959 | 1961 | 1963 | 1965 | 1967 |
| Jan | | 62.12 | 77.79 | 146.46 | 84.54 | 118.61 | 99.5 | 93.8 | 91.1 | 94.8 | 100.0 | 90.1 |
| Feb | | 52.80 | 83.73 | 93.05 | 107.57 | 111.23 | 98.0 | 94.4 | 91.4 | 94.8 | 101.5 | 92.2 |
| Mar- | | 56.21 | 116.17 | 94.12 | 146.29 | 108.87 | 97.3 | 94.8 | 91.7 | 93.4 | 101.7 | 93.0 |
| Apr | | 53.71 | 76.88 | 88.15 | 79.51 | 110.80 | 96.0 | 95.1 | 91.9 | 92.3 | 101.9 | 93.7 |
| May | | 46.71 | 82.96 | 115.05 | 139.09 | 93.00 | 95.0 | 95.3 | 92.3 | 91.4 | 102.2 | 94.9 |
| June- | | 50.90 | 86.69 | 91.07 | 135.66 | 87.20 | 92.9 | 95.1 | 92.5 | 92.0 | 102.4 | 95.0 |
| July | | 51.92 | 80.15 | 144.50 | 120.64 | 64.15 | 91.4 | 95.0 | 93.0 | 95.0 | 103.0 | 96.0 |
| Aug | | 53.10 | 94.47 | 52.86 | 128.98 | 98.29 | 90.0 | 94.8 | 93.2 | 96.2 | 103.2 | 96.5 |
| Sept- | | 57.61 | 126.12 | 94.52 | 108.56 | 93.10 | 88.0 | 94.2 | 93.7 | 96.4 | 103.0 | 96.0 |
| Oct | | 53.32 | 72.28 | 99.92 | 85.67 | 98.0 | 86.2 | 94.0 | 94.0 | 96.6 | 102.8 | 94.5 |
| Nov | | 53.40 | 119.93 | 255.72 | 66.65 | 77.24 | 83.7 | 93.8 | 94.4 | 96.9 | 102.6 | 93.0 |
| Dec- | | 59.72 | 71.81 | 87.17 | 128.06 | | 83.7 | 93.8 | 95.0 | 97.2 | 102.0 | |

TABLE X

#85 Change in Money Supply

| | 1956 | 1958 | 1960 | 1962 | 1964 | 1966 |
|---|---|---|---|---|---|---|
| Jan | | | -1.25 | 2.75 | 4.58 | 7.92 |
| Feb | | | -.90 | 3.00 | 3.28 | 2.88 |
| Mar- | | | -2.60 | +3.60 | 3.17 | 6.36 |
| Apr | | | .75 | +2.85 | 3.10 | 9.24 |
| May | | | 4.90 | -1.20 | 4.10 | -2.16 |
| June- | | | 4.60 | 1.80 | 4.55 | 2.88 |
| July | | | +2.01 | +.95 | +5.10 | 4.92 |
| Aug | | | -.61 | -.70 | 8.10 | 1.44 |
| Sept- | | | -2.43 | -1.02 | 6.10 | 2.88 |
| Oct | | | 0.00 | 5.04 | 5.26 | -2.76 |
| Nov | | | 3.60 | 4.95 | 4.85 | 0.00 |
| Dec- | | | 2.75 | 5.03 | 2.50 | 2.16 |

| | 1957 | 1959 | 1961 | 1963 | 1965 | 1967 |
|---|---|---|---|---|---|---|
| Jan | | | 4.90 | 5.15 | 2.28 | -0.72 |
| Feb | | | 4.65 | 4.75 | 3.00 | 8.40 |
| Mar- | | | 3.90 | 2.45 | 2.28 | 11.16 |
| Apr | | | 4.60 | 4.60 | 3.72 | -2.76 |
| May | | | 3.20 | 4.75 | 0.00 | 12.48 |
| June- | | | .79 | 5.10 | 6.72 | 11.64 |
| July | | | 4.25 | 2.38 | 5.16 | 11.52 |
| Aug | | | 5.80 | 4.95 | 5.88 | 8.04 |
| Sept- | | | 4.10 | 7.85 | 5.88 | 1.32 |
| Oct | | | 6.13 | 5.20 | 8.76 | 6.72 |
| Nov | | | 4.10 | 4.10 | 3.60 | -7.32 |
| Dec- | | | 2.60 | -2.15 | 7.92 | |

#112 Change in Bus. Loans Billion $

| | 1956 | 1958 | 1960 | 1962 | 1964 | 1966 |
|---|---|---|---|---|---|---|
| Jan | | | 3.25 | 3.01 | 3.45 | 14.10 |
| Feb | | | 6.10 | 3.25 | 1.01 | 6.24 |
| Mar- | | | 4.10 | 4.00 | 3.20 | 8.76 |
| Apr | | | 6.85 | 3.80 | 5.00 | 8.50 |
| May | | | 2.10 | 4.40 | 5.05 | 9.58 |
| June- | | | -.70 | 4.69 | 4.20 | 17.70 |
| July | | | 1.85 | 4.75 | 5.15 | 21.11 |
| Aug | | | 2.00 | 4.70 | 8.21 | 2.89 |
| Sept- | | | 1.60 | 4.73 | 4.25 | 0.67 |
| Oct | | | .85 | 4.85 | 8.21 | 5.93 |
| Nov | | | -.10 | 3.40 | 9.20 | 2.63 |
| Dec- | | | +.60 | 2.05 | 12.20 | .14 |

| | 1957 | 1959 | 1961 | 1963 | 1965 | 1967 |
|---|---|---|---|---|---|---|
| Jan | | | .98 | 1.90 | 9.90 | 6.01 |
| Feb | | | .90 | 1.97 | 12.67 | .86 |
| Mar- | | | 2.79 | 2.75 | 11.34 | 6.83 |
| Apr | | | 1.95 | 2.85 | 7.68 | 9.25 |
| May | | | 1.75 | 3.10 | 10.38 | 1.63 |
| June- | | | 1.00 | 2.51 | 10.09 | 8.16 |
| July | | | .90 | 2.63 | 14.12 | 16.46 |
| Aug | | 5.80 | .50 | 5.25 | 5.39 | -9.44 |
| Sept- | | 4.05 | 2.15 | 10.00 | 7.87 | -2.34 |
| Oct | | 4.16 | 1.10 | 6.51 | 7.45 | 5.38 |
| Nov | | 3.68 | 1.95 | 3.80 | 6.96 | 1.88 |
| Dec- | | 4.05 | 3.00 | -.30 | 5.30 | |

TABLE XI

Survey Research Centre
The University of Michigan

Five-Question Index of Consumer Sentiment

(for all families — 1952 to May 1963)

| | | | | | |
|---|---|---|---|---|---|
| Nov-Dec. | 1952 | 86.2 | Jan-Feb. | 1962 | 97.2 |
| Jan-Feb. | 1953 | 90.7 | May | 1962 | 95.4 |
| Sept-Oct. | 1953 | 80.8 | Aug-Sept. | 1962 | 91.6 |
| Jan-Feb. | 1954 | 82.0 | Nov-Dec. | 1962 | 95.0 |
| June | 1954 | 82.9 | Jan-Feb. | 1963 | 94.8 |
| October | 1954 | 87.0 | May | 1963 | 91.4 |
| June | 1955 | 99.1 | August | 1963 | 96.2 |
| October | 1955 | 99.7 | November | 1963 | 96.9 |
| May | 1956 | 98.2 | Jan-Feb. | 1964 | 99.0 |
| August | 1956 | 99.9 | May-June | 1964 | 98.1 |
| Nov-Dec. | 1956 | 100.2 | September | 1964 | 100.2 |
| June | 1957 | 92.9 | December | 1964 | 99.4 |
| Nov-Dec. | 1957 | 83.7 | February | 1965 | 101.5 |
| Jan-Feb. | 1958 | 78.5 | May-June | 1965 | 102.2 |
| May-June | 1958 | 80.9 | August | 1965 | 103.2 |
| October | 1958 | 90.8 | November | 1965 | 102.6 |
| May-June | 1959 | 95.3 | February | 1966 | 99.8 |
| Oct-Nov. | 1959 | 93.8 | May | 1966 | 95.8 |
| Jan-Feb. | 1960 | 98.9 | August | 1966 | 91.1 |
| May | 1960 | 92.9 | Nov-Dec. | 1966 | 88.3 |
| Oct-Nov. | 1960 | 90.1 | February | 1967 | 92.2 |
| Jan-Feb. | 1961 | 91.1 | May-June | 1967 | 94.9 |
| May-June | 1961 | 92.3 | August | 1967 | 96.5 |
| November | 1961 | 94.4 | | | |

TABLE XII

Standard and Poor 500 Index 1941-3 = 100

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1956 | Jan | 44.15 | 1959 | Jan | 55.62 | 1962 | Jan | 69.07 | 1965 | Jan | 86.12 |
| | Feb | 44.43 | | Feb | 54.77 | | Feb | 70.22 | | Feb | 86.75 |
| | Mar | 47.49 | | Mar | 56.15 | | Mar | 70.29 | | Mar | 86.83 |
| | Apr | 48.05 | | Apr | 57.10 | | Apr | 68.05 | | Apr | 87.97 |
| | May | 46.54 | | May | 57.96 | | May | 62.99 | | May | 89.28 |
| | June | 46.27 | | June | 57.46 | | June | 55.63 | | June | 85.04 |
| | July | 48.78 | | July | 59.74 | | July | 56.97 | | July | 84.91 |
| | Aug | 48.49 | | Aug | 59.40 | | Aug | 58.52 | | Aug | 86.49 |
| | Sept | 46.84 | | Sept | 57.05 | | Sept | 58.00 | | Sept | 89.38 |
| | Oct | 46.24 | | Oct | 57.00 | | Oct | 56.17 | | Oct | 91.39 |
| | Nov | 45.76 | | Nov | 57.23 | | Nov | 60.04 | | Nov | 92.15 |
| | Dec | 46.44 | | Dec | 59.06 | | Dec | 62.64 | | Dec | 91.73 |
| 1957 | Jan | 45.43 | 1960 | Jan | 58.03 | 1963 | Jan | 65.06 | 1966 | Jan | 93.22 |
| | Feb | 43.47 | | Feb | 55.78 | | Feb | 65.92 | | Feb | 92.69 |
| | Mar | 44.03 | | Mar | 55.02 | | Mar | 65.67 | | Mar | 88.88 |
| | Apr | 45.05 | | Apr | 55.73 | | Apr | 68.76 | | Apr | 91.60 |
| | May | 46.78 | | May | 55.22 | | May | 70.14 | | May | 86.78 |
| | June | 47.55 | | June | 57.26 | | June | 70.11 | | June | 86.06 |
| | July | 48.51 | | July | 55.84 | | July | 69.07 | | July | 85.84 |
| | Aug | 45.84 | | Aug | 56.51 | | Aug | 70.98 | | Aug | 80.65 |
| | Sept | 43.98 | | Sept | 54.81 | | Sept | 72.85 | | Sept | 77.81 |
| | Oct | 41.24 | | Oct | 53.73 | | Oct | 73.03 | | Oct | 77.13 |
| | Nov | 40.35 | | Nov | 55.47 | | Nov | 72.62 | | Nov | 80.99 |
| | Dec | 40.33 | | Dec | 56.80 | | Dec | 74.17 | | Dec | 81.33 |
| 1958 | Jan | 41.12 | 1961 | Jan | 59.72 | 1964 | Jan | 76.45 | 1967 | Jan | 84.45 |
| | Feb | 41.26 | | Feb | 62.17 | | Feb | 77.39 | | Feb | 87.36 |
| | Mar | 42.11 | | Mar | 64.12 | | Mar | 78.80 | | Mar | 89.42 |
| | Apr | 42.34 | | Apr | 65.83 | | Apr | 79.94 | | Apr | 90.96 |
| | May | 43.70 | | May | 66.50 | | May | 80.72 | | May | 92.59 |
| | June | 44.75 | | June | 65.62 | | June | 80.24 | | June | 91.43 |
| | July | 45.98 | | July | 65.44 | | July | 83.22 | | July | 93.01 |
| | Aug | 47.70 | | Aug | 67.79 | | Aug | 82.00 | | Aug | 94.49 |
| | Sept | 48.96 | | Sept | 67.26 | | Sept | 83.41 | | Sept | 95.81 |
| | Oct | 50.95 | | Oct | 68.00 | | Oct | 84.85 | | Oct | 94.92 |
| | Nov | 52.50 | | Nov | 71.08 | | Nov | 85.44 | | | |
| | Dec | 53.49 | | Dec | 71.74 | | Dec | 83.96 | | Dec | 96.11 |

# CHAPTER IV

## TECHNICAL INDICATORS

In this chapter we will examine the theory of the technical study and position of the market, and (the description of the market movement under) the Dow Theory. An explanation of what technical indicators are will be provided, along with a list of the currently used ones that will be included in our analysis. The logic of their use and method of application will also be reviewed. A method of using them in an aggregate measure will be discussed, and its construction will be left for Chapter V.

### THEORY OF THE TECHNICAL STUDY AND POSITION OF THE MARKET

The technical study of the market has often been referred to as a study of the supply and demand schedules for a stock or for the stock market as a whole. As mentioned earlier, Cohen & Zinbarg liken it to the study of recurrent patterns of price movements and other market data.(1) They recognize that price movements reflect the opinions of millions of different people, and thus it is unlikely that the analyst would know in all cases why the discovered patterns occur.(1)

Garfield Drew sees the technical study of the market as an attempt to measure the psychological changes that are taking place in the thousands of individuals whose collective action makes up all the price movements of the market.(2) This he believes is the heart of technical study, although he concedes that it is usually called determining supply and demand. Drew

---

(1) Cohen, J.B. and Zinbarg, E.D. Investment Analysis and Portfolio Management, p. 503, Publ. R.D. Irwin inc. 1967.

(2) Drew, Garfield A. New Methods for Profit in the Stock Market, p. 169, Publ. Fraser Publishing Co., 1966.

views that the market reflects human behaviour. Its price fluctuations result from the actions of many human beings motivated in buying and selling. He states: "If it was known just how the public would react to any given market situation, how professional traders would behave, what investment trusts would do, etc., beating the market would be comparatively easy."(3)

Eiteman describes the technical study of the market as a study of the momentary structure of the market itself.(4) He categorized the conditions that make up the market and called them technical factors. The interaction of these conditions, taken at any one time, comprise what is called the technical position of the market. His technical factors are described as follows:(5)

1. Investors: shareholders interested in long term price trends
2. Traders: shareholders interested in short term price trends
3. Bulls: those hoping for rises
4. Bears: those hoping for declines
5. Longs: those who own the shares they hold
6. Shorts: those who have sold shares they borrowed
7. Floating Supply: shares that can be purchased slightly higher than current quotations
8. Investment Holdings: shares that can be purchased only at prices much higher than current quotations

---

(3) Ibid., p. 169.

(4) Eiteman, W.J. et al The Stock Market, 4th Ed., p. 403, Publ. McGraw Hill 1966.

(5) Ibid., p. 403

With the interaction of all these factors in the market, Eiteman visualized many combinations of situations, or technical situations that could develop. For example, the floating supply of stock could be in strong hands, (wealthy traders) or in weak hands, (small traders) or traders may have accumulated more stock than they can distribute at current price levels, or at times they may be short more stock than what is contained in the floating supply.

Eiteman develops a theory of interaction between fundamental factors and technical factors to explain four possible market situations with these two classes of variables.(6) The theory runs as follows:

A short term position of equilibrium will exist when no correction between the technical situations is necessary. However, this is short lived, as the floating supply of stock is too large or too small, or short term traders are overbought or oversold. A market disequilibrium develops, and as it gets further away from its short term equilibrium a set of corrective forces develop and bring about a reversal of the existing price movement. This is characterized by a series of wave like price movements. The market being technically weak if the situation calls for downward movement, and technically strong if it calls for an upward movement.

As these technical movements are occurring, another movement created by the revaluation of intrinsic stock values by fundamentalists is occurring. This movement was recognized by Eiteman as an underlying trend, and was upward or downward depending on the appraisal of factors such as earnings per share, costs of production, and dividend policy. The market being fundamentally strong when successive notions of intrinsic value are

---

(6) Ibid., p. 403.

higher, and fundamentally weak when the reverse occurs. As the theory relates, the market is thus composed of two movements; a general upward or downward trend, reflecting fundamental factors; and wavelike deviations above and below this trend, representing technical factors. These movements are indicated by Figures 5 and 6, and represent four market situations.

1. Fundamentally weak and technically strong
2. Fundamentally weak and technically weak
3. Fundamentally strong and technically strong
4. Fundamentally strong and technically weak

Conditions 1 and 2 are represented in Figure 5. The XY line represents the downward trend of the fundamental situation when it is weak. The mn curve represents the technical movements.

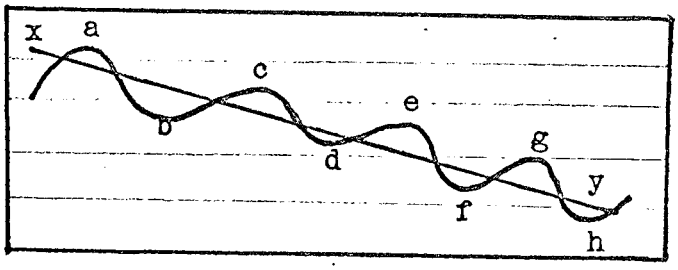



Figure 5

Fundamentally weak market

Technically strong or weak market

Condition one occurs as XY represents the downward fundamental trend, and points b, d, f, & h represent technically strong points.

Condition two occurs with XY, and at points of technical weakness a, c, e, & g.

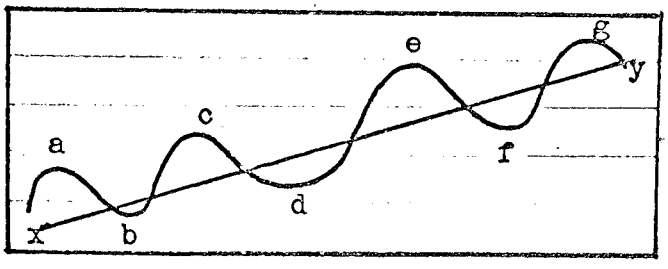



Figure 6

Fundamentally strong market

Technically weak or strong

Condition three is represented by a Fundamentally strong trend XY, and Technically weak points a, c, e, g.

Condition four is represented by a Fundamentally strong trend XY and Technically strong points b, d, f.

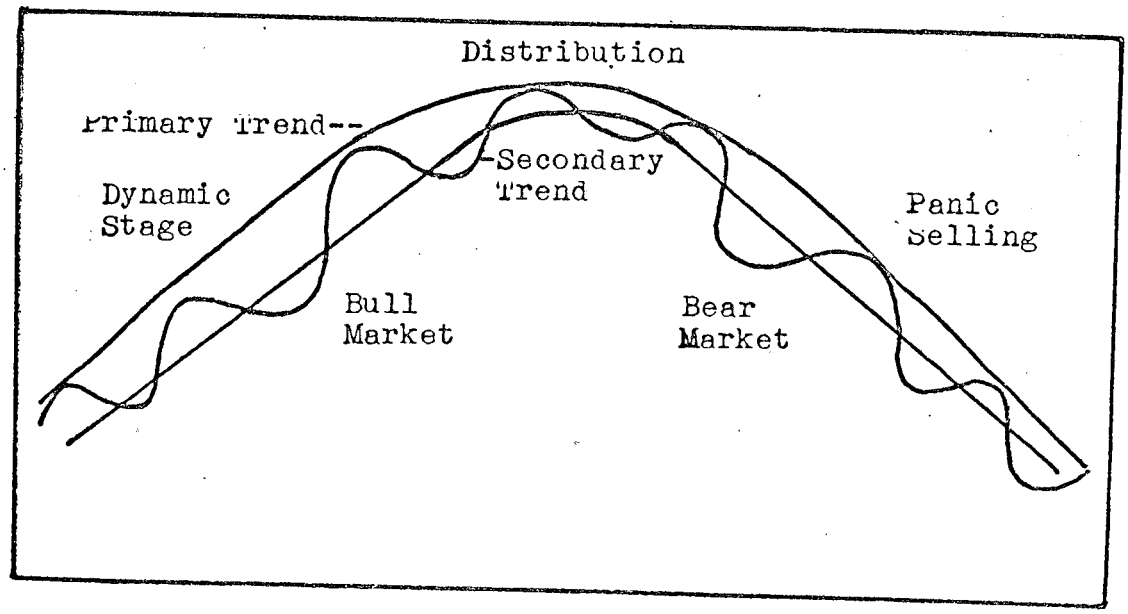
Eiteman thus explained the technical market action in an uptrend and a downtrend of underlying market strength. These technical movements are synonymous with the secondary trends that are described in the Dow Theory.

## DOW THEORY

A consideration of the Dow explanation of market movements can draw Eiteman's explanation of technical factors into the concept of a complete stock market cycle. To explain the Dow Theory of the technical action of the market, we can combine Figures 5 and 6 to give a complete cycle from Bull through Bear market.

Figure 7

Dow Concept of a Market Major Trend



The theory as explained by Edwards and Magee is described as follows:(7)

The prices of stocks move in three trends; Primary, Secondary and Minor. As minor trends, being day to day fluctuations are not pertinent to our analysis, they will be disregarded. Primary trends are the broad up and down movements that last for more than a year. They are comprised of secondary trends, or contrary price movements, to the long term trend, which last for at least 3 weeks. They are the corrections that occur during Bull Markets, and recoveries which occur in Bear Markets. Normally they retrace 1/3 to 2/3 of the gain (or less as the case may be) in prices registered in the preceding swing in the Primary direction. The action of these trends has been likened to a movement of the tide and waves. The primary movement being the tide, and the secondary movement being waves. The incoming tide is analogous to a Bull Market, and outgoing tide to that of a Bear Market. As the tide reaches to its peak, the waves wash further and further on the shore, till a high water mark is reached and then their successive momentum gradually diminishes. Then follows the ebb tide comparable to a Bear Market and their movement recedes from the high water mark. Dow theory classifies market action into four phases; accumulation, dynamic, distribution, and panic. Figure 7 illustrates these phases and the primary and secondary movements in the market.

Phase I - Accumulation:

This phase usually occurs at the bottom of a Bear and beginning of a Bull market. At this point, financial reports of companies are bad, and business conditions are depressed. Far sighted investors can forecast a

---

(7)Edwards, R. and Magee, J. Technical Analysis of Stock Trends, p. 13.

business upturn and proceed to pick up stocks from discouraged and distressed sellers. As they accumulate the floating stock, prices tend to rise.

Phase II - Dynamic:

Business reports and earnings start to improve and interest is created in the market. Stock prices advance steadily, and at this position, the technical trader is most active. The small investor also regains some interest and participates slightly.

Phase III - Distribution:

All financial news is good, and prices on some issues advance in a spectacular fashion. New issues appear, the public gets aroused and purchases run rampant, causing the market to boil over. At this stage, the trader who purchased in the dynamic stage is taking his profits as he distributes his stock to the eager buyers. This stage characterizes a switch from a Bull to a Bear market. The professional traders, astute investors and some of the institutions have lightened their portfolios in aniticipation of weaker business conditions. Much of the stock is now in weaker hands, but the value and trading remains high, with more frequent market dips as some of the fervour diminishes. As unfavourable earnings and business reports appear much of the public shows signs of frustration as hoped for profits fade away.

Phase IV - Panic Selling:

Buyers thin out and sellers become more urgent, the downward trend accelerates into an almost vertical drop and volume mounts to climactic proportions. After this sell off, there is a sidewise action, previous to the holdouts from panic selling getting discouraged. There is now a second sell off, mainly of all the poorer quality stocks that had appreciated out of

proportion during the dynamic stage. As we approach the bottom of the Bear Market, the holders of blue chip stocks, who had the courage to weather the panic selling, now become discouraged from the length of market depression, and sell off at low prices anticipating that they will buy back at still lower levels. According to the Dow theory, the final stage of a Bear Market is frequently concentrated in such issues and the end is reached when the worst news to be expected has been discounted.

## WHAT ARE TECHNICAL INDICATORS AND WHAT ARE USED?

Eiteman described technical indicators as statistical data that are used to ascertain the technical position of the market.(8) He stressed that there are no absolute criteria, but certain ascertainable facts yield clues about what is going on in the market. He is also ever cautious to the fact that changing circumstances can destroy the validity of a past relationship. Some of the more important statistical data used to judge the technical strength of the market include:(9)

1. Number of advances and declines
2. New Highs and New Lows
3. Credit Balances in Brokers Accounts
4. Quality of Market Leadership
5. Volume of trading
6. Odd lot purchases and sales

---

(8)Eiteman, W.J. op.cit., p. 408

(9)Ibid., p. 408

## LOGIC OF USE AND METHOD OF APPLICATION OF THE INDIVIDUAL INDICATORS

Technical analysts are interested in predicting minor and intermediate, as well as primary trends in the market. The coverage of analysis in their method is therefore much broader than that of business cycle analysis. In the latter we are primarily concerned with detecting the changes in primary trend. As the appraisal in this study is concerned with the movements in the primary trend, our investigation in the field of technical analysis will be so directed, and consideration will be given to the secondary trend only as an influence on the primary trend.

The logic of the use of technical indicators is explained by G.K. Freeman.(10) A description of his support for their use is as follows. The underlying trend of the market is not always recognized by the well known averages. This is particularly noticeable towards the end of a Bull market, where the performance of a large group of stocks falls below the averages. Freeman recognizes this pattern even under Dow Theory, which is based on averages. Under Dow theory, a recognition is given to the overlapping of two phases under a Bull and a Bear market. In the distribution phase of a Bull market there is disparate movement, that is not recognized by the averages, when investors sell stocks to feverish latecomers. The same situation exists at the end of a Bear market in the accumulation phase, where astute investors buy stocks from the discouraged public. Here again, the internal deterioration of one market and the strengthening of another is not signalled by the averages. Freeman sees the averages as a means of depicting

---

(10) Freeman, G.K. "Advance Decline Line" Elements of Investments. Zakon et al., p. 408, Publ. Holt Rhinehart & Winston, 1965.

the sub surface condition of the market only in the middle phases of a Bull or a Bear market. On this logic, he sees the validity of statistical indices if they are able to identify the underlying condition of the market at points of disparate movements such as the distribution or accumulation phase. One of the indicators which he particularly advocates as being an effective measure, is the Advance-Decline Line.

## ADVANCE-DECLINE INDICATOR

The statistics used in this series are derived from New York Stock Exchange data. Advances are the number of issues that closed up, and declines are the number of issues that closed down on a certain day. The method of application is based on a comparison of the Advance-Decline data with current movements of the Standard and Poor 500 stock price index, to derive a forecast of the most likely next movement of the index.

Eiteman describes four basic rules upon which forecasts of this indicator are based.(11)

1. If advances exceed declines, and the price index rises, the index will continue to rise.
2. If advances exceed declines, and the price index declines, the downward movement of the index is about to be reversed.
3. If declines exceed advances and the price index is rising, the rise of the index is about to be reversed.
4. If declines exceed advances and the price index is falling, the decline of the index will continue.

---

(11)Eiteman, W.J. op.cit., p. 409.

He bases his logic for these rules on the following assumption: A price index of the averages is based on a certain number of stocks and tends to be more representative of the market leaders. By contrast, an indicator related to advance-decline data is representative of the market as a whole. It is believed that the prices of market leaders cannot continue to move in opposition to the market as a whole, and eventually will move to conform to that of the market. The longer that the market leaders resist this change, the more certain it is that the direction of the movement will be reversed.

This indicator is compiled on daily or weekly data, depending on the purpose for which it is used. Daily data is used to form indicators that are utilized in forecasting minor and possibly secondary trends in the stock indexes. Weekly data is more often used in the forecasting of secondary and primary trends. In this analysis, the latter data only is considered, as it is more easily applicable to our purpose.

Various statistical combinations are used by analysts such as 3 day moving averages and resistance indexes, however, we will be concerned with the more currently used Advance-Decline Line in this analysis. Hereafter, the Advance-Decline line will be referred to as the A-D line.

Freeman as previously mentioned, is a strong advocate of the A-D line as an indicator. He has found that the trend of the A-D line reveals whether the number of stocks which are rising is growing larger or smaller, and he recommends it as a barometer of the strength of Bull markets and the weakness of Bear markets.(12) His description of construction, and method of application is as follows. The compilation from weekly data, is presented, as Freeman found that these results formed an index of good forecasting

---

(12)Freeman, G.K. op.cit., p.410

qualities, comparable to the daily index. The data are the weekly tabulation of Friday through Friday price changes which appear in Barron's. The calculation is a simple cumulative algebraic total of advances and declines as reported weekly. For example:

| Net Advance-Declines | Index Value |
|---|---|
| Week I - 200 Declines (- 200) | - 200 |
| Week II - 350 Advances (+ 350) | + 150 |
| Week III - 75 Advances (+ 75) | + 425 |
| Week IV - 120 Declines (- 120) | + 305 |

Freeman compared the performance of the Advance-Decline Line against the Dow Jones Industrial Index from the period of 1950 to 1962.(13) His observations were as follows:

1. Bull markets as indicated by the A-D line generally reach a momentum peak well before the averages.
2. In early 1955, early 1959 and mid-1961, the indicator reached a peak substantially ahead of far more important peaks in the average.
3. The typical pattern is revealed in Figure 8. The absolute peak in the A-D line appears before a market peak of importance. It seldom coincides with the final top of the Average. The market rebounds from its correction, and goes on to new highs, but the A-D line which has passed its major peak, fails to reach a new high on the upswing. This disparity indicates that some stocks have already passed Bull market peaks. This sequence may occur for several

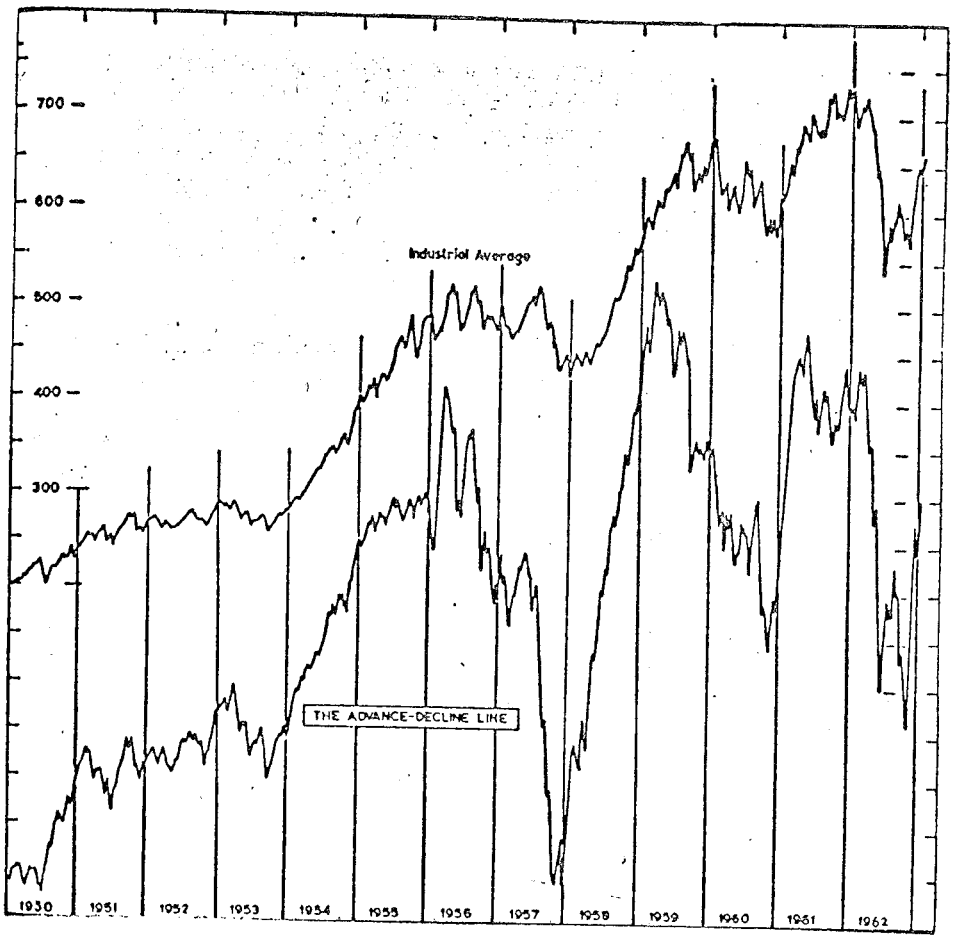
---

(13)Freeman, G.K. op.cit., p. 409

months, and eventually, the average finding fewer and fewer stocks participating in price advances, declines as the A-D line had done long before.

Figure 8

The Advance-Decline Line




Source: Elements of Investments Zakon, A.J.

## NEW HIGHS AND NEW LOWS

A measure of disparity between price and market breadth is attempted by the use of an index formed from new highs and new lows (hereafter described as NH's and NL's). As in the theory underlying the A-D line, the NH's and NL's index may reveal an impending weakness of price trends near market peaks and strength near market lows. It is argued that as a price appreciation continues, a decline in NH's and an increase in NL's, is evidence that fewer stocks are participating in the trend. Similarly, as a market decline continues, fewer NL's and greater NH's may indicate that the trend is about to reverse.(14) The use of this index is of particular value at turning points in the market cycle. Initial weakness is indicated in a trading phase when NH's decline prior to an advance in NL's. Similarly, in an accumulation phase, a decline in NL's with an increase in NH's will occur.

A technique similar to that used in the calculation of the advance-decline line is used, where an algebraic cumulative total is computed on the data of the NH's and NL's.

The cumulative total of NH's and NL's (henceforth referred to as N.H.N.L. Index) operates in a manner similar to the advance-decline line. This is illustrated in Figure 9.

---

(14)These concepts are discussed by G.A. Drew, New Methods for Profit in the Stock Market.

Figure 9

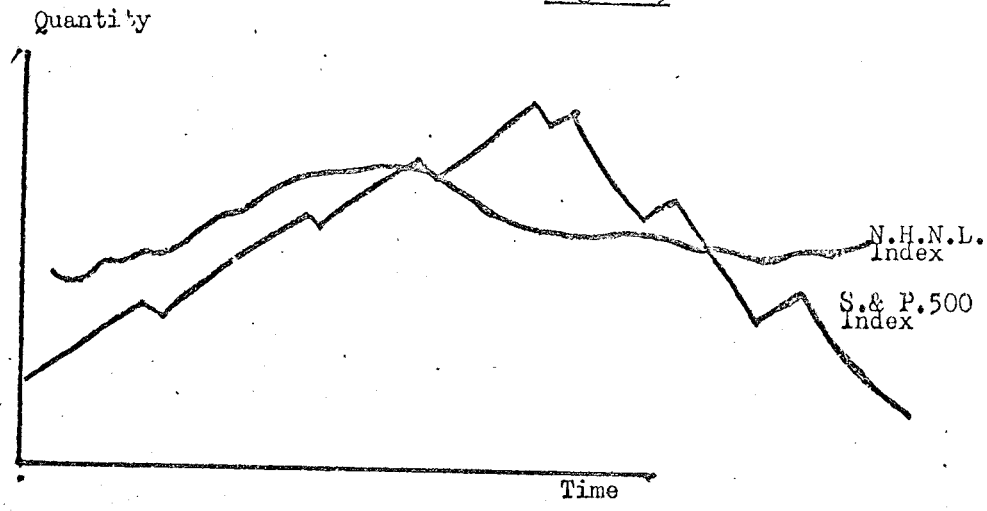



Figure 9

As the dynamic phase begins, the net new highs are positive, and therefore the index rises with the price averages, until at some point near the onset of the trading area the rate of increase of NH's decrease and NL's increase, and the NHNL Index diverges from the movement of the price averages. As the trading area is passed, the index of price averages declines, and its direction has been preceded by the NHNL Index. As the Bear market ensues and the accumulation stage is reached, the NH's tend to exceed the NL's, and an upturn in the index occurs.

The writer uses a monthly calculation of the NH's and NL's in his index, and plots them against the monthly figure for the S. and P. 500 price average.

## CREDIT BALANCES IN BROKERAGE ACCOUNTS

The theory behind the use of this indicator has been outlined by Cohen & Zinbarg and is described as follows.(15)

When an investor disposes of a holding of stock he can do either of two things with his funds:

a. He can leave an account balance, if he intends to reinvest his funds, and draw interest on the balance.

b. He can withdraw his funds, if he does not foresee any re-investment opportunity. When this amount rises steadily, it indicates that strong buying potential is building up, as investors are keeping funds for reinvestment.

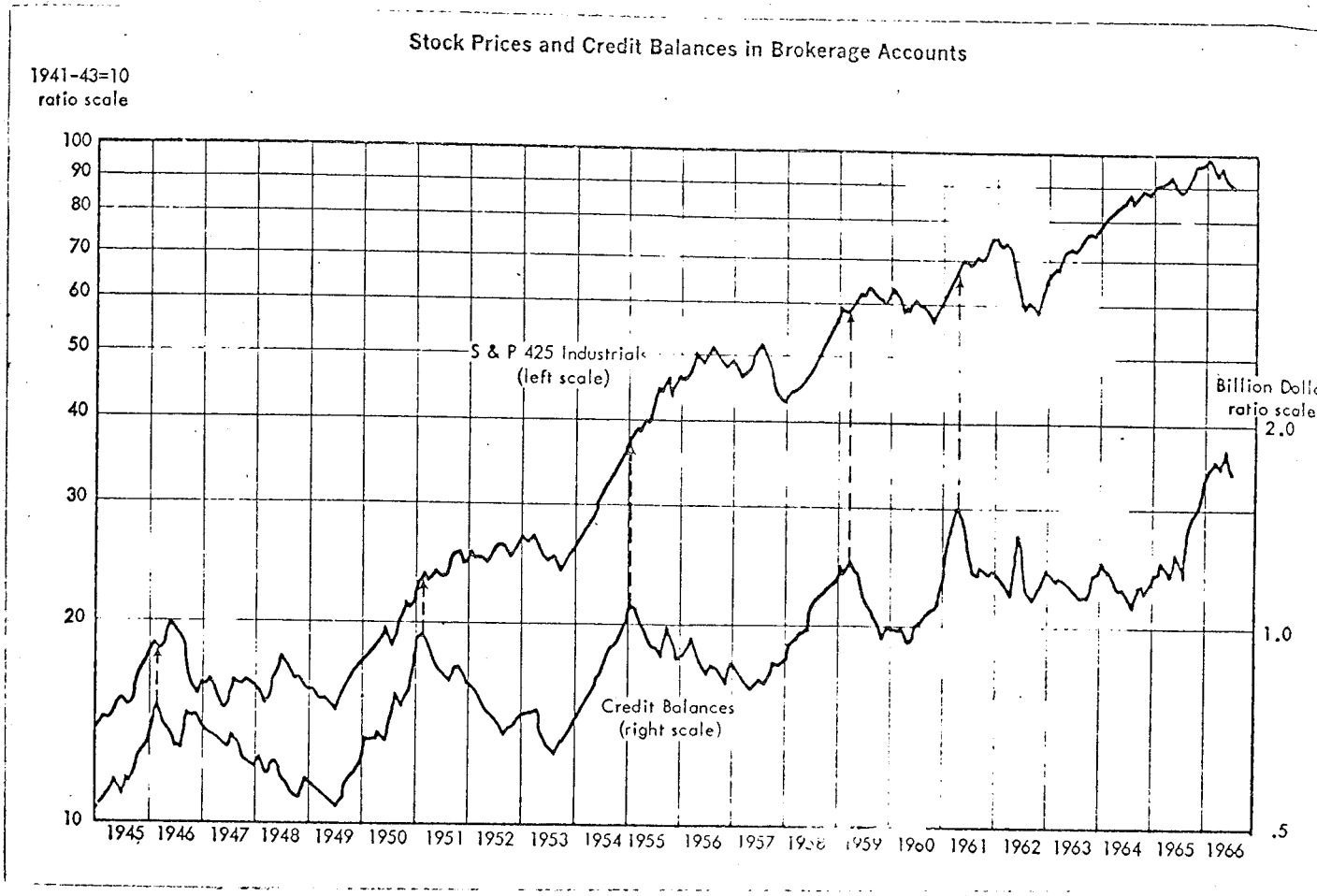
The crucial part of the theory, is similar to that of the odd lotter, that sentiment usually tends to change at the wrong time. The owners of these funds are awaiting a market setback, to step in and buy, but, like the odd lotter, as the market moves toward its peak, they begin their reinvestment, and their credit balances decline. This decline in balances, which represents a weakening of potential buying support, usually precedes major stock declines. This is expressed in Figure 10.

It can also be noted, that the downtrend in customers' balances has usually ended before the bottom of the Bear market. The prediction of this indicator is, however, better at tops than at bottoms. The indication of an upturn in the years 1949 and 1953 were almost coincident with the stock index, whereas the end of a primary phase expansion was predicted in 1946, 1951, 1955, 1959 and 1961

---

(15) Cohen, J.B. and Zinbarg, E.D. op.cit., p. 514

Figure 10




Source: Investment Analysis and Portfolio Management
- Cohen and Zinbarg

The writer has chosen to form a monthly index of Credit Balances in Brokerage Accounts to cover the period 1956 to 1967. This index is compared to the Standard and Poor 500 index on a monthly basis, and a short term forecast is made.

This decision is incorporated into the composite index of technical indicators.

## QUALITY OF MARKET LEADERSHIP

The statistics used are the daily quotations in the Wall Street Journal of the average closing price of the 10 most active stocks. This average varies significantly from day to day, and it is believed by some technical analysts that it reveals the quality of market leadership.

Eiteman explains the logic of this theory in the following manner.(16) The basic assumption of the theory is that high quality issues sell for higher prices than do low quality issues. Thus on any one day, the 10 most active stocks may be market leaders or on another day they may be low quality, commonly referred to as "cats and dogs". In the accumulation stage of a Bull market, all stocks tend to be underpriced, hence investors prefer and will purchase high quality issues. As high quality issues move up in price, they tend to be unattractive, so investors switch some of their preference to lower quality issues which now seem underpriced. As the prices rise in the market and we pass through the dynamic phase into the distribution phase, we find many investors becoming less discriminating and bold, hence we have much activity in the "cats and dogs". It is at this point that traders believe that the end of a market rally is approaching and a correction is imminent.

As applied to the averages, Eiteman explained that when an important stock price average is moving up, but the quality measure was low or declining, a near term decline of the stock averages was imminent. Also, if the stock index was declining and the quality index was also declining, the end of a Bear market was in the offing. An increase in the quality measure

---

(16) Eiteman, W.J. op.cit., p. 420

particularly if associated with a high volume of trading was thought to be indicative of a continuing higher trend.

An index formed from the monthly average of the data is used in this appraisal. A prediction will be made on a monthly basis, and then incorporated into a composite index.

## VOLUME OF TRADING

H.M. Gartley relates volume of trading to demand and supply. He develops a difference between "demand" volume and "supply" volume to express their value as indicators.(17) He assumes that the number of shares involved in a purchase and sale constitutes volume. Then states that every transaction is the result of a meeting of demand, on the one hand and supply on the other. When demand exceeds supply, prices tend to rise. Conversely, when supply exceeds demand, prices tend to fall. Therefore:

1. Volume which occurs during advances may be designated as demand volume.
2. Volume which occurs during declines may be termed supply volume

According to Gartley, four rules are generally accepted by technical students for using volume of shares as an indicator.(18)

1. When volume tends to increase during price declines, it is a bearish implication.
2. When volume tends to increase during advances, it is a bullish indication.

---

(17)Gartley, H.M. "Volume of Trading - A Forecasting Factor" A Treasury of Wall Street Wisdom, p. 248. Shultz, H. and Coslow, S. Investors Press, Palisades N.Y. 1965.

(18)Ibid., p. 248

3. When volume tends to decrease during price declines, it is bullish.
4. When volume tends to decrease during price advances, it is bearish.

These premises being based on the changing levels of volume, not on any particular level. The logic of these rules is strengthened by tracing the activity of volume through a major trend. Gartley gives a description of share volume through a bull and bear market that is summarized as follows.(19)

Bull markets start out of the terminating dullness of bear markets. The first crescendo of activity is characterized by a high volume of trading, which carries through to the peak of the intermediate trend, which terminates in dullness, from which the next intermediate trend begins. As the bull market continues, each intermediate advance occurs on greater volume than the previous one. Finally, a long period of trading fails to produce a price rise, and a moderate decline occurs, with the volume remaining high. This is the distribution stage, and the beginning of the bear market.

Bear markets start with a moderate decline in prices and an increase in volume, as the public starts to worry. As the price declines in a bull market, volume tends to decrease, but in a bear market, the opposite occurs. When bearish sentiment develops, fear grows to panic, and the selling volume rises to a point where daily trading for a time exceeds any seen in the preceding bull market. The selling climax of the panic produces a rally which terminates an intermediate trend. The major downtrend is again

---

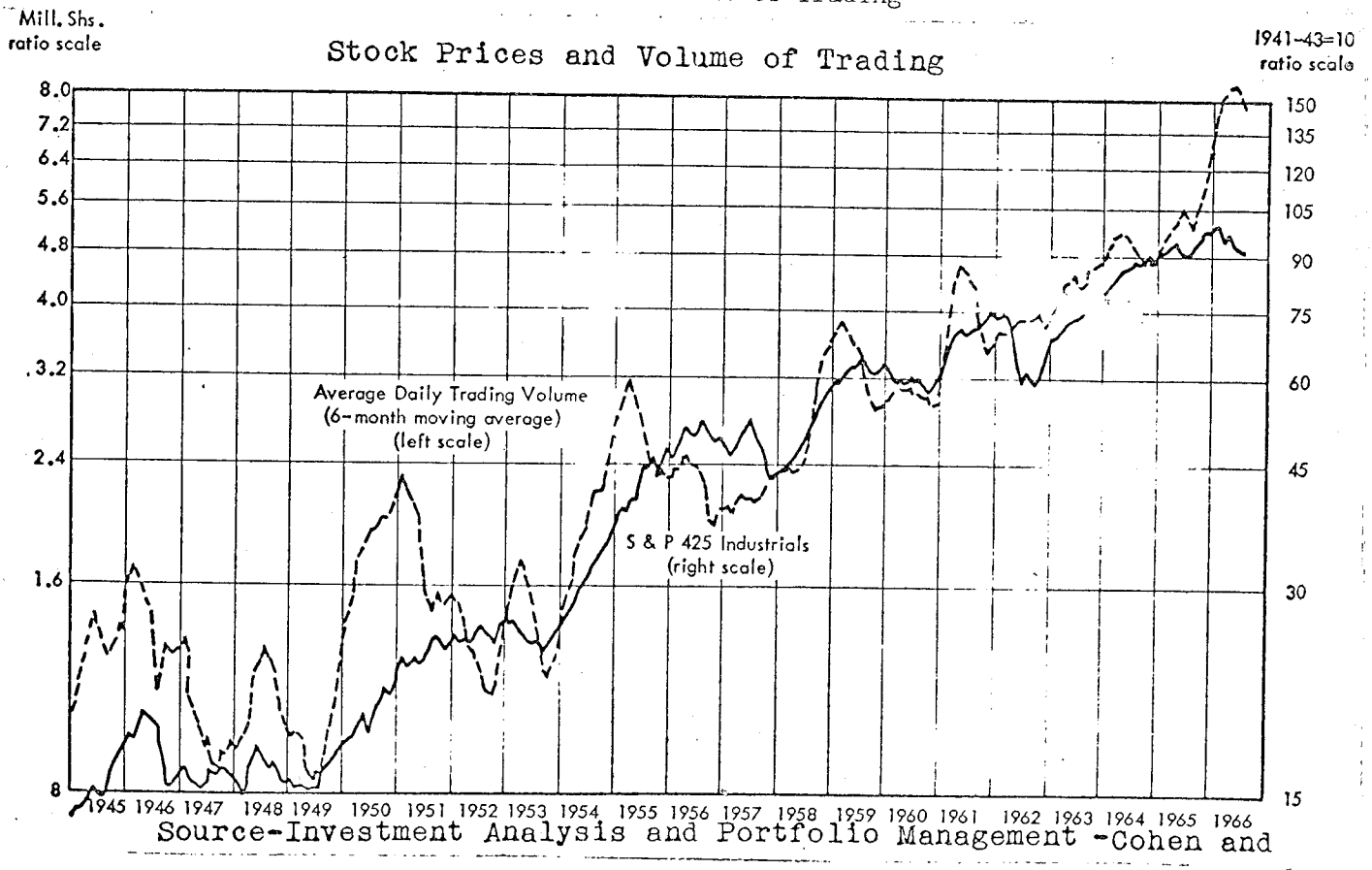
(19)Ibid., p. 254

resumed, accompanied by heavy volume, which does not equal that of the first selling climax. This sequence continues through the bear market, with each climax showing less volume than the previous. In time, the force of the liquidation becomes spent, and we reach the bottom of the bear market.

As an application of volume of shares to analysis, Eiteman recommended the use of weekly or monthly data rather than daily figures, as he found the former more indicative of a change in major trends.(20) Cohen and Zinbarg use a 6 month moving average of the volume of trading, and compare this to the Standard and Poor 425 Industrial Index as in Figure 11.

Figure 11

Stock Prices and Volume of Trading




Source: Investment Analysis and Portfolio Management - Cohen and Zinbarg

(20) Eiteman, W.J. op.cit., p. 419

The author has chosen to use a monthly average of daily volume and to smooth the series with moving averages. The monthly prediction derived from this index will be incorporated into the composite index.

## ODD LOT PURCHASES AND SALES

The Odd Lot theory is based on the psychology of action of the small investor. He is identified statistically as a purchaser of from 1 to 99 shares of a stock on the New York Stock Exchange, when the board lot is considered as 100 shares. The psychology of action of the small investor has been described by Garfield A. Drew, who is recognized as the high priest of the Odd Lot Theory.(21) Drew explains the action of the odd lotter in the market in terms of the Humphrey B. Neill's theory of Contrary Opinion.(22) The theory states that mass psychology is the element of primary importance in market speculation.(23) Neill believed that price is determined by human opinion, and if something changes that opinion, there will be changes in price, regardless of whether the cause of the change was rational. He assumed that any very widely held opinion may be proved wrong, and then would investigate the reasons for believing it may be wrong.

Drew visualizes the market as consisting of the less informed public, and the professionals. The public outnumbers the professionals, but the professionals have more influence on the market by nature of their knowledge, commitment, and access to funds. They are able to test the market, by buying large blocks of stock, to find out whether purchase is difficult or easy,

---

(21)"Is the Odd Lotter always wrong?" Business Week, May 6, 1967 p. 147

(22)Drew, Garfield A. New Methods for Profit in the Stock Market, p. 190 Publ. 1955 - Fraser Publishing, Wells Vermount

(23)Ibid., p. 167

thereby learning how the public feels in order that they may do the opposite.(24) Drew does concede that the public is not always wrong, but insists that the professionals are more apt to be right because they are playing a game they know.(25)

The odd lot statistics have been made available for current publication by two large brokerage firms that transact most of the odd lot business on the New York Stock Exchange. The figures have been available on a daily published basis since early 1950. Many applications of these statistics are in use, but the more currently accepted ones such as the Balance Index and Short Sales Index of Drew's, and Net Purchase or Net Sales indexes as commonly used will be considered.

Drew has established some points concerning the odd lot trades that perhaps should be stressed, to better guide interpretation of the theory.

a. Odd lot dealings represent speculative trading more so than investment. It has been established that 80 per cent to 95 per cent of all odd lot trades are turned over within one month.(26)

b. The changes of sentiment, as measured by the index, are almost always wrong. The public is never wrong in that it buys around the bottom, but is invariably wrong in that it buys proportionately less at the bottom. Similarly, as an advance proceeds towards its peak, selling may either become less or change to buying.(27)

---

(24) Ibid., p. 169
(25) Ibid., p. 192
(26) Ibid., p. 195
(27) Ibid., p. 199

c. "The odd lot short seller is apparently a different breed of cat than the average member of the odd lot public, which is not surprising, since comparatively few members of the public understand short selling, and even fewer are willing to put it into practice. However, he is even less 'right' than the average odd lot trader, and the reactions of those willing to employ the short side more nearly conform to the supposed habits of the public than is indicated by the buying and selling share balances themselves."(28)

The application of Net Purchases and Net Sales Index to the odd lot theory has been explained by Eiteman.(29) This index is calculated by use of the data resulting from the excess of odd lot purchases to odd lot sales, or vice versa. Eiteman perceives that the machinery for executing odd lot orders is such as to cause odd-lot traders to buy and sell among themselves to the maximum extent possible. Only when there is an excess of buy or sell orders can it be said that odd lot traders purchase from or sell to full-lot traders. This implies that only the excess orders are of value in an analysis, as the remainder are neutralized.

The Net purchases and Net sales index is calculated on a monthly basis, and compared to the S. & P. 500 index for the period being evaluated (1956 to 1967). On the basis of the odd lot theory, predictions are made monthly, and the result is combined in the composite indicator index. A compilation of Drew's Major Balance Index is used. The Balance Index is a 10 day moving average of the ratio of Odd Lot Sales to Odd Lot Purchases.

---

(28) Ibid., p. 205

(29) Eiteman, W.J. op.cit., p. 416

The variation will be to use the Sales to Purchase ratio, which is more currently used. The average range of this ratio is said to be between 60 and 140.(30) Monthly predictions will be made with this index on the basis of the Odd Lot Theory. These predictions are included in the composite indicator index.

The short position of the odd lotter is used in the Short-Sales Index as originated by Drew.(31) It consists of a ratio of the number of shares sold short in each day to all odd lot sales for the day. A ten day moving average will be used on this ratio, to form a series called the Short-Sales Index. An interpretation as suggested by Drew in point (c) of this Chapter, is that the odd lot shorts should be relatively high at the bottom of a bear market, and relatively low at the top of a bull market. We would then expect a higher index reading at the bottom of a bear market as related to the earlier stage of the downward trend. Conversely, a lower index reading at the top of a bull market as related to the earlier stage of the upward trend.

A monthly prediction is made with this index, and the results are incorporated in the Composite Indicator Index.

---

(30) Hager, R.J. Investment Counsellor, Phillips, Hager & North, Vancouver, B.C.

(31) Drew, G.A. op.cit., p. 205

# CHAPTER V

## A COMPOSITE INDEX

In this chapter we will describe what a composite index is, and how we propose to use it in our model.[1] We also will test the technical indicators, that we have chosen, following the procedures used in Chapter III for the Diffusion Index. If their performance is equal to, or better than, the control measure, criteria will be stated for their individual performance, and they will be incorporated into the composite index. The composite index will then be formed by the method outlined in the next section. The composite will be tested in the same manner as the other indexes, and criteria developed for its performance.

### DESCRIPTION

A composite index is a summarizing device used to measure a consensus of opinion that is expressed by a group of indicators. It is very similar in construction to diffusion indexes that are used for business cycle indicators. An example of a composite index that is used by an investment service is given by Cohen and Zinbarg in their recent publication.[2] It consists of a monthly measure of the percentage of indicators that predict a bull market. The individual indicators that comprise the index are assigned weights to increase or decrease their influence on the aggregate. The percentage of indicators that are favourable, is then calculated from the total number of indicators. The composite index that the writer used, was of a similar structure, with the exception of a system of weighting which

---

[1] Model is described in Chapter I.

[2] Cohen, J.B. and Zinbarg, E.D. op.cit., p. 532.

was devised for this appraisal. The weighting system is described below, with the actual construction left to the latter part of the chapter.

The relative performances, measured by the profitability of the buy and sell decisions made by each indicator in the ten year period (1956-1966) as related to the performance from a buy and hold decision in the same period, are the criteria for assigning points to each indicator. The performance of a buy and hold decision was measured in Chapter III under Criteria for Buy and Sell Indications, as the profit in index points resulting from an investment in the S. and P. 500 between 1956 and 1966. The method of calculation is explained in Figure 12.

Profit in S. & P. 500 index points in the ten year period 1956-1966

| Profit Source | Benchmark Buy and Hold | Index #1 | Index #2 | Index #3 | Index #4 | Index #5 | Index #6 | Index #7 | Index #8 |
|---|---|---|---|---|---|---|---|---|---|
| Stock Market Bonds | 35.85 | | | | | | | | |
| Total profit | 35.85 | | | | | | | | |

Index Profit as % improvement of the Benchmark - 35.85 = 100%

| % | % | % | % | % | % | % | % |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

$\sum_{i=1}^{n=8}$ of % = 100 points

Points for Indicators =

Figure 12

The indexes that are considered in this system are tested individually. The control against which they are tested is the benchmark in Figure 12, and if they are not equal to, or better, they are discarded.

## METHODOLOGY

The technical indicators are individually subjected to the same text that was used on the Diffusion Index in Chapter III. On the basis of this test either criteria for ideal performance of the indicator are established, or the indicator is not used if performance is not equal to or better than that of the control measure. In all of the tests, the control measure will be a buy and hold investment decision in the S. and P. 500. The test will cover the period 1956 to 1966 inclusive. Also, the treatment of dividends and interest and brokerage commission will be as described under Criteria for Buy and Sell Indications in Chapter III.

TABLE XIII

INDUSTRIAL BOND YIELDS %

| | 1955 | | | |
|---|---|---|---|---|
| December | 3.25 | | | |
| | 1956 | 1959 | 1962 | 1965 |
| January | 3.23 | 4.28 | 4.57 | 4.53 |
| February | 3.20 | 4.31 | 4.57 | 4.52 |
| March | 3.24 | 4.28 | 4.52 | 4.52 |
| April | 3.37 | 4.35 | 4.46 | 4.54 |
| May | 3.40 | 4.46 | 4.42 | 4.55 |
| June | 3.39 | 4.55 | 4.45 | 4.59 |
| July | 3.42 | 4.58 | 4.52 | 4.62 |
| August | 3.55 | 4.56 | 4.51 | 4.63 |
| September | 3.68 | 4.68 | 4.45 | 4.65 |
| October | 3.75 | 4.70 | 4.40 | 4.67 |
| November | 3.82 | 4.69 | 4.39 | 4.71 |
| December | 3.95 | 4.70 | 4.40 | 4.79 |
| | 1957 | 1960 | 1963 | 1966 |
| January | 4.02 | 4.73 | 4.39 | 4.84 |
| February | 3.94 | 4.74 | 4.38 | 4.91 |
| March | 3.90 | 4.71 | 4.37 | 5.06 |
| April | 3.89 | 4.64 | 4.38 | 5.09 |
| May | 3.96 | 4.61 | 4.40 | 5.12 |
| June | 4.14 | 4.65 | 4.40 | 5.25 |
| July | 4.19 | 4.64 | 4.40 | 5.33 |
| August | 4.29 | 4.61 | 4.43 | 5.49 |
| September | 4.31 | 4.49 | 4.45 | 5.71 |
| October | 4.32 | 4.46 | 4.46 | 5.63 |
| November | 4.34 | 4.50 | 4.47 | 5.59 |
| December | 4.11 | 4.55 | 4.47 | 5.63 |
| | 1958 | 1961 | 1964 | 1967 |
| January | 3.91 | 4.53 | 4.50 | 5.45 |
| February | 3.86 | 4.52 | 4.48 | 5.33 |
| March | 3.86 | 4.46 | 4.49 | 5.39 |
| April | 3.83 | 4.40 | 4.53 | 5.37 |
| May | 3.80 | 4.45 | 4.54 | 5.46 |
| June | 3.77 | 4.48 | 4.54 | 5.64 |
| July | 3.81 | 4.54 | 4.52 | 5.79 |
| August | 3.94 | 4.59 | 4.52 | 5.84 |
| September | 4.24 | 4.60 | 4.52 | 5.93 |
| October | 4.25 | 4.61 | 4.53 | 6.05 |
| November | 4.23 | 4.60 | 4.53 | 6.28 |
| December | 4.24 | 4.58 | 4.54 | 6.39 |

These yields are used in the calculations for when the investments are in the bond market

Source: Federal Reserve Bulletin

TABLE XIV

STANDARD & POOR COMPOSITE INDEX

Quarterly Dividends Yields

| | | | | | |
|---|---|---|---|---|---|
| 1955 | 11 | 1.64/45.48 X 100 = 3.60% | | | |
| 1956 | 1 | 1.73/48.48 X 100 = 3.56% | 1962 | 1 | 2.04/69.55 X 100 = 2.93% |
| | 2 | 1.80/46.97 X 100 = 3.83% | | 2 | 2.06/54.75 X 100 = 3.76% |
| | 3 | 1.84/45.35 X 100 = 4.05% | | 3 | 2.08/56.27 X 100 = 3.69% |
| | 4 | 1.74/46.67 X 100 = 3.72% | | 4 | 2.3/63.10 X 100 = 3.37% |
| 1957 | 1 | 1.73/44.11 X 100 = 3.92% | 1963 | 1 | 2.15/66.57 X 100 = 3.22% |
| | 2 | 1.73/47.37 X 100 = 3.65% | | 2 | 2.20/69.37 X 100 = 3.17% |
| | 3 | 1.76/42.42 X 100 = 4.14% | | 3 | 2.21/71.70 X 100 = 2.70% |
| | 4 | 1.79/39.99 X 100 = 4.47% | | 4 | 2.28/75.02 X 100 = 3.03% |
| 1958 | 1 | 1.77/42.10 X 100 = 4.20% | 1964 | 1 | 2.33/78.98 X 100 = 2.95% |
| | 2 | 1.73/45.24 X 100 = 3.81% | | 2 | 2.38/81.69 X 100 = 2.91% |
| | 3 | 1.73/50.06 X 100 = 3.45% | | 3 | 2.44/84.18 X 100 = 2.89% |
| | 4 | 1.75/55.21 X 100 = 3.16% | | 4 | 2.50/84.75 X 100 = 2.94% |
| 1959 | 1 | 1.77/55.44 X 100 = 3.19% | 1965 | 1 | 2.55/86.16 X 100 = 2.96% |
| | 2 | 1.79/58.47 X 100 = 3.35% | | 2 | 2.61/84.12 X 100 = 3.10% |
| | 3 | 1.81/56.88 X 100 = 3.18% | | 3 | 2.66/89.96 X 100 = 2.95% |
| | 4 | 1.83/59.89 X 100 = 3.05% | | 4 | 2.72/92.43 X 100 = 2.94% |
| 1960 | 1 | 1.94/55.34 X 100 = 3.50% | 1966 | 1 | Source: Survey = 3.36% |
| | 2 | 1.95/56.92 X 100 = 3.42% | | 2 | of Business = 3.59% |
| | 3 | 1.95/53.52 X 100 = 3.64% | | 3 | = 3.76% |
| | 4 | 1.95/58.11 X 100 = 3.35% | | 4 | = 3.78% |
| 1961 | 1 | 1.94/65.06 X 100 = 2.98% | 1967 | 1 | = 3.44% |
| | 2 | 1.94/64.64 X 100 = 3.8% | | 2 | = 3.39% |
| | 3 | 1.96/66.73 X 100 = 2.93% | | 3 | = 3.19% |
| | 4 | 2.02/71.55 X 100 = 2.59% | | 4 | |

(These yields are used for the calculations for when the investments are out of the stock market)

Source: Standard and Poor's Security Price Index Record 1966 and 1967 Editions

## TEST I: THE ADVANCE-DECLINE LINE

This indicator was prepared by taking the cumulative algebraic total of advances and declines of the issues traded daily on the N.Y.S.E. To start the series with a positive number, the origin was assumed to be twenty-five thousand, and thus, positive values were maintained for most of the series. The monthly statistics of the series were plotted on Charts IV and V with the S. and P. 500, and the data are recorded in Table XV.

The index was then tested by the method previously established for the evaluation of criteria and indicator performance.

### Situation I

When the index value on the downside reaches 20 per cent below a preceding peak, a sell signal is indicated.

When the index value has risen 20 per cent above the lowest value it reached after the sell signal was given, a buy signal is then indicated.

## SITUATION I

A - Investment in the Market

(End of month dates)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Jan. 58 | 41.12 + .41 = 41.53 | Sept 59 | 59.06 - .59 = 58.47 | 16.94 |
| Dec. 60 | 56.80 + .57 = 57.37 | Mar. 62 | 70.29 - .70 = 69.59 | 12.22 |
| July 62 | 56.97 + .57 = 57.54 | Oct. 63 | 73.03 - .73 = 72.30 | 14.76 |
| June 64 | 80.24 + .80 = 81.04 | Mar. 65 | 86.83 - .87 = 85.96 | 4.92 |
| July 65 | 84.91 + .85 = 85.76 | Feb. 66 | 92.69 - .93 = 91.76 | 6.00 |
| | | | Total | 54.84 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Return (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Jan. 58 | 25/12 | 45.48 | 3.58 - 3.90 = | (32) | (.27) |
| Sept.59 to Dec. 60 | 14/12 | 58.47 | 4.69 - 3.27 = | 1.42 | .94 |
| Mar. 62 to July 62 | 4/12 | 69.59 | 4.47 - 3.34 = | 1.13 | .27 |
| Oct. 63 to June 64 | 8/12 | 72.30 | 4.48 - 2.99 = | 1.49 | .72 |
| Mar. 65 to July 65 | 4/12 | 85.96 | 4.56 - 2.95 = | 1.61 | .43 |
| Feb. 66 to Dec. 66 | 10/12 | 91.76 | 5.27 - 3.57 = | 1.70 | .55 |
| | | | | Total | 2.64 |

Total profit from Situation I is A + B 57.48 points

The control investment is 35.85

The improvement is 21.63/35.85 X 100 = 50.33% better

Situation II

When the index value on the downside reaches 20 per cent below a preceding peak, a sell signal is indicated.

When the index value has risen 10 per cent above the lowest value it reached after the sell signal was given, a buy signal is indicated.

## SITUATION II

A - Investment in the Market

(End of month dates)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Jan. 58 | 41.12 + .41 = 41.53 | Sept.59 | 59.06 - .59 = 58.47 | 16.94 |
| Nov. 60 | 55.47 + .55 = 56.02 | Mar. 62 | 70.29 - .70 = 69.59 | 13.57 |
| June 62 | 55.63 + .56 = 56.19 | Oct. 63 | 73.03 - .73 = 72.30 | 16.11 |
| Feb. 64 | 77.39 + .77 = 78.16 | Mar. 65 | 86.83 - .87 = 85.96 | 7.80 |
| July 65 | 84.91 + .85 = 85.46 | Feb. 66 | 92.69 - .93 = 91.76 | 6.30 |
| | | | Total | 60.72 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Return (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Jan. 58 | 25/12 | 45.48 | 3.58 - 3.90 = | (32) | (27) |
| Sept.59 to Nov. 60 | 14/12 | 58.47 | 4.68 - 3.27 = | 1.41 | .94 |
| Mar. 62 to June 62 | 3/12 | 69.59 | 4.43 - 3.34 = | 1.09 | .26 |
| Oct. 63 to Feb. 64 | 4/12 | 72.30 | 4.47 - 2.99 = | 1.48 | .29 |
| Mar. 65 to July 65 | 4/12 | 85.96 | 4.57 - 2.95 = | 1.62 | .44 |
| Feb. 66 to Dec. 66 | 10/12 | 91.76 | 5.27 - 3.57 = | 1.70 | .55 |
| | | | | Total | 2.21 |

Total profit from Situation II is A + B 62.93 points

The control investment is 35.85

The improvement is 27.08/35.85 X 100 = 75.53% better

Conclusion:

Situation II is the better, therefore it was selected as the Advance-Decline Line Indicator. The criteria for use of the indicator are:

When the index value on the downside reaches 20 per cent below a preceding peak, a sell signal is indicated.

When the index value has risen 10 per cent above the lowest value, it reached after the sell signal was given, a buy signal is indicated.

# THE ADVANCE--DECLINE LINE

# THE ADVANCE --DECLINE LINE

CHART V

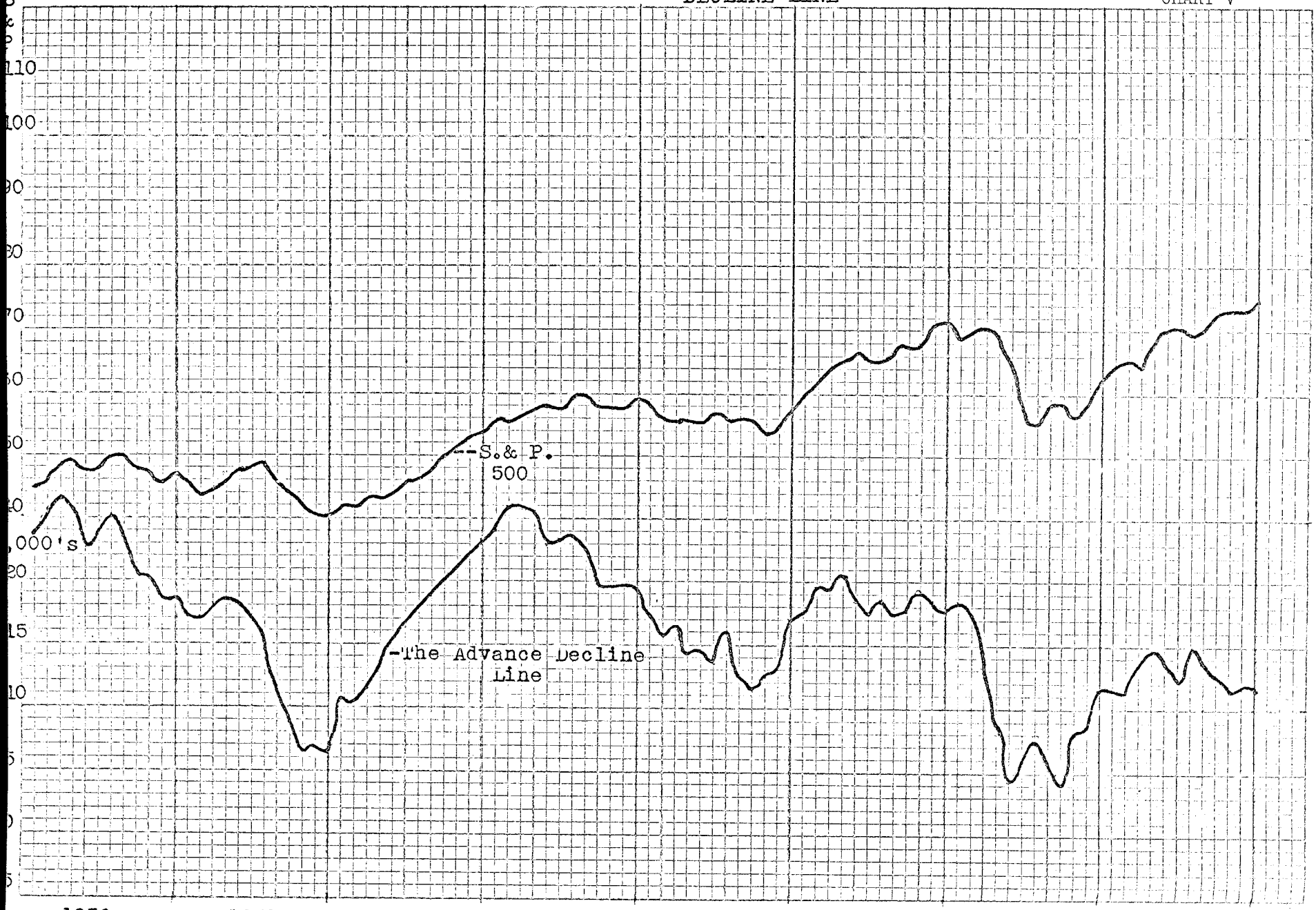


TABLE XV

CUMULATIVE ADVANCES AND DECLINES

(+ 25,000 shares)

| | 1956 | 1959 | 1962 | 1965 |
|---|---|---|---|---|
| January | 23765 | 24212 | 18240 | 16459 |
| February | 25918 | 26136 | 17255 | 16795 |
| March | 26580 | 25889 | 13819 | 17951 |
| April | 25345 | 25203 | 8805 | 16284 |
| May | 22836 | 23099 | 4192 | 11755 |
| June | 24118 | 23415 | 5700 | 12010 |
| July | 25290 | 23755 | 7540 | 14441 |
| August | 23587 | 22830 | 5835 | 15516 |
| September | 20423 | 19801 | 4013 | 16577 |
| October | 20246 | 19852 | 8080 | 16218 |
| November | 18566 | 19932 | 8609 | 15768 |
| December | 18641 | 19478 | 11559 | 16223 |
| | 1957 | 1960 | 1963 | 1966 |
| January | 17750 | 17097 | 11552 | 14553 |
| February | 17160 | 15648 | 11332 | 11995 |
| March | 18046 | 16429 | 13387 | 11891 |
| April | 18624 | 14474 | 14862 | 6850 |
| May | 18249 | 14798 | 13865 | 6761 |
| June | 17123 | 13837 | 12034 | 4180 |
| July | 15790 | 16040 | 14264 | (1352) |
| August | 11743 | 12808 | 13683 | (2367) |
| September | 9037 | 11525 | 12867 | (2740) |
| October | 6691 | 12417 | 11237 | (3212) |
| November | 6891 | 13060 | 11387 | (3845) |
| December | 6635 | 17052 | 11489 | (4316) |
| | 1958 | 1961 | 1964 | 1967 |
| January | 10715 | 17627 | 12159 | |
| February | 10491 | 19446 | 13389 | |
| March | 11307 | 19325 | 12995 | |
| April | 13450 | 20967 | 11813 | |
| May | 15281 | 18449 | 12747 | |
| June | 16149 | 17685 | 14251 | |
| July | 18001 | 18508 | 13424 | |
| August | 18998 | 17129 | 14328 | |
| September | 20375 | 17559 | 14851 | |
| October | 21197 | 19250 | 14369 | |
| November | 22069 | 18383 | 12862 | |
| December | 23408 | 17200 | 15741 | |

Data Source: Barron's Weekly, Issues traded + 25000

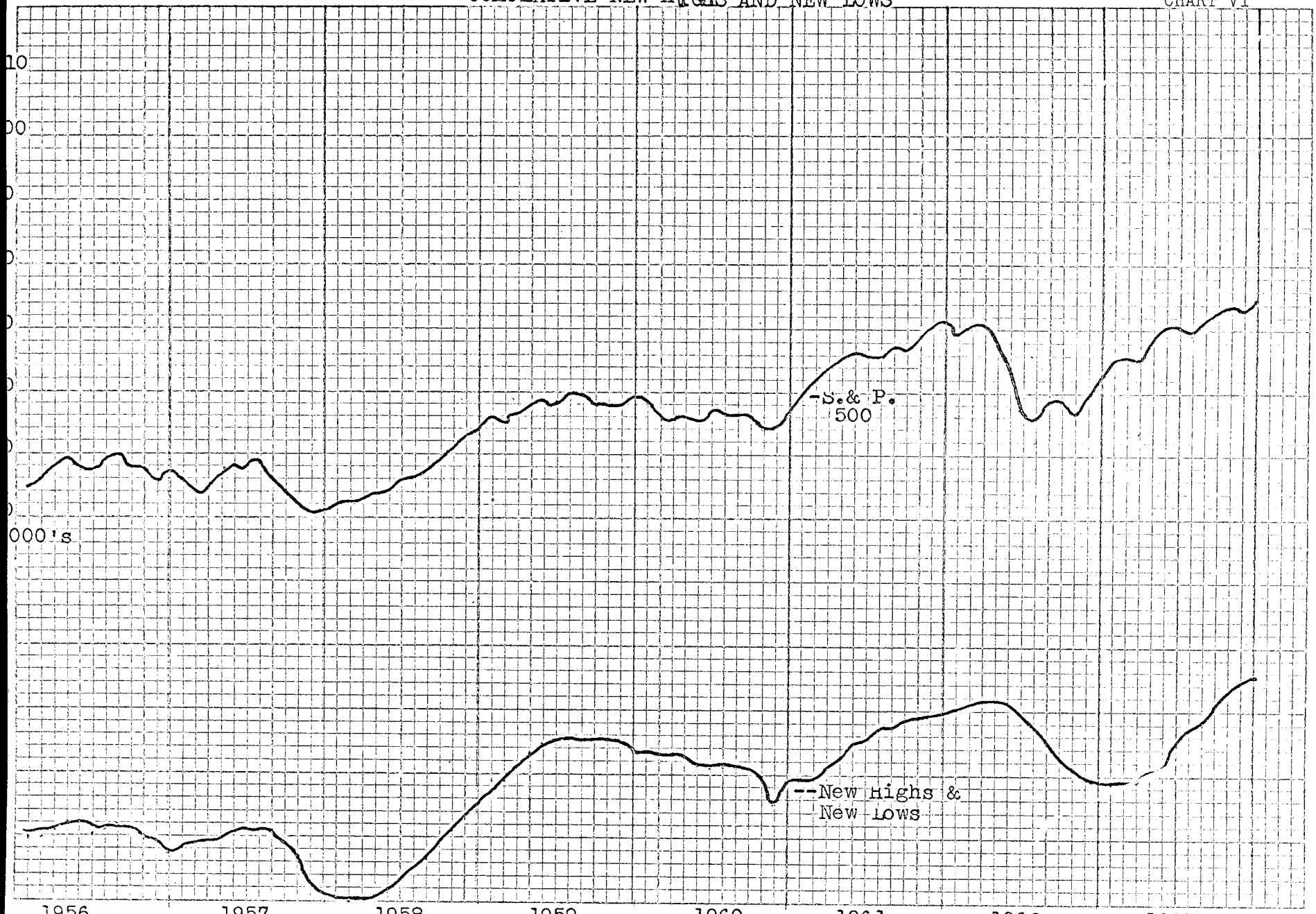
## TEST II: THE NEW HIGHS AND NEW LOWS INDEX

The index was calculated from the statistics for the number of new highs and new lows that were traded on the N.Y.S.E. It is a cumulative algebraic total of the new highs as a positive number, and new lows as a negative number. The index at the beginning of the period was assumed to be 15,000, as this kept the resulting data positive. In this appraisal, the monthly figures for the index were used, and a three month moving average was used to smooth the data. The moving average made the index values when plotted, easier to analyze. The index was plotted against the S. and P. 500 on Charts VI and VII. The values for the New Highs and New Lows Index are recorded in Table XVI.

A visual inspection of the index was made, in order that situations for testing the index might be construed. The series appears to be highly correlated to the S. and P. 500, but the lead qualities that one would expect, if the indicator were to be of use in this appraisal, appear to be non-existant in the time regions of the major breaks in the S. and P. 500. As the writer could ascertain no visual leads for the index, it was decided not to submit the series to tests and to conclude that there were no significant lead qualities.

CUMULATIVE NEW HIGHS AND NEW LOWS

CHART VI



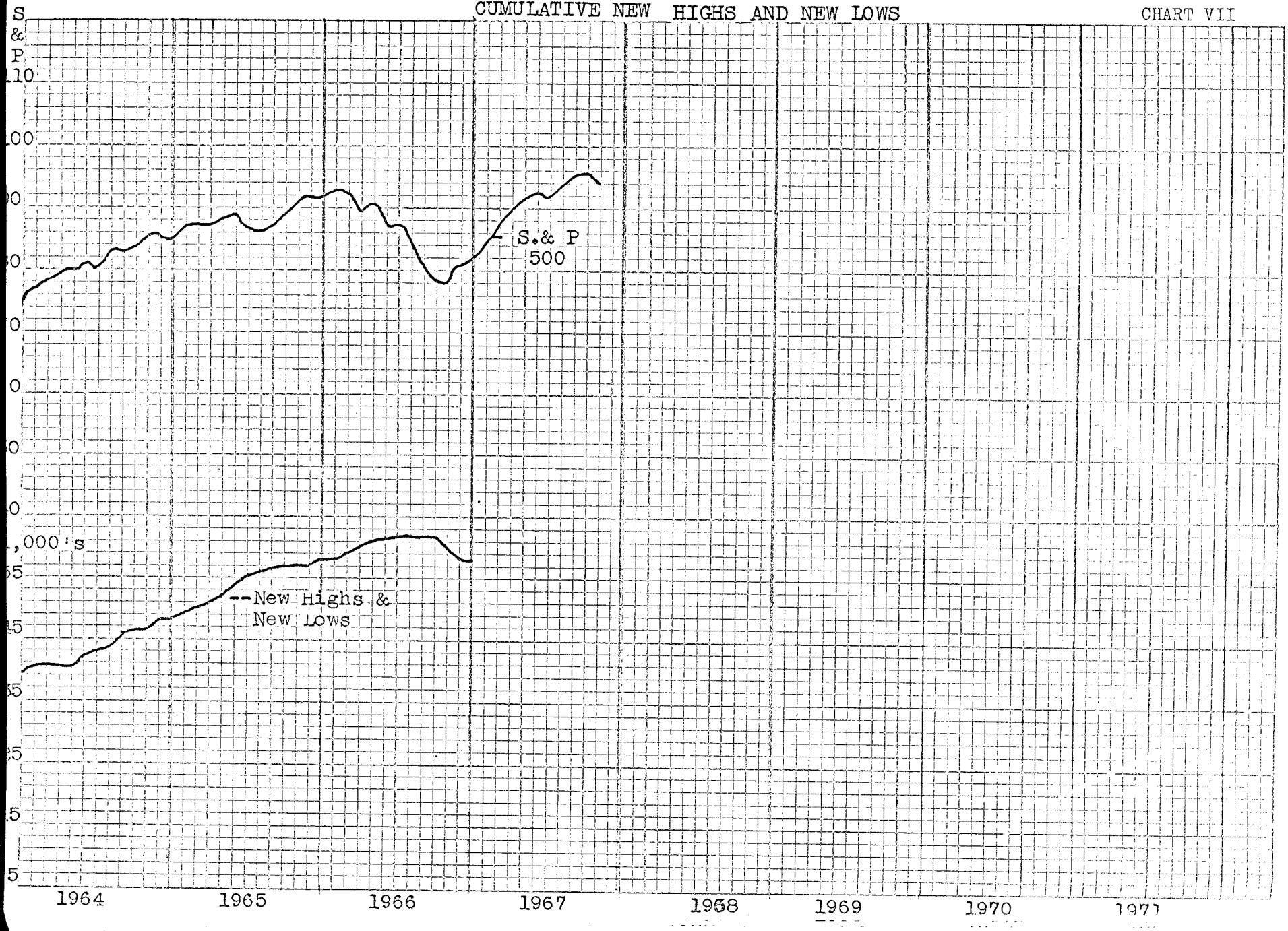

CUMULATIVE NEW HIGHS AND NEW LOWS
CHART VII
S
&
P
110
00
0
0
0
0
,000's
5
5
5
5
5
S.& P
500
--New Highs &
New Lows
1964
1965
1966
1967
1968
1969
1970
1971

TABLE XVI

CUMULATIVE NEW HIGHS AND NEW LOWS

| | 1956 | 1959 | 1962 | 1965 |
|---|---|---|---|---|
| January | | 22.4 | 35.0 | 49.1 |
| February | | 24.3 | 35.4 | 50.1 |
| March | 16.2 | 26.1 | 35.9 | 51.1 |
| April | 16.3 | 27.6 | 36.0 | 52.2 |
| May | 16.5 | 28.7 | 35.7 | 53.5 |
| June | 16.5 | 29.5 | 34.6 | 55.1 |
| July | 16.3 | 30.1 | 32.6 | 56.2 |
| August | 15.8 | 30.4 | 30.2 | 56.9 |
| September | 15.5 | 30.3 | 27.9 | 57.0 |
| October | 14.8 | 29.9 | 25.9 | 56.9 |
| November | 14.1 | 29.7 | 24.6 | 56.8 |
| December | 13.9 | 29.2 | 24.1 | 58.0 |
| | 1957 | 1960 | 1963 | 1966 |
| January | 13.5 | 28.7 | 23.9 | 57.8 |
| February | 13.6 | 28.2 | 24.0 | 59.0 |
| March | 14.1 | 27.7 | 24.3 | 60.5 |
| April | 14.7 | 27.2 | 25.2 | 61.6 |
| May | 15.0 | 26.6 | 26.5 | 62.6 |
| June | 15.3 | 25.9 | 29.3 | 63.0 |
| July | 15.1 | 25.5 | 32.0 | 63.1 |
| August | 14.4 | 25.4 | 34.6 | 62.4 |
| September | 12.6 | 25.2 | 36.9 | 61.4 |
| October | 10.8 | 24.9 | 38.9 | 59.9 |
| November | 8.7 | 19.9 | 39.3 | 58.4 |
| December | 6.9 | 24.3 | 39.8 | 57.7 |
| | 1958 | 1961 | 1964 | 1967 |
| January | 5.6 | 24.3 | 40.0 | |
| February | 5.2 | 24.7 | 40.3 | |
| March | 5.2 | 25.9 | 40.6 | |
| April | 5.9 | 27.6 | 41.5 | |
| May | 7.0 | 29.4 | 42.4 | |
| June | 8.4 | 30.9 | 43.9 | |
| July | 10.2 | 32.1 | 44.6 | |
| August | 12.2 | 32.9 | 45.5 | |
| September | 11.9 | 33.3 | 46.0 | |
| October | 16.2 | 33.6 | 46.6 | |
| November | 18.4 | 34.1 | 47.5 | |
| December | 20.3 | 34.5 | 48.2 | |

Data Source: Barron's Weekly, 3 month moving average
15,000 added

## TEST III: CREDIT BALANCES IN BROKERAGE ACCOUNTS

The statistics on Credit Balances in Brokerage Accounts are available monthly in the Federal Reserve Bulletin. These statistics, recorded as billions of dollars were used as raw data and were not smoothed by moving averages. The raw data plotted a smooth series, so it was considered appropriate. The statistics and the plotted index are in respectively Table XVII and Charts VIII and IX.

Two situations were construed by visual comparison of the index to the S. and P. 500 for ideal buy and sell indications. They are tested with the assigned test and the investment control of a buy and hold decision, over the ten year period 1956 to 1966.

### Situation I

When the credit balance index expands beyond 100 million dollars from the previous low since the last sale, a buy is indicated. When it contracts beyond a 100 million dollars from the previous high since the last purchase, a sell is indicated.

SITUATION I (100 million on the upside and 100 million on the downside)

A - Investment in the Market (Dates are the end of month)

| Date | Purchase + Commission | Date | Sales - Commission | Profit (Pts) |
|---|---|---|---|---|
| Jan. 58 | 41.12 + .41 = 41.53 | July 59 | 59.74 - .60 = 59.14 | 17.61 |
| Oct. 60 | 53.73 + .54 = 54.27 | Aug. 61 | 56.51 - .57 = 55.94 | 1.67 |
| July 62 | 56.97 + .57 = 57.54 | Sept.62 | 58.00 - .58 = 57.42 | (12) |
| Dec. 62 | 62.64 + .63 = 63.27 | May 64 | 70.14 - .70 = 69.44 | 6.17 |
| Jan. 65 | 86.12 + .86 = 86.98 | July 66 | 85.84 - .86 = 84.98 | 2.00 |
| | | | Total | 27.33 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Jan. 58 | 24/12 | 45.48 | 3.58 - 3.90 = | (.32) | (.27) |
| July 59 to Oct. 60 | 15/12 | 59.14 | 4.51 - 3.49 = | 1.02 | .71 |
| Aug. 61 to July 62 | 11/12 | 55.94 | 4.56 - 3.74 = | .82 | .39 |
| Sept.62 to Dec. 62 | 3/12 | 57.42 | 4.43 - 3.54 = | .89 | .17 |
| May 64 to Jan. 65 | 8/12 | 69.44 | 4.54 - 2.94 = | 1.60 | .76 |
| July 66 to Dec. 66 | 5/12 | 84.98 | 5.44 - 3.77 = | 1.67 | .60 |
| | | | | Total | 2.36 |

Total profit from Situation I is A + B 29.69

The performance of the control is 6.16/35.85 X 100 = 17.18% better than that of the index.

Situation II

When the credit balance index expands beyond 150 million dollars from the previous low since the last sale, a buy is indicated. When it contracts beyond a 150 million dollars from the previous high since the last purchase, a sell is indicated.

SITUATION II (150 million on the upside and 150 million on the downside)

A - Investment in the Market

(Dates are the end of month)

| Date | Purchase + Commission | Date | Sales - Commission | Profit (Pts) |
|---|---|---|---|---|
| Mar. 58 | 42.11 + .42 = 42.53 | July 59 | 59.74 - .60 = 59.14 | 16.61 |
| Dec. 60 | 56.80 + .57 = 57.37 | Aug. 61 | 56.51 - .57 = 55.94 | (1.43) |
| July 62 | 56.97 + .57 = 57.54 | Sept.62 | 58.00 - .58 = 57.42 | (.12) |
| Feb. 64 | 77.39 + .77 = 78.16 | July 64 | 83.22 - .83 = 82.39 | 4.23 |
| Mar. 65 | 86.83 + .87 = 87.70 | July 66 | 85.84 - .86 = 84.98 | (2.72) |
| | | | Total | 16.57 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to March 58 | 27/12 | 45.48 | 3.55 - 3.70 = | (.15) | (.14) |
| July 59 to Dec. 60 | 17/12 | 59.14 | 4.57 - 3.36 = | 1.21 | 1.01 |
| Aug. 61 to July 62 | 11/12 | 55.94 | 4.46 - 3.78 = | .68 | .34 |
| Sept.62 to Feb. 64 | 17/12 | 57.42 | 4.47 - 3.33 = | 1.14 | .92 |
| July 64 to March 65 | 8/12 | 82.39 | 4.53 - 2.93 = | 1.60 | .91 |
| July 66 to Dec. 66 | 5/12 | 84.98 | 5.44 - 3.77 = | 1.67 | .60 |
| | | | | Total | 3.64 |

Total profit from Situation II is A + B 19.01

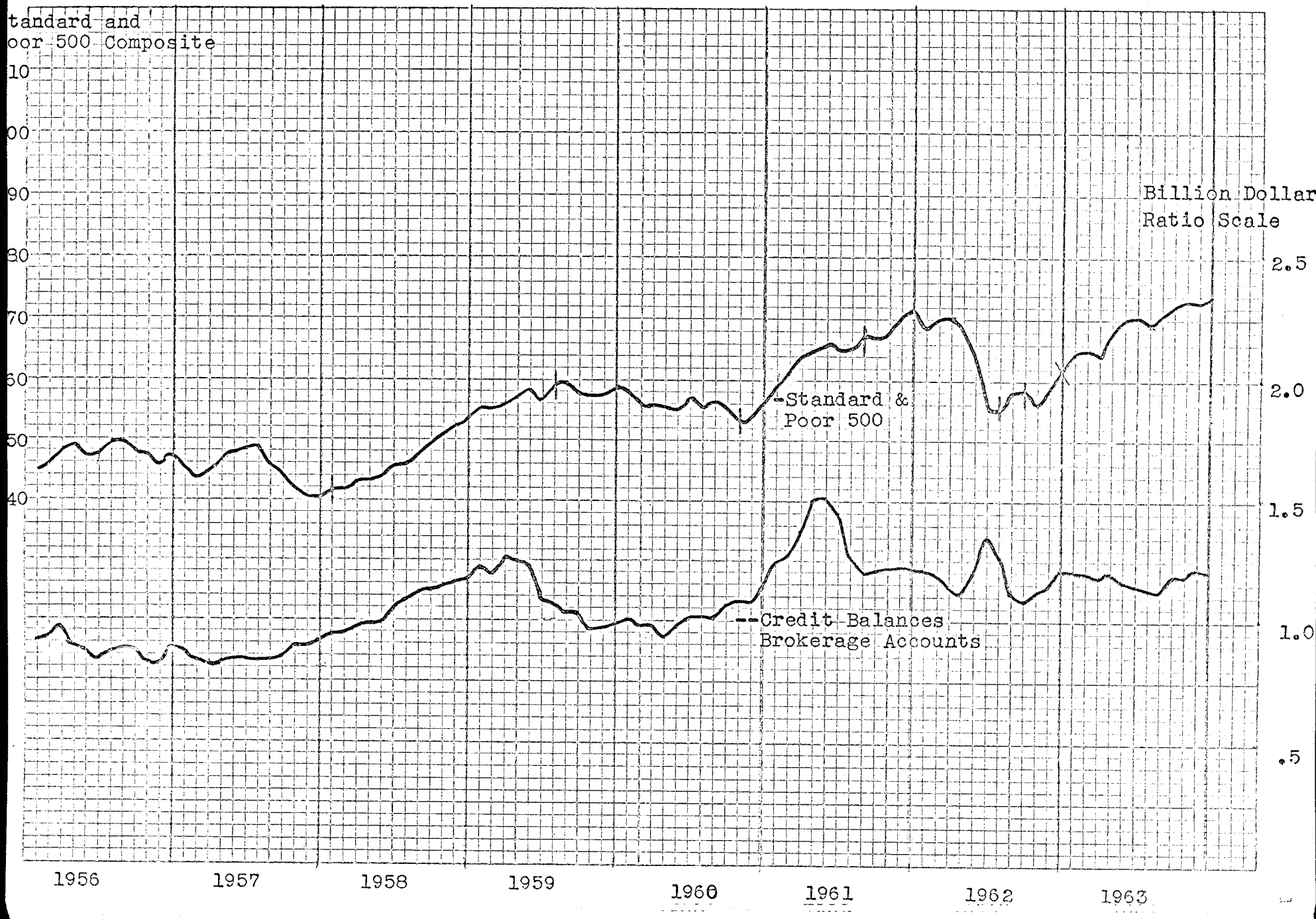
The performance of the control is 15.64/35.85 X 100 = 43.62% better than that of the investment

## Conclusion

The results of the two tests indicate that neither situation was suitable for use in the composite index, so this indicator was eliminated.

Stock Prices and Credit Balances in Brokerage Accounts

CHART VIII



Stock Prices and Credit Balances in Brokerage Accounts

CHART IX

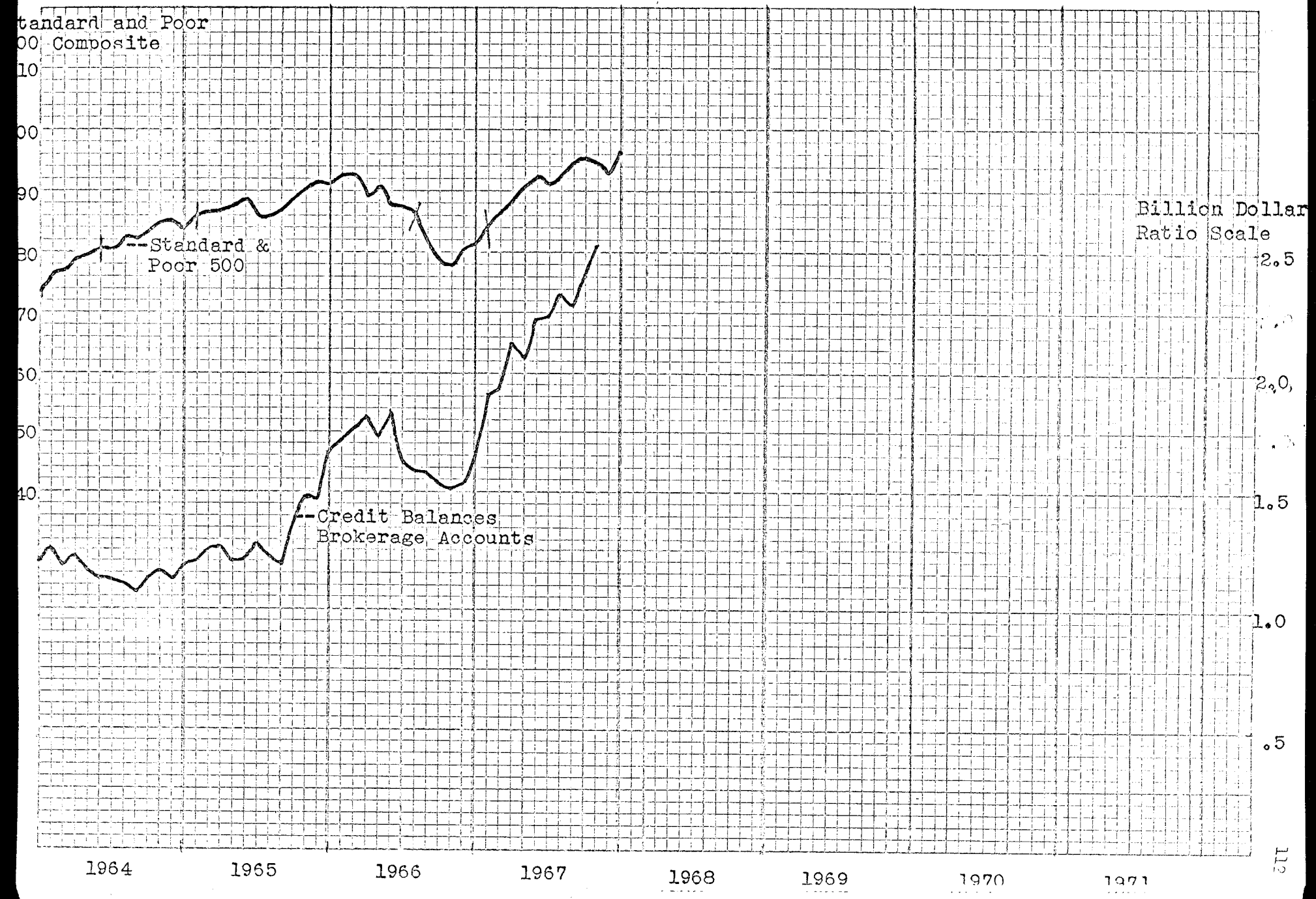


TABLE XVII

Credit Balances in Brokers Accounts

(Customer Net Free in Billion Dollars)

| | 1956 | 1959 | 1962 | 1965 |
|---|---|---|---|---|
| January | .905 | 1.226 | 1.225 | 1.207 |
| February | .913 | 1.196 | 1.190 | 1.254 |
| March | .960 | 1.257 | 1.154 | 1.264 |
| April | .896 | 1.205 | 1.110 | 1.207 |
| May | .870 | 1.188 | 1.205 | 1.208 |
| June | .836 | 1.094 | 1.374 | 1.297 |
| July | .858 | 1.079 | 1.252 | 1.233 |
| August | .872 | 1.035 | 1.130 | 1.193 |
| September | .866 | 1.039 | 1.091 | 1.369 |
| October | .835 | .967 | 1.126 | 1.475 |
| November | .822 | .974 | 1.151 | 1.479 |
| December | .880 | .996 | 1.216 | 1.666 |
| | 1957 | 1960 | 1963 | 1966 |
| January | .866 | 1.001 | 1.199 | 1.730 |
| February | .828 | .981 | 1.191 | 1.765 |
| March | .820 | .988 | 1.175 | 1.822 |
| April | .807 | .940 | 1.201 | 1.744 |
| May | .817 | .970 | 1.166 | 1.839 |
| June | .820 | 1.016 | 1.149 | 1.658 |
| July | .829 | 1.018 | 1.126 | 1.595 |
| August | .816 | 1.021 | 1.120 | 1.595 |
| September | .838 | 1.059 | 1.180 | 1.528 |
| October | .879 | 1.063 | 1.176 | 1.520 |
| November | .876 | 1.062 | 1.211 | 1.532 |
| December | .896 | 1.135 | 1.210 | 1.637 |
| | 1958 | 1961 | 1964 | 1967 |
| January | .937 | 1.269 | 1.262 | 1.914 |
| February | .939 | 1.392 | 1.199 | 1.936 |
| March | .954 | 1.507 | 1.231 | 2.135 |
| April | .985 | 1.508 | 1.165 | 2.078 |
| May | .979 | 1.453 | 1.138 | 2.220 |
| June | 1.047 | 1.280 | 1.146 | 2.231 |
| July | 1.080 | 1.207 | 1.114 | 2.341 |
| August | 1.103 | 1.208 | 1.077 | 2.281 |
| September | 1.119 | 1.227 | 1.145 | 2.401 |
| October | 1.140 | 1.214 | 1.155 | 2.513 |
| November | 1.148 | 1.213 | 1.131 | |
| December | 1.159 | 1.219 | 1.169 | |

Data Source: Federal Reserve Bulletin

## TEST IV: QUALITY OF MARKET LEADERSHIP

The indicator used is the index formed from the daily quotations of the price of the ten most active stocks on the N.Y.S.E. The index is formed from monthly data which are the monthly averages of the daily statistics. The monthly averages are subjected to a 5 month moving average, to smooth the statistics.(3) The resulting index of the 5 month moving average is then plotted as, "The Ten Most Active Stocks on the New York Stock Exchange".

As W. J. Eiteman suggested that the index when combined with volume of sales was more effective, the writer decided to use the ratio of the volume of the ten most active stocks to the volume of the N.Y.S.E. expressed in a percentage, as another measure of "Quality of Market Leadership".(4) An inverse value relationship exists between this statistic and the price of the ten most active stocks.

For example: As the price of the ten most active increase, the numerator of the Volume/Volume relationship decreases, with a lower ratio as the price increases.

The percentage figures for this ratio are available in Barron's Weekly, and are computed on a daily basis. An index was formed from the monthly average of these statistics, and was smoothed by a five month moving average.(5) The resulting data were then plotted as an index, "The Ratio of the Ten Most Active Stocks to the Volume of the Market".

---

(3) The statistics and plotted Index are respectively in Tables XVIII and XIX.

(4) Eiteman, W.J. op.cit. p. 420

(5) The statistics and plotted Index are respectively in Tables XX and XXI and Charts XII and XIII.

Recapitulating, we are measuring the quality of market leadership with two indexes:

1. Average Monthly Price of the Ten Most Active Stocks.
2. The Ratio of the Ten Most Active Stocks to the Volume of the Market.

These indexes will be tested separately to ascertain their value for forecasting and to establish criteria for their best forecast.

## TEST IV-A: AVERAGE MONTHLY PRICE OF THE TEN MOST ACTIVE STOCKS

By a visual comparison of this index to the S. and P. 500 two situations were construed for testing against the control that was established for the tests, a buy and hold of the S. and P. 500 for the ten year period 1956 to 1966.

### Situation IA

When the value of the index on the upside reaches $53 the S. and P. 500 was bought. When the value of the index on the downside reaches $37 the S. and P. 500 was sold.

SITUATION IA (Buy at $53 level and sell at $37 level)

A - Investment in the Market (Dates are end of month)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Oct. 56 | 46.24 + .46 = 46.70 | Feb. 58 | 41.26 - .41 = 40.85 | (5.85) |
| June 62 | 55.63 + .56 = 56.19 | Nov. 65 | 60.04 - .60 = 59.44 | 3.25 |
| Aug. 66 | 80.65 + .81 = 81.46 | Dec. 66 | 92.43 - .92 = 91.51 | 10.05 |
| | | | Total | 7.45 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Oct. 56 | 10/12 | 45.48 | 3.50 - 3.66 = | (.16) | (.16) |
| Feb. 58 to June 62 | 52/12 | 40.85 | 4.16 - 3.99 = | .17 | .37 |
| Nov. 65 to Aug. 66 | 9/12 | 59.44 | 4.90 - 3.35 = | 1.55 | .72 |
| | | | | Total | .93 |

Total profit from Situation IA is A + B 8.38 points

Control investment is 35.85

The performance of the control is 27.47/35.85 X 100 = 76.6% better than that of the investment.

Situation IIA

When the value of the index on the upside reaches $49, the S. and P. 500 is bought, and when the value of the index on the downside reaches $39, the investment in the S. and P. 500 is sold.

SITUATION IIA (Buy at $49 level and sell at $37 level)

A - Investment in the Market

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Aug. 56 | 48.49 + .48 = 48.97 | Apr. 57 | 45.05 - .45 = 44.60 | (4.37) |
| June 62 | 55.63 + .56 = 56.19 | Mar. 63 | 65.67 - .66 = 65.01 | 8.82 |
| Aug. 65 | 86.49 + .86 = 87.35 | Oct. 65 | 91.39 - .91 = 90.48 | 3.13 |
| May 66 | 86.78 + .87 = 87.65 | Dec. 66 | 92.43 - .92 = 91.51 | 3.86 |
| | | | Total | 11.44 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Aug. 56 | 7/12 | 45.48 | 3.40 - 3.82 = | (.42) | (.09) |
| Apr. 57 to June 62 | 62/12 | 44.60 | 4.17 - 3.67 = | .50 | 1.12 |
| Mar. 63 to Aug. 65 | 27/12 | 65.01 | 4.51 - 3.08 = | 1.43 | 2.08 |
| Oct. 65 to May 66 | 7/12 | 90.48 | 4.90 - 3.27 = | 1.63 | .91 |
| | | | | Total | 4.02 |

Total profit from Situation IIA is A + B 15.46 points

Control investment is 35.85

The performance of the control is 20.39/35.85 X 100 = 56.9% better than that of the investment

Conclusion

On the basis of the results of the tests on these two situations this index was not accepted.

CHART X

Average Monthly Price of The Ten Most Active Stocks-Barron's Weekly Statistics

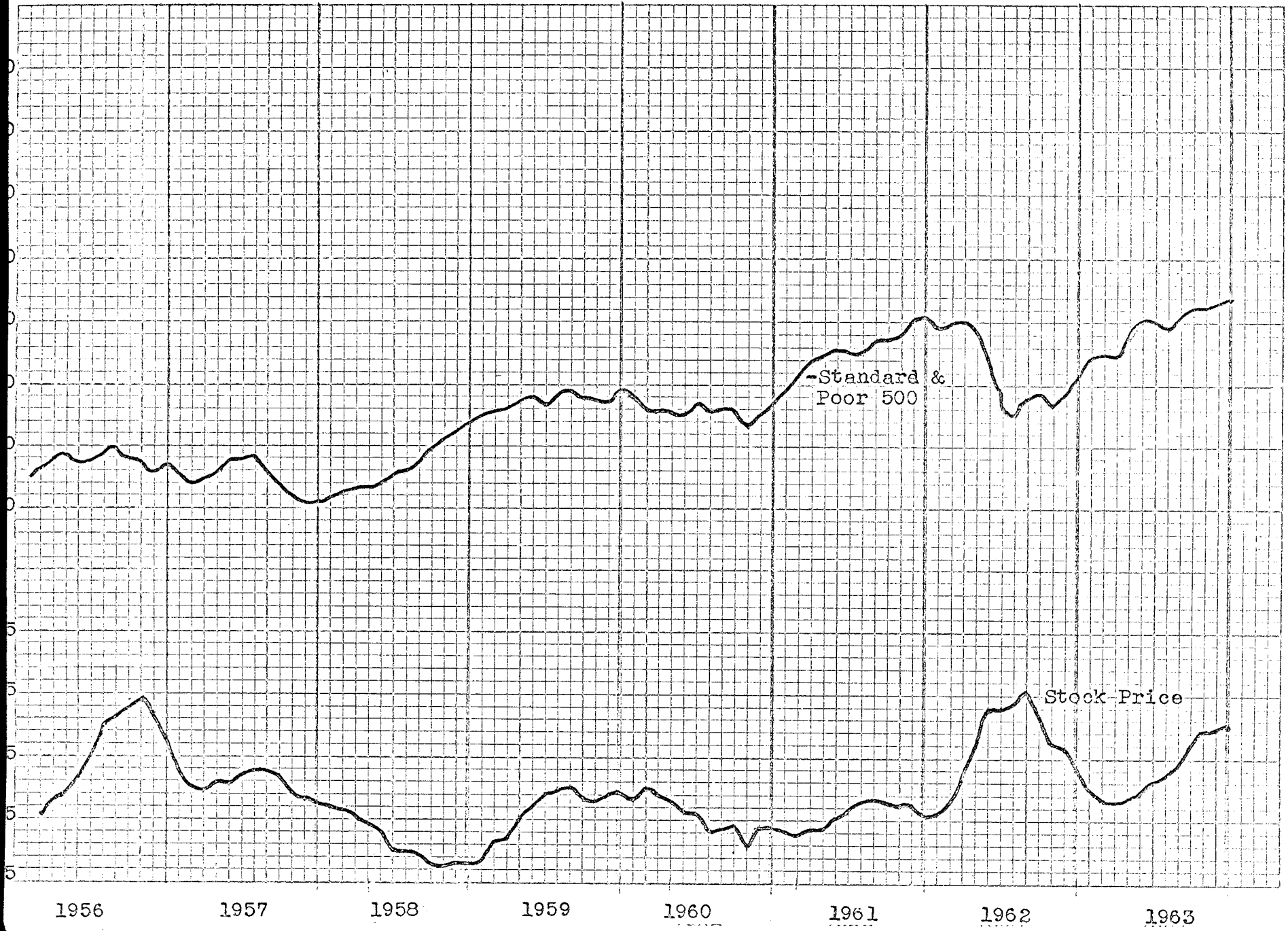


CHART XI Average Monthly Price of The Ten Most Active Stocks-Barron's Weekly Statistics

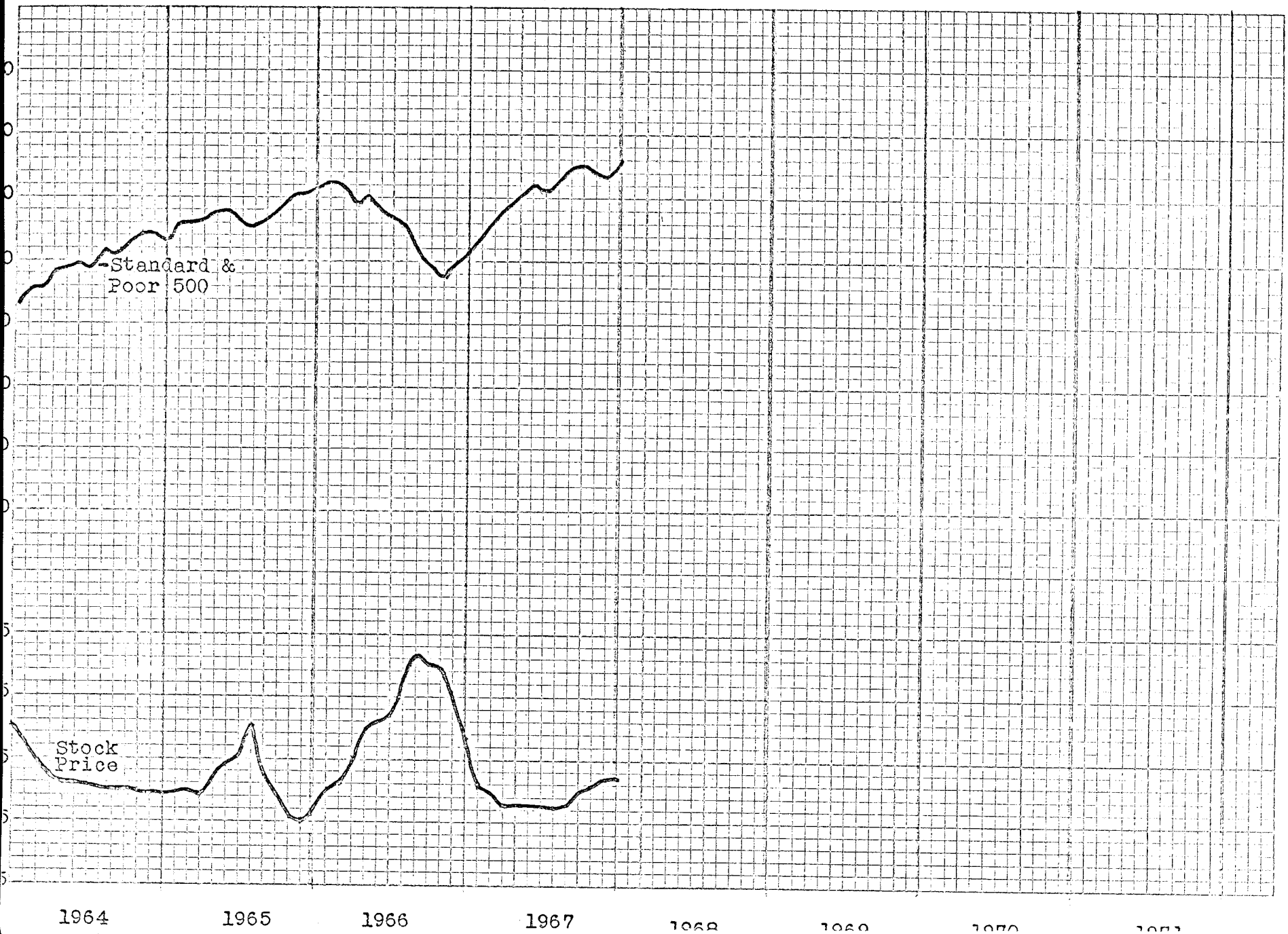


TABLE XVIII

Average Monthly Price of the Ten Most Active Stocks on the New York Stock Exchange

(figures are a 5 month moving average)

| | 1956 | 1959 | 1962 | 1965 |
|---|---|---|---|---|
| January | | 28.90 | 36.53 | 39.74 |
| February | 35.60 | 31.27 | 38.20 | 40.66 |
| March | 38.39 | 32.81 | 41.76 | 39.96 |
| April | 39.78 | 35.39 | 47.20 | 42.89 |
| May | 41.47 | 37.08 | 53.08 | 44.41 |
| June | 45.53 | 39.15 | 53.18 | 45.29 |
| July | 49.43 | 39.75 | 54.35 | 50.45 |
| August | 51.46 | 40.03 | 55.57 | 42.55 |
| September | 54.54 | 38.28 | 51.83 | 39.77 |
| October | 54.72 | 38.27 | 47.23 | 35.99 |
| November | 51.32 | 39.35 | 46.87 | 35.03 |
| December | 47.53 | 39.28 | 44.95 | 36.22 |
| | 1957 | 1960 | 1963 | 1966 |
| January | 44.10 | 38.84 | 40.47 | 40.73 |
| February | 40.73 | 40.17 | 38.72 | 41.07 |
| March | 39.51 | 39.79 | 38.02 | 45.44 |
| April | 40.94 | 37.69 | 38.91 | 49.73 |
| May | 41.53 | 36.89 | 39.26 | 51.20 |
| June | 42.89 | 35.74 | 41.19 | 52.27 |
| July | 43.20 | 33.68 | 41.94 | 58.20 |
| August | 43.10 | 33.82 | 44.00 | 61.58 |
| September | 41.50 | 34.23 | 47.36 | 60.10 |
| October | 39.41 | 32.79 | 49.33 | 59.01 |
| November | 38.45 | 33.96 | 49.65 | 55.04 |
| December | 38.00 | 33.77 | 50.15 | 46.70 |
| | 1958 | 1961 | 1964 | 1967 |
| January | 37.31 | 32.47 | 48.39 | 41.50 |
| February | 36.82 | 31.84 | 44.81 | 39.81 |
| March | 35.53 | 32.71 | 42.58 | 38.17 |
| April | 34.15 | 33.46 | 41.32 | 38.26 |
| May | 33.04 | 35.37 | 41.05 | 38.10 |
| June | 30.94 | 36.95 | 41.44 | 38.07 |
| July | 30.39 | 38.31 | 41.84 | 37.86 |
| August | 29.61 | 38.89 | 41.55 | 38.19 |
| September | 28.14 | 38.04 | 40.71 | 40.31 |
| October | 27.53 | 37.02 | 40.31 | 41.13 |
| November | 28.60 | 37.63 | 39.84 | 42.11 |
| December | 28.63 | 36.43 | 40.23 | 42.05 |

Data Source: Barrons' Weekly

TABLE XIX

Average Monthly Price of the Ten Most Active Stocks on the New York Stock Exchange

| | 1956 | 1959 | 1962 | 1965 |
|---|---|---|---|---|
| January | 36.23 | 32.05 | 40.24 | 37.73 |
| February | 36.90 | 28.80 | 33.74 | 43.06 |
| March | 35.41 | 28.52 | 37.10 | 36.67 |
| April | 39.46 | 37.99 | 43.89 | 42.87 |
| May | 43.98 | 36.70 | 53.84 | 39.49 |
| June | 43.15 | 44.94 | 67.47 | 52.36 |
| July | 45.39 | 37.29 | 63.14 | 50.70 |
| August | 55.68 | 38.86 | 37.58 | 41.05 |
| September | 58.95 | 40.98 | 49.76 | 36.96 |
| October | 54.17 | 38.10 | 59.94 | 31.72 |
| November | 58.55 | 36.21 | 48.74 | 38.46 |
| December | 46.26 | 37.20 | 40.16 | 31.80 |
| | 1957 | 1960 | 1963 | 1966 |
| January | 38.71 | 44.28 | 35.75 | 36.22 |
| February | 39.96 | 40.62 | 40.17 | 42.91 |
| March | 37.04 | 35.91 | 37.53 | 54.29 |
| April | 41.70 | 42.84 | 40.02 | 40.14 |
| May | 40.16 | 35.06 | 36.63 | 53.67 |
| June | 45.86 | 34.05 | 40.22 | 57.64 |
| July | 42.92 | 36.62 | 41.92 | 50.27 |
| August | 43.82 | 30.16 | 47.18 | 59.64 |
| September | 43.27 | 32.54 | 43.77 | 69.79 |
| October | 39.67 | 35.76 | 46.94 | 70.60 |
| November | 37.86 | 36.09 | 57.04 | 50.21 |
| December | 32.45 | 29.42 | 51.76 | 44.85 |
| | 1958 | 1961 | 1964 | 1967 |
| January | 39.01 | 36.01 | 48.75 | 39.76 |
| February | 37.58 | 31.59 | 46.30 | 37.06 |
| March | 37.20 | 29.27 | 38.13 | 35.65 |
| April | 31.41 | 32.95 | 39.13 | 41.73 |
| May | 31.03 | 33.73 | 40.59 | 36.67 |
| June | 33.54 | 39.76 | 42.47 | 39.20 |
| July | 32.06 | 41.14 | 44.96 | 36.28 |
| August | 26.71 | 37.21 | 40.07 | 35.48 |
| September | 28.65 | 39.72 | 41.14 | 40.68 |
| October | 27.13 | 36.62 | 39.11 | 38.34 |
| November | 26.17 | 35.51 | 38.27 | 50.79 |
| December | 29.00 | 36.06 | 42.99 | 40.38 |

Data Source: Barron's Weekly

## TEST IV-B: RATIO OF THE TEN MOST ACTIVE STOCKS TO THE VOLUME OF THE MARKET

By visual comparison to the S. and P. 500, two situations were constructed for testing against the control investment that was established for these tests.

### Situation IB

The S. and P. 500 is bought when the volume index reaches 12.3% on the downside. The S. and P. 500 is sold when 14.9% is reached on the upside.

SITUATION IB (Buy at 12.3% on the downside and sell at 14.9% on the upside)

A - Investment in the Market (Dates are the end of month)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Oct. 56 | 46.24 + .46 = 46.70 | Aug. 59 | 59.40 - .59 = 59.81 | 13.11 |
| Apr. 62 | 68.05 + .68 = 68.73 | Aug. 63 | 70.98 - .71 = 70.27 | 1.54 |
| | | | Total | 14.65 |

B - Investment in Bonds

| Period out of market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Oct. 56 | 10/12 | 45.48 | 3.50 - 3.56 = | (.06) | (.02) |
| Aug. 59 to Apr. 62 | 20/12 | 59.81 | 4.58 - 3.48 = | 1.10 | 1.08 |
| Aug. 63 to Dec. 66 | 28/12 | 70.27 | 5.04 - 3.24 = | 1.80 | 2.88 |
| | | | | Total | 3.94 |

Total profit from Situation IB is A + B 18.59 points

Improvement is 17.26/35.85 (control) X 100 = 48.1% worse

Situation IIB

The S. and P. 500 averages are bought when the volume index reaches 13.3% on the downside, and the averages are sold when the index reaches 14.9% on the upside.

SITUATION IIB (Buy at 13.3% on the downside and sell at 14.9% on the upside)

A - Investment in the Market

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Aug. 57 | 45.84 + .46 = 46.30 | Aug. 59 | 59.40 - .59 = 59.81 | 13.51 |
| Oct. 60 | 53.73 + .54 = 54.27 | Aug. 63 | 70.98 - .71 = 70.27 | 16.00 |
| Jan. 65 | 86.12 + .86 = 86.98 | Oct. 65 | 91.39 - .91 = 90.48 | 3.50 |
| | | | Total | 33.01 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Aug. 57 | 19/12 | 45.48 | 3.72 - 3.62 = | .10 | .07 |
| Aug. 59 to Oct. 60 | 14/12 | 59.40 | 4.51 - 3.26 = | 1.25 | .83 |
| Aug. 63 to Jan. 65 | 17/12 | 70.98 | 4.48 - 2.83 = | 1.65 | 1.63 |
| Oct. 65 to Dec. 66 | 14/12 | 91.39 | 5.15 - 3.36 = | 1.79 | 1.92 |
| | | | | Total | 4.45 |

Total profit from Situation IIB is A + B 37.46 points

Improvement is 1.61/35.85 X 100 = 4.49% better

Conclusion:

Situation IIB improved the investment performance by 4.5%. It was therefore decided to accept Situation IIB as criteria, and also to use the indicator as such in the composite index.

The criteria for the use of the index are:

1. An indication to purchase is given when the index of the Ratio of the Ten Most Active Stocks to the Volume of the Market reaches 13.3% on the downside.
2. An indication to sell is given when the index reaches 14.9% on the upside.

Ratio of The Ten Most Active Stocks to The Volume of The Market- Barron's Weekly Statistics CHART XII

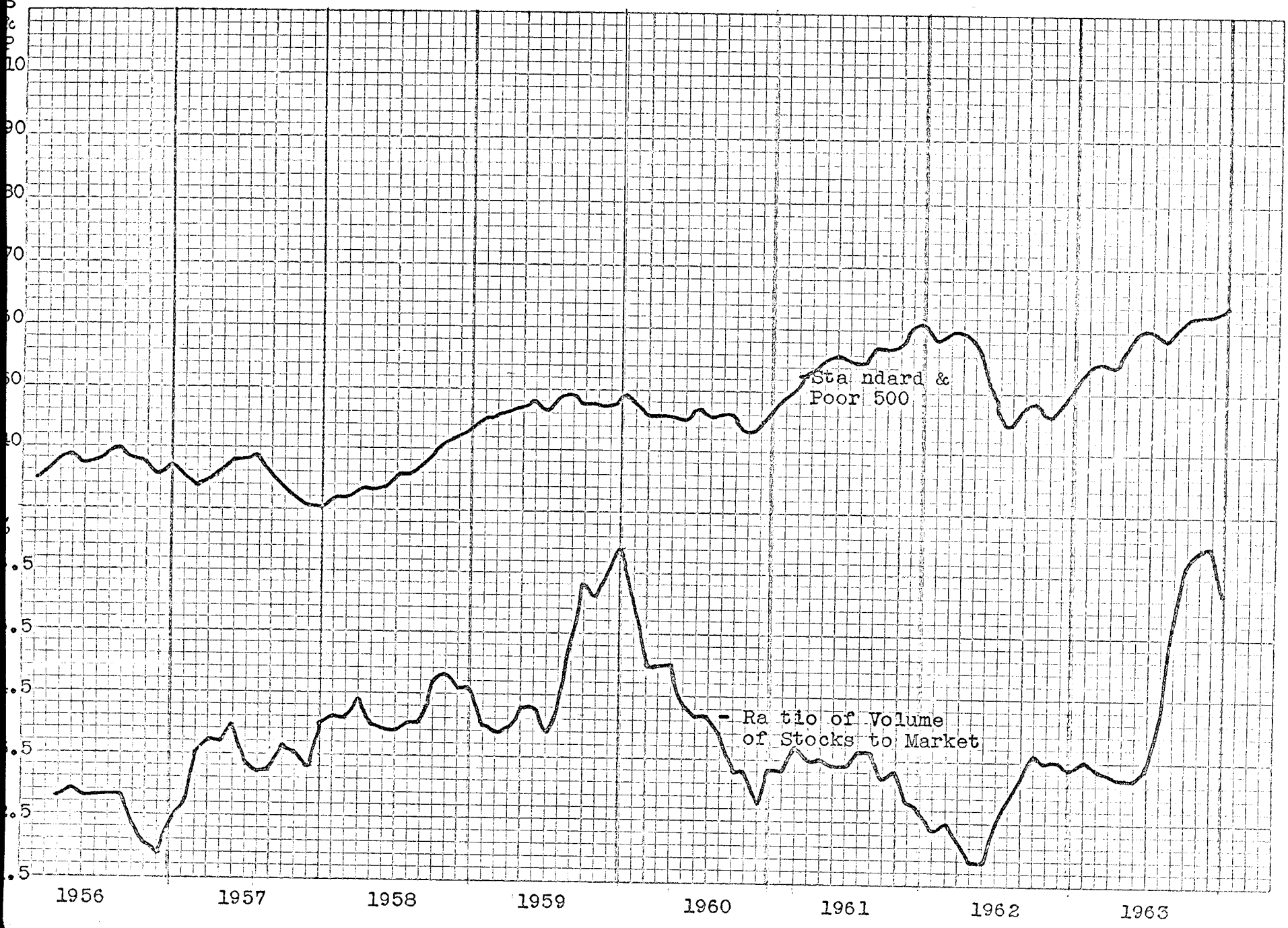


CHART XIII Ratio of The Ten Most Active Stocks to The Volume of The Market- Barron's Weekly Statistics

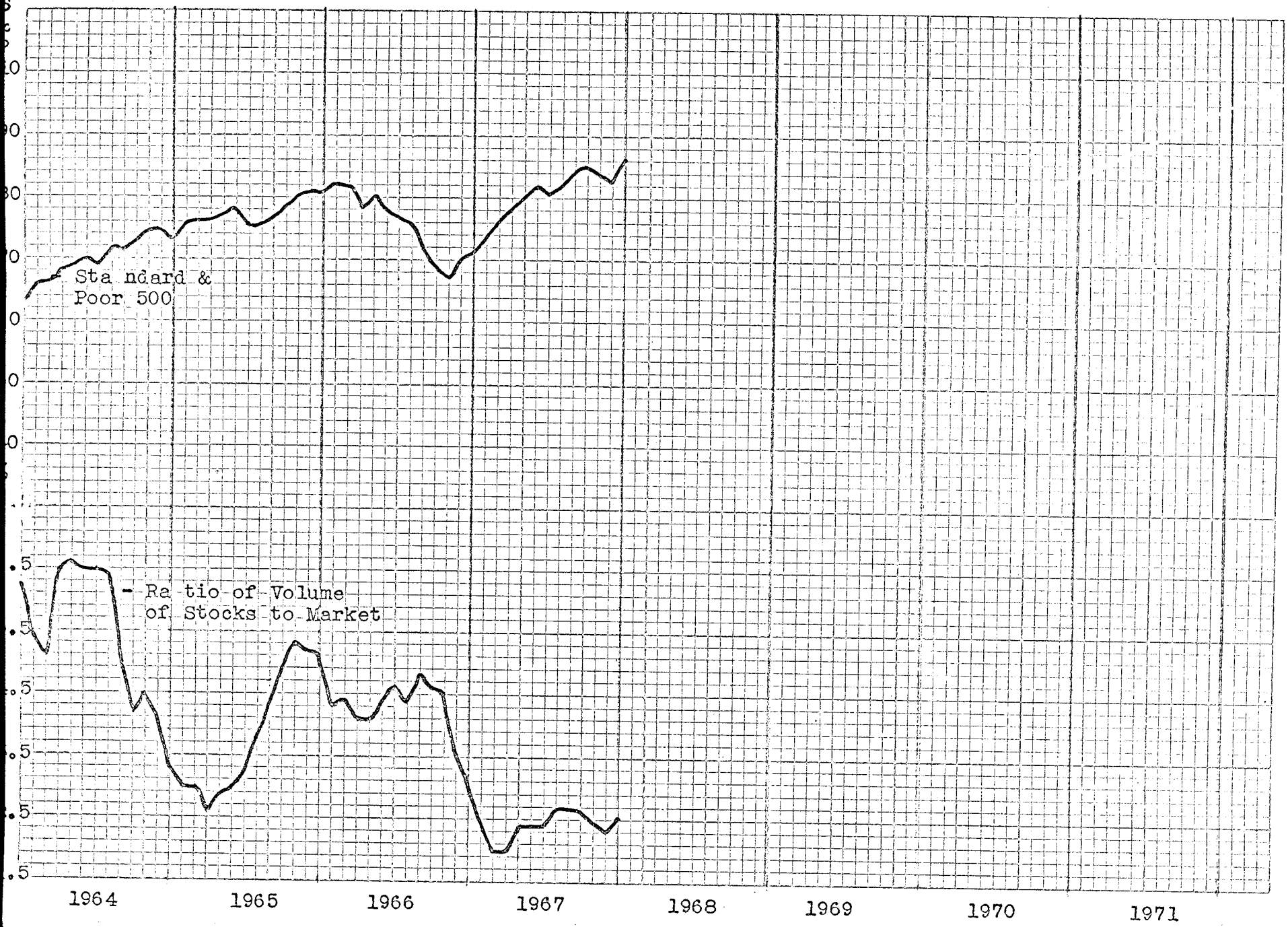


TABLE XX

Ratio of the Volume of the Ten Most Active Stocks to the Daily Volume of Shares Traded on the New York Stock Exchange

(figures are a 5 month moving average of the monthly data)

| | 1956 | 1959 | 1962 | 1965 |
|---|---|---|---|---|
| January | | 14.0 | 12.4 | 13.0 |
| February | | 13.9 | 12.5 | 13.0 |
| March | 12.8 | 13.9 | 12.2 | 12.6 |
| April | 12.9 | 14.2 | 11.9 | 12.9 |
| May | 12.8 | 14.2 | 11.9 | 13.0 |
| June | 12.8 | 13.9 | 12.5 | 13.3 |
| July | 12.8 | 14.3 | 12.9 | 13.8 |
| August | 12.8 | 15.3 | 13.2 | 14.7 |
| September | 12.3 | 16.3 | 13.6 | 14.9 |
| October | 12.0 | 16.1 | 13.5 | 15.3 |
| November | 11.9 | 16.5 | 13.5 | 15.4 |
| December | 12.3 | 16.9 | 13.4 | 15.1 |
| | 1957 | 1960 | 1963 | 1966 |
| January | 12.7 | 16.0 | 13.5 | 14.3 |
| February | 13.5 | 15.0 | 13.4 | 14.4 |
| March | 13.7 | 15.0 | 13.3 | 14.14 |
| April | 13.7 | 15.0 | 13.2 | 14.12 |
| May | 13.9 | 14.3 | 13.2 | 14.39 |
| June | 13.2 | 14.2 | 13.4 | 14.60 |
| July | 13.3 | 14.2 | 14.3 | 14.39 |
| August | 13.3 | 13.9 | 15.8 | 14.80 |
| September | 13.6 | 13.2 | 16.7 | 14.62 |
| October | 13.5 | 13.2 | 16.9 | 14.05 |
| November | 13.3 | 12.8 | 17.0 | 13.51 |
| December | 14.0 | 13.3 | 16.3 | 13.15 |
| | 1958 | 1961 | 1964 | 1967 |
| January | 14.1 | 13.3 | 15.4 | 12.48 |
| February | 14.1 | 13.7 | 15.1 | 11.99 |
| March | 14.4 | 13.5 | 16.5 | 12.07 |
| April | 14.0 | 13.5 | 16.6 | 12.40 |
| May | 13.9 | 13.4 | 16.5 | 12.44 |
| June | 13.9 | 13.4 | 16.5 | 12.44 |
| July | 14.0 | 13.6 | 16.4 | 12.57 |
| August | 14.0 | 13.6 | 15.0 | 12.57 |
| September | 14.7 | 13.2 | 14.2 | 12.58 |
| October | 14.8 | 13.3 | 14.5 | 12.45 |
| November | 14.6 | 12.8 | 14.1 | 12.36 |
| December | 14.6 | 12.7 | 13.3 | 12.52 |

TABLE XXI

Ratio of the Volume of the Ten Most Active Stocks to the Daily Volume of Shares Traded on the New York Stock Exchange

(Figures are the monthly averages of the daily ratios)

| | 1956 | 1959 | 1962 | 1965 |
|---|---|---|---|---|
| January | 13.4 | 12.5 | 13.2 | 12.3 |
| February | 13.8 | 14.6 | 13.1 | 12.6 |
| March | 12.0 | 14.6 | 11.0 | 13.2 |
| April | 12.7 | 13.1 | 11.7 | 12.46 |
| May | 12.1 | 15.0 | 12.2 | 12.8 |
| June | 13.9 | 14.0 | 11.8 | 13.6 |
| July | 12.7 | 15.0 | 12.9 | 13.1 |
| August | 12.8 | 12.8 | 14.1 | 14.5 |
| September | 12.8 | 14.7 | 13.7 | 15.1 |
| October | 12.1 | 20.1 | 13.9 | 17.3 |
| November | 11.4 | 19.2 | 13.8 | 14.7 |
| December | 11.0 | 14.0 | 12.0 | 14.9 |
| | 1957 | 1960 | 1963 | 1966 |
| January | 12.5 | 14.5 | 14.3 | 14.8 |
| February | 14.8 | 17.1 | 13.3 | 13.8 |
| March | 14.1 | 15.4 | 14.4 | 13.2 |
| April | 15.1 | 14.3 | 13.1 | 15.5 |
| May | 12.3 | 14.0 | 11.6 | 13.5 |
| June | 12.6 | 14.3 | 14.0 | 14.7 |
| July | 14.2 | 13.5 | 13.2 | 15.2 |
| August | 15.4 | 15.0 | 15.3 | 14.2 |
| September | 11.7 | 14.3 | 17.7 | 14.5 |
| October | 12.7 | 12.6 | 19.1 | 15.5 |
| November | 14.3 | 11.0 | 18.4 | 13.8 |
| December | 13.4 | 13.3 | 14.4 | 12.3 |
| | 1958 | 1961 | 1964 | 1967 |
| January | 14.8 | 13.0 | 15.7 | 11.5 |
| February | 14.8 | 13.7 | 13.9 | 12.7 |
| March | 13.5 | 15.8 | 14.7 | 12.8 |
| April | 14.3 | 12.9 | 16.8 | 11.4 |
| May | 14.8 | 12.5 | 21.7 | 12.7 |
| June | 13.0 | 13.0 | 16.3 | 13.2 |
| July | 14.2 | 13.1 | 13.2 | 12.9 |
| August | 13.4 | 15.9 | 14.5 | 12.2 |
| September | 14.7 | 13.7 | 16.2 | 12.0 |
| October | 17.7 | 12.5 | 14.8 | 12.7 |
| November | 13.7 | 10.9 | 12.2 | 13.2 |
| December | 14.7 | 13.8 | 14.8 | 12.3 |
| | | | | 11.7) |
| | | | | 12.8) |

Source: Barron's Weekly

Extrapolated

## TEST V: VOLUME OF TRADING

The index was calculated from the monthly average of the daily volume of shares traded on the New York Stock Exchange (N.Y.S.E.). The monthly figures were subjected to a five month moving average to smooth the series. The last two months of the moving average data were extrapolated to the current period. The data for these averages is located in Tables XXII and XXIII.

The control measure is a buy and hold of the S. and P. 500 from January 1, 1956 to December 31, 1966. The profit on the control is:

| | |
|---|---|
| S. and P. 500 - December 31, 1966 | 81.33 pts |
| less S. and P. 500 - January 1, 1956 | 45.48 |
| | 35.85 pts |

By the use of a visual comparison of the volume of shares traded, as related to the peaks and troughs of the S. and P. 500 index; two situations were formed for testing the Volume of Trading Index.

Situation I

A purchase is made when the volume of trading is .6 million above the lowest observable level since the last sale. A sale is made when the volume of trading is .6 million below the highest observable level since the last purchase.

SITUATION I (.6 million differential)

A - Investment in the Market (Dates are the end of month)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| June 58 | 44.75 + .45 = 45.20 | Aug. 59 | 59.40 - .59 = 58.81 | 13.61 |
| Feb. 61 | 62.17 + .62 = 62.79 | Aug. 61 | 67.79 - .68 = 67.11 | 4.32 |
| June 62 | 55.63 + .56 = 56.19 | May. 66 | 86.78 - .87 = 85.91 | 29.72 |
| | | | Total | 47.65 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to June 58 | 30/12 | 45.48 | 3.51 - 3.50 = | .01 | (negligible) |
| Aug. 59 to Feb. 61 | 18/12 | 58.81 | 4.60 - 3.08 = | 1.52 | 1.29 |
| Aug. 61 to June 62 | 10/12 | 67.11 | 4.53 - 3.35 = | 1.18 | .67 |
| May 66 to Dec. 66 | 7/12 | 85.91 | 5.37 - 3.68 = | 1.69 | .86 |
| | | | | Total | 2.82 |

Total profit from Situation I is A + B 50.47 points

Control Investment is 35.85

Improvement is 14.62/35.85 X 100 = 40.78% better

Situation II

Same as Situation I with the exception that the differential is .4 million shares rather than .6 million.

SITUATION II (.4 million differential)

A - Investment in the Market

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Dec. 57 | 40.33 + .40 = 40.73 | June 59 | 57.46 - .57 = 56.89 | 16.16 |
| Jan. 61 | 57.92 + .60 = 58.52 | July 61 | 65.44 - .65 = 64.79 | 6.27 |
| Dec. 61 | 71.74 + .72 = 72.46 | Oct. 62 | 56.17 - .56 = 55.61 | (16.85) |
| Jan. 63 | 65.06 + .65 = 65.71 | July 64 | 83.22 - .83 = 82.39 | 16.68 |
| Jan. 65 | 86.12 + .86 = 86.99 | May 66 | 86.78 - .87 = 85.92 | (1.07) |
| | | | Total | 21.19 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Dec. 57 | 24/12 | 45.85 | 3.68 - 4.03 = | (.35) | (.31) |
| June 59 to Jan. 61 | 19/12 | 56.89 | 4.55 - 3.16 = | 1.39 | 1.25 |
| July 61 to Dec. 61 | 5/12 | 64.79 | 4.58 - 3.20 = | 1.39 | .40 |
| Oct. 62 to Jan. 63 | 3/12 | 55.61 | 4.42 - 3.45 = | .97 | .11 |
| July 64 to Jan. 65 | 6/12 | 82.39 | 4.53 - 2.93 = | 1.60 | .66 |
| | | | | Total | 2.11 |

Total profit from Situation II is A + B 23.30 points

Improvement is 12.55/35.85 X 100 = 35.0% worse

Conclusion:

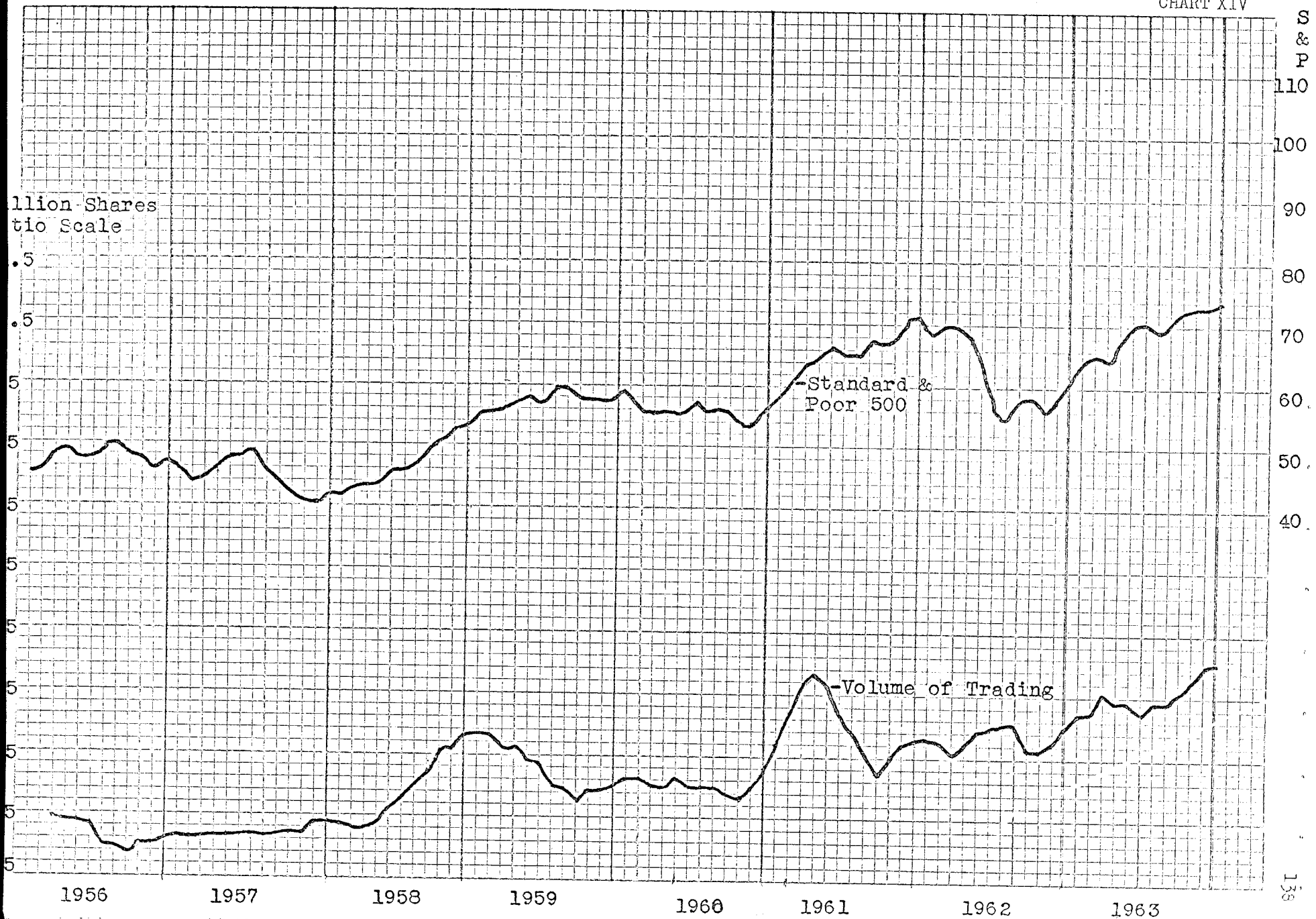
Situation I improved the investment performance by 38.4%. It was therefore decided to accept Situation I as criteria, and also to use the indicator as such in the Composite index.

The criteria for use of the index are restated:

1. An indication to purchase is given when the volume of trading is .6 million above the lowest observable level since the last sale.
2. An indication to sell is given when the volume of trading is .6 million below the highest observable level since the last purchase.

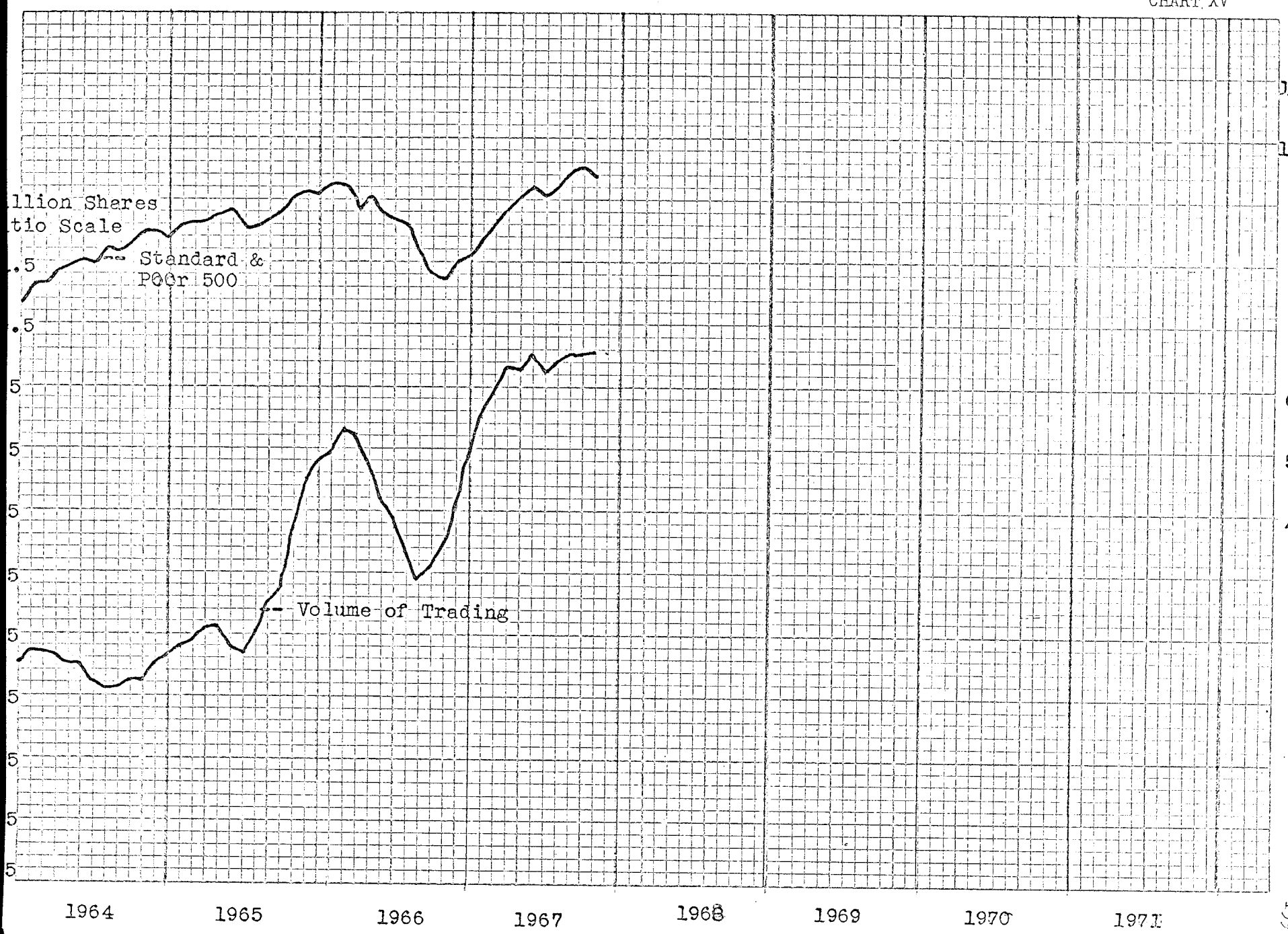
Stock Prices and Volume of Trading

CHART XIV



Stock Prices and Volume of Trading

CHART XV



# TABLE XXII

## AVERAGE DAILY VOLUME ON THE NEW YORK STOCK EXCHANGE

5 month moving average

(000's shares)

| | 1956 | 1959 | 1962 | 1965 |
|---|---|---|---|---|
| January | | 3,866 | 3,801 | 5,290 |
| February | | 3,824 | 3,761 | 5,439 |
| March | 2,492 | 3,690 | 3,535 | 5,595 |
| April | 2,435 | 3,641 | 3,721 | 5,670 |
| May | 2,369 | 3,433 | 3,940 | 5,299 |
| June | 2,180 | 3,385 | 3,949 | 5,206 |
| July | 2,057 | 3,086 | 4,001 | 5,552 |
| August | 1,923 | 2,944 | 4,009 | 6,011 |
| September | 2,005 | 2,826 | 3,685 | 6,318 |
| October | 2,059 | 2,920 | 3,692 | 7,245 |
| November | 2,063 | 2,933 | 3,796 | 8,039 |
| December | 2,109 | 3,087 | 4,037 | 8,309 |
| | 1957 | 1960 | 1963 | 1966 |
| January | 2,113 | 3,144 | 4,209 | 8,413 |
| February | 2,102 | 3,157 | 4,236 | 8,803 |
| March | 2,126 | 3,051 | 4,529 | 8,698 |
| April | 2,115 | 3,049 | 4,437 | 8,190 |
| May | 2,123 | 3,106 | 4,427 | 7,638 |
| June | 2,165 | 3,040 | 4,287 | 7,386 |
| July | 2,203 | 3,036 | 4,405 | 6,868 |
| August | 2,112 | 3,043 | 4,457 | 6,435 |
| September | 2,190 | 2,905 | 4,565 | 6,616 |
| October | 2,253 | 2,830 | 4,717 | 6,993 |
| November | 2,333 | 3,028 | 4,965 | 7,557 |
| December | 2,405 | 3,309 | 5,056 | 8,371 |
| | 1958 | 1961 | 1964 | 1967 |
| January | 2,442 | 3,704 | 5,273 | 9,014 |
| February | 2,332 | 4,260 | 5,281 | 9,432 |
| March | 2,303 | 4,659 | 5,189 | 9,842 |
| April | 2,300 | 4,845 | 5,003 | 9,799 |
| May | 2,385 | 4,661 | 5,008 | 10,010 |
| June | 2,616 | 4,293 | 4,706 | 9,772 |
| July | 2,765 | 3,929 | 4,628 | 9,940 |
| August | 2,971 | 3,550 | 4,605 | 10,060 |
| September | 3,282 | 3,291 | 4,716 | 10,180 |
| October | 3,569 | 3,503 | 4,729 | 10,130 |
| November | 3,660 | 3,718 | 5,037 | 10,440) |
| December | 3,859 | 3,744 | 5,173 | 10,510) |

) Extrapolated

Source: Federal Reserve Bulletin

TABLE XXIII

AVERAGE DAILY VOLUME ON THE
NEW YORK STOCK EXCHANGE
(000's shares)

| | 1956 | 1959 | 1962 | 1965 |
|---|---|---|---|---|
| January | 2,247 | 3,964 | 3,677 | 5,457 |
| February | 2,320 | 3,463 | 3,481 | 5,910 |
| March | 2,874 | 3,926 | 3,113 | 5,427 |
| April | 2,576 | 3,449 | 3,263 | 5,673 |
| May | 2,420 | 3,379 | 5,045 | 5,510 |
| June | 1,771 | 2,925 | 4,770 | 5,828 |
| July | 2,177 | 3,222 | 3,532 | 4,056 |
| August | 1,936 | 2,431 | 3,368 | 4,962 |
| September | 1,959 | 2,739 | 3,310 | 7,403 |
| October | 1,754 | 2,788 | 3,423 | 7,809 |
| November | 2,178 | 3,398 | 4,803 | 7,360 |
| December | 2,443 | 3,284 | 4,048 | 8,690 |
| | 1957 | 1960 | 1963 | 1966 |
| January | 2,189 | 3,197 | 4,573 | 8,935 |
| February | 1,978 | 3,027 | 4,168 | 8,753 |
| March | 1,698 | 2,857 | 3,561 | 8,327 |
| April | 2,300 | 2,865 | 5,072 | 9,310 |
| May | 2,389 | 3,277 | 4,781 | 8,165 |
| June | 2,224 | 3,479 | 4,528 | 6,393 |
| July | 2,194 | 2,694 | 3,467 | 5,997 |
| August | 1,882 | 2,841 | 4,154 | 7,064 |
| September | 1,844 | 2,898 | 5,331 | 5,722 |
| October | 2,782 | 2,592 | 5,316 | 7,000 |
| November | 2,538 | 3,100 | 5,294 | 7,297 |
| December | 2,594 | 3,684 | 4,701 | 7,883 |
| | 1958 | 1961 | 1964 | 1967 |
| January | 2,267 | 4,243 | 5,302 | 9,885 |
| February | 2,010 | 4,884 | 4,639 | 9,788 |
| March | 2,223 | 5,365 | 5,428 | 10,217 |
| April | 2,395 | 5,089 | 5,616 | 9,389 |
| May | 2,580 | 4,617 | 4,959 | 9,933 |
| June | 2,696 | 3,324 | 4,372 | 9,666 |
| July | 3,159 | 3,045 | 4,663 | 10,834 |
| August | 2,970 | 3,545 | 3,919 | 9,037 |
| September | 3,427 | 3,193 | 5,228 | 10,251 |
| October | 4,134 | 3,318 | 4,843 | 10,223 |
| November | 4.131 | 4.390 | 4,928 | 10,578 |
| December | 3,615 | 4,120 | 4,729 | |

Source: Federal Reserve Bulletin

## TEST VI: ODD LOT SALES TO ODD LOT PURCHASES

A modified form of G. A. Drew's odd lot sales to purchase ratio was calculated. Drew used a ten day moving average of the daily odd lot sales to purchases. In this analysis, a three month moving average was calculated on the ratio formed from the monthly figures of odd lot sales and odd lot purchases. The index thus formed was plotted on Charts XVI and XVII against the S. and P. 500, and is recorded in Table XXIV.

As in the method used for the other index series, two situations are construed for testing, to enable us to evaluate the worth of the index and its criteria for our forecast.

Situation I

When the value of the index on the upside reaches .95 per cent, a purchase is indicated.

When the value of the index on the downside reaches .90 per cent, a sale is indicated.

SITUATION I

A - Investment in the Market (End of month dates)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Mar. 58 | 42.11 + .42 = 42.53 | Apr. 59 | 57.10 - .57 = 57.67 | 15.14 |
| Dec. 60 | 56.80 + .56 = 57.36 | Feb. 62 | 70.22 - .70 = 70.92 | 13.56 |
| July 62 | 56.97 + .57 = 57.54 | Dec. 65 | 91.73 - .92 = 92.65 | 35.11 |
| Oct. 66 | 77.13 + .77 = 77.90 | Dec. 66 | 81.33 - .81 = 82.14 | 4.24 |
| | | | Total | 68.05 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Mar. 58 | 27/12 | 45.48 | 3.55 - 3.90 = | (.35) | (.36) |
| Apr. 59 to Dec. 60 | 8/12 | 57.67 | 4.45 - 3.26 = | 1.19 | .46 |
| Feb. 62 to July 62 | 5/12 | 70.92 | 4.54 - 3.34 = | 1.20 | .35 |
| Dec. 65 to Oct. 66 | 10/12 | 92.65 | 5.21 - 3.35 = | 1.86 | 1.48 |
| | | | | Total | 1.93 |

Total profit from Situation I is A + B 69.98 points

Control investment is 35.85

Improvement is 34.13/35.85 X 100 = 95.20% better

Situation II

When the value of the index on the upside reaches .95 per cent, a purchase is indicated.

When the value of the index on the downside reaches .87 per cent, a sale is indicated.

## SITUATION II

A - Investment in the Market (End of month dates)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Mar. 58 | 42.11 + .42 = 42.53 | May 59 | 57.96 - .58 = 57.38 | 14.85 |
| Dec. 60 | 56.80 + .56 = 57.36 | Mar. 62 | 70.29 - .70 = 69.59 | 12.23 |
| July 62 | 56.97 + .57 = 57.54 | Jan. 66 | 93.22 - .93 = 92.29 | 34.75 |
| Oct. 66 | 77.13 + .77 = 77.90 | Dec. 66 | 81.33 - .81 = 82.14 | 4.24 |
| | | | Total | 66.07 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Mar. 58 | 28/12 | 45.48 | 3.55 - 3.90 = | (.25) | (.27) |
| May 59 to Dec. 60 | 8/12 | 57.38 | 4.42 - 3.35 = | 1.07 | .40 |
| Mar. 62 to July 62 | 5/12 | 69.59 | 4.52 - 3.31 = | 1.31 | .35 |
| Jan. 66 to Oct. 66 | 9/12 | 92.29 | 5.23 - 3.57 = | 1.66 | .65 |
| | | | | Total | 1.12 |

Total profit from Situation II is A + B 67.19 points

Control investment is 35.85

Improvement is 31.34/35.85 X 100 = 87.41% better

Conclusion:

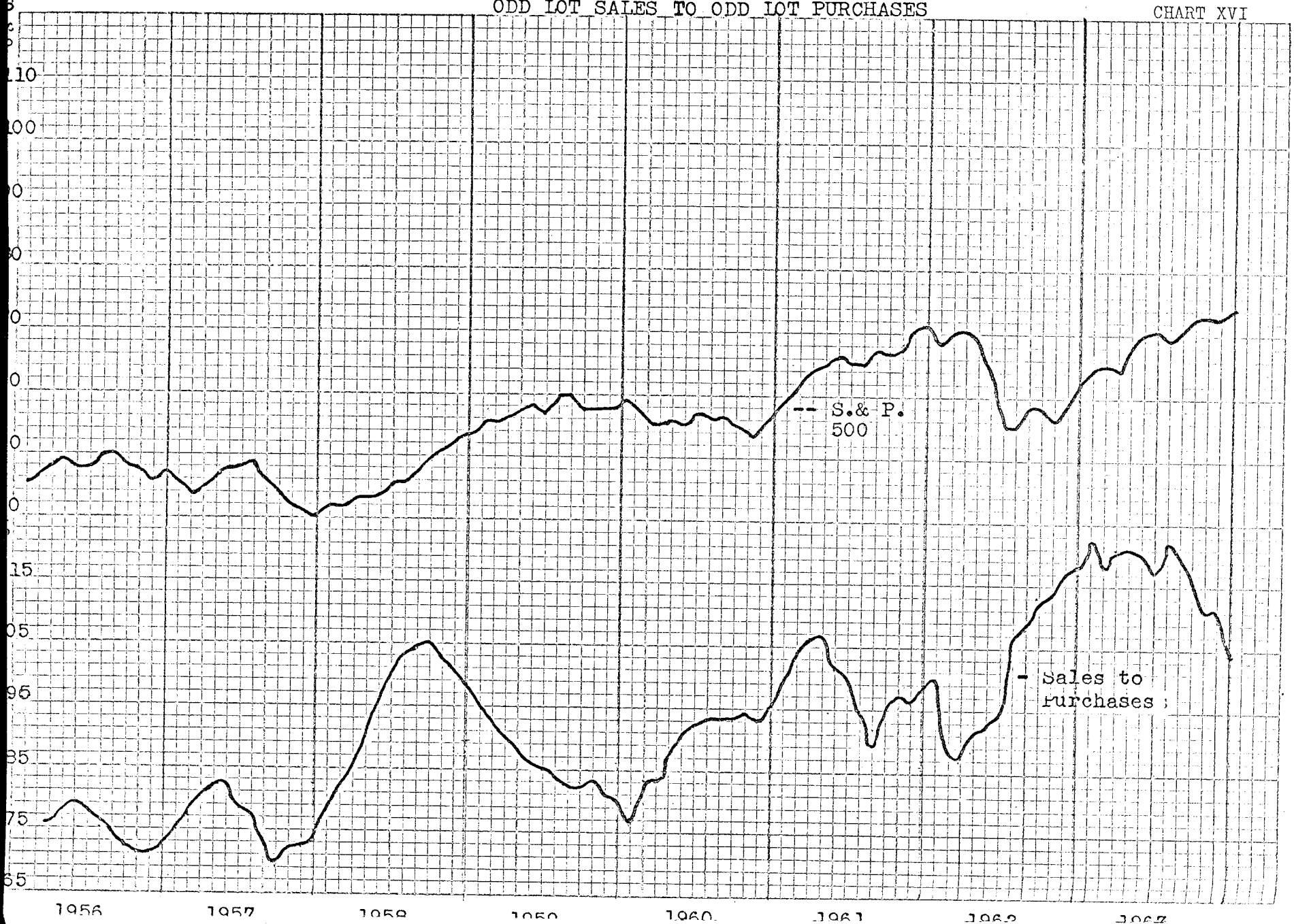
As Situation I represented the best performance, it was accepted as the indicator for Odd Lot Sales to Odd Lot Purchases.

The criteria for use of the index are restated as follows:

1. When the value of the index on the upside reaches .95 per cent, a purchase is indicated.
2. When the value of the index on the downside reaches .90 per cent, a sale is indicated.

ODD LOT SALES TO ODD LOT PURCHASES

CHART XVI



ODD LOT SALES T O ODD LOT PURCHASES

CHART XVII

TABLE XXIV

ODD LOT SALES TO PURCHASE RATIO

| | 1956 | 1959 | 1962 | 1965 |
|---|---|---|---|---|
| January | | .95 | 1.00 | 1.06 |
| February | | .93 | .88 | 1.03 |
| March | .76 | .90 | .87 | 1.07 |
| April | .78 | .88 | .91 | 1.07 |
| May | .79 | .86 | .92 | 1.04 |
| June | .78 | .85 | .94 | .98 |
| July | .75 | .84 | 1.06 | .98 |
| August | .75 | .82 | 1.08 | .97 |
| September | .72 | .82 | 1.12 | .97 |
| October | .71 | .83 | 1.13 | .95 |
| November | .71 | .81 | 1.17 | .94 |
| December | .72 | .80 | 1.18 | .90 |
| | 1957 | 1960 | 1963 | 1966 |
| January | .75 | .76 | 1.22 | .87 |
| February | .77 | .83 | 1.18 | .86 |
| March | .80 | .83 | 1.21 | .90 |
| April | .82 | .87 | 1.21 | .93 |
| May | .82 | .90 | 1.20 | .93 |
| June | .78 | .92 | 1.17 | .92 |
| July | .77 | .93 | 1.22 | .88 |
| August | .73 | .93 | 1.20 | .84 |
| September | .69 | .93 | 1.16 | .88 |
| October | .72 | .94 | 1.11 | .99 |
| November | .72 | .93 | 1.11 | 1.11 |
| December | .74 | .95 | 1.04 | 1.10 |
| | 1958 | 1961 | 1964 | 1967 |
| January | .78 | .99 | 1.01 | |
| February | .82 | 1.02 | 1.01 | |
| March | .85 | 1.06 | 1.05 | |
| April | .91 | 1.06 | 1.03 | |
| May | .96 | 1.01 | 1.07 | |
| June | 1.00 | 1.00 | 1.05 | |
| July | 1.03 | .95 | 1.04 | |
| August | 1.04 | .89 | 1.01 | |
| September | 1.05 | .94 | 1.05 | |
| October | 1.03 | .97 | 1.00 | |
| November | 1.00 | .96 | 1.01 | |
| December | .98 | .98 | 1.03 | |

Data Source: Barrons' Weekly, Three month moving average

## TEST VII: NET PURCHASES AND NET SALES ON ODD LOTS

The index was formed from the odd lot statistics of volume of purchases and sales that are recorded in Barron's Weekly. Monthly net figures of the algebraic total of purchases and sales are the data plotted in the index. The positive figures represent purchases and the negative figures represent sales. A central line was formed at the value of zero, and the positive data (net purchases) were plotted above, and the negative data (net sales) were plotted below.

As stated in Chapter IV, the logic of forecast is based on the fact that the odd lotter usually is acting against the trend of the market at turning points. He proportionately buys more at the top of the cycle, and proportionately less at the bottom.

To establish criteria for a forecast with this index, two situations were formed and tested against the control, a buy and hold decision.

### Situation I

When the value of the index on the upside exceeds 1.8 million shares the S. & P. averages are sold.

When the value of the index on the downside proceeds below .8 million shares, the averages are bought.

## SITUATION I

A - Investment in the Market

(Dates are the end of month)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| April 57 | 45.05 + .45 = 45.50 | Oct. 57 | 41.24 - .41 = 40.83 | (4.67) |
| Nov. 57 | 40.35 + .40 = 40.75 | Jan. 60 | 58.03 - .58 = 57.45 | 16.70 |
| Apr. 60 | 55.73 + .55 = 56.28 | Apr. 62 | 68.05 - .68 = 67.37 | 11.09 |
| July 62 | 56.97 + .57 = 57.54 | June 65 | 85.04 - .86 = 84.18 | 26.64 |
| July 65 | 84.91 + .85 = 85.76 | Jan. 66 | 93.22 - .93 = 92.29 | 6.53 |
| | | | Total | 56.29 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Apr. 57 | 16/12 | 45.48 | 3.57 - 3.62 = | .05 | (negligible) |
| Oct. 57 to Nov. 57 | 1/12 | 40.83 | 4.33 - 4.47 = | .14 | (negligible) |
| Jan. 60 to Apr. 60 | 3/12 | 57.45 | 4.67 - 3.46 = | 1.21 | .17 |
| Apr. 62 to July 62 | 3/12 | 67.37 | 4.49 - 3.72 = | .77 | .14 |
| June 65 to July 65 | 1/12 | 84.18 | 4.60 - 3.10 = | 1.50 | .08 |
| Jan. 66 to Dec. 66 | 11/12 | 92.29 | 5.24 - 3.57 = | 1.67 | 1.38 |
| | | | | Total | 1.77 |

Total profit from Situation I is A + B 58.06 points

Control investment is 35.85

Improvement is 22.21/35.85 X 100 = 61.95% better

Situation II

When the value of the index on the upside exceeds 1 million shares, the S. and P. averages are sold.

When the value of the index on the downside proceeds below 200,000 shares, the S. and P. averages are bought.

## SITUATION II

A - Investment in the Market (Dates are end of month)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| May 58 | 43.70 + .44 = 44.14 | Feb. 59 | 54.77 - .55 = 54.22 | 10.08 |
| May 59 | 56.15 + .56 = 56.71 | Apr. 59 | 57.10 - .57 = 56.53 | (.18) |
| Apr. 60 | 55.73 + .56 = 56.29 | July 60 | 55.84 - .56 = 55.28 | (1.01) |
| Dec. 60 | 56.80 + .57 = 57.37 | Apr. 62 | 68.05 - .68 = 67.37 | 10.00 |
| July 62 | 56.97 + .57 = 57.54 | June 65 | 85.04 - .85 = 84.19 | 26.65 |
| Aug. 65 | 86.49 + .86 = 87.35 | Jan. 66 | 93.22 - .93 = 92.29 | 4.94 |
| | | | Total | 50.48 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to May 58 | 29/12 | 45.48 | 3.57 - 3.70 = | (.13) | (.14) |
| Feb. 59 to Mar. 59 | 1/12 | 54.22 | 4.30 - 3.35 = | .05 | (negligible) |
| Apr. 59 to Apr. 60 | 12/12 | 56.53 | 4.50 - 3.46 = | 1.04 | .57 |
| July 60 to Dec. 60 | 5/12 | 55.28 | 4.60 - 3.39 = | 1.21 | .28 |
| Apr. 62 to July 62 | 3/12 | 67.37 | 4.49 - 3.72 = | .77 | .14 |
| June 65 to Aug. 65 | 2/12 | 84.19 | 4.60 - 3.10 = | 1.50 | .17 |
| Jan. 66 to Dec. 66 | 11/12 | 92.29 | 5.24 - 3.57 = | 1.67 | 1.38 |
| | | | | Total | 2.40 |

Total profit from Situation II is A + B 52.88 points

Control investment is 35.85

Improvement is 52.88/35.85 X 100 = 47.50% better

Conclusion:

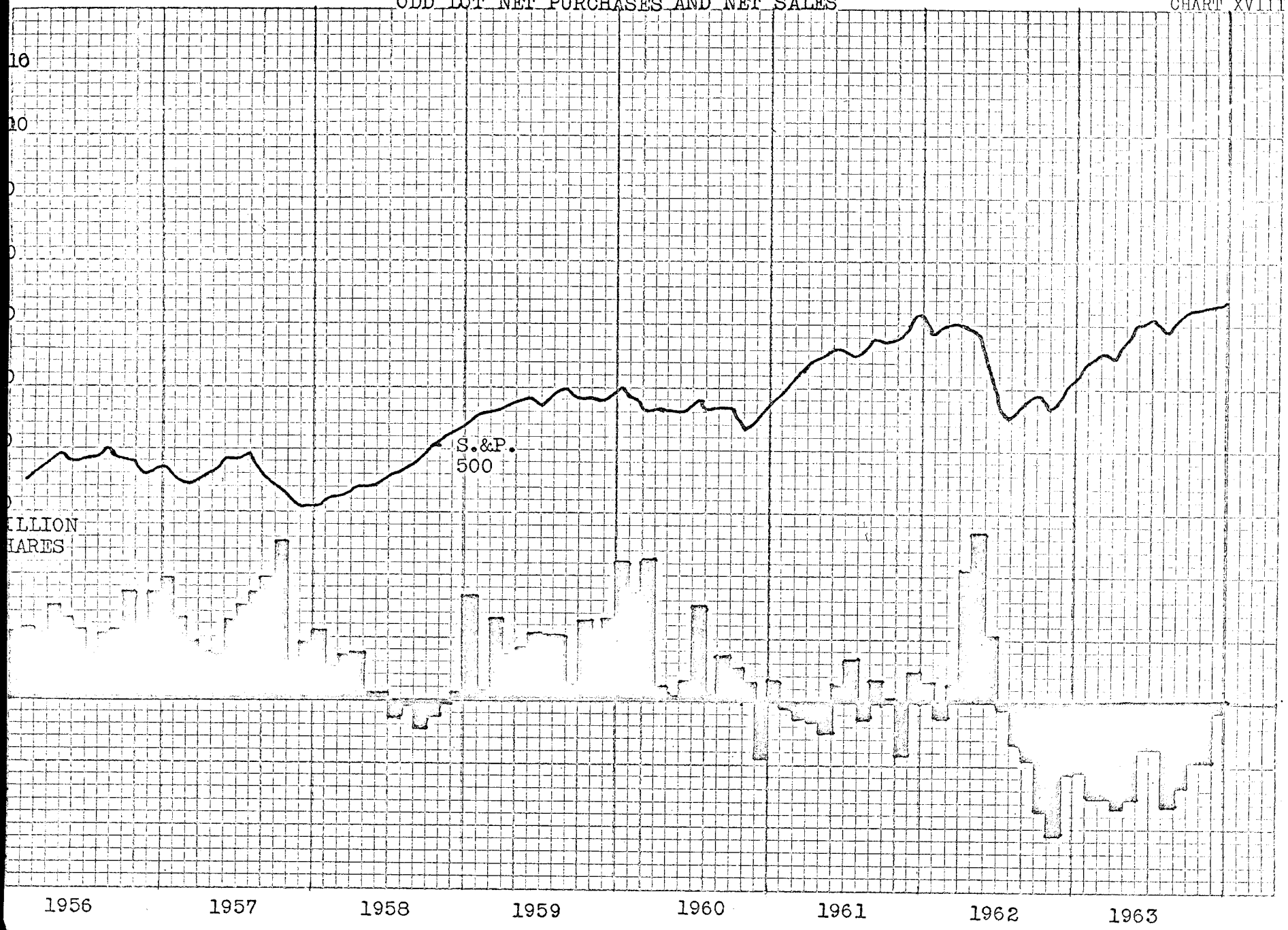
The results of the tests indicate that either situation represents better results than the control. Situation I (61.95 per cent better) was chosen as the index criteria for Net Purchases and Net Sales of Odd Lots.

The criteria for use of the index are restated:

1. When the value of the index on the upside exceeds 1.8 million shares, the S. and P. averages are sold.
2. When the value of the index on the downside proceeds below .8 million shares, the averages are bought.

# ODD LOT NET PURCHASES AND NET SALES

CHART XVIII



ODD LOT NET PURCHASES AND NET SALES

CHART XIX

TABLE XXV

ODD LOT NET PURCHASES AND NET SALES

(monthly data)

Net purchases = +
Net sales = -

(000's)

| | 1956 | 1959 | 1962 | 1965 |
|---|---|---|---|---|
| January | 1103 | 1632 | 163 | 215 |
| February | 1185 | 191 | -238 | -313 |
| March | 1020 | 1364 | 363 | -804 |
| April | 1470 | 787 | 2150 | -505 |
| May | 1297 | 821 | 2717 | -544 |
| June | 1068 | 1063 | 1070 | 1371 |
| July | 768 | 1041 | -177 | 206 |
| August | 1018 | 1022 | -664 | -932 |
| September | 1117 | 2227 | -870 | -1103 |
| October | 1741 | 1297 | -1744 | -546 |
| November | 1341 | 1196 | -2123 | -77 |
| December | 1670 | 1323 | -1061 | +741 |
| | 1957 | 1960 | 1963 | 1966 |
| January | 1994 | 2325 | -1197 | 1260 |
| February | 1254 | 1724 | -1535 | 2131 |
| March | 850 | 2284 | -1499 | 1190 |
| April | 752 | 214 | -1616 | 913 |
| May | 675 | 46 | -1470 | 1260 |
| June | 1225 | 378 | -684 | 870 |
| July | 1492 | 1585 | -679 | 826 |
| August | 1780 | 85 | -1602 | 2183 |
| September | 1910 | 688 | -1273 | 2099 |
| October | 2444 | 574 | -825 | 1881 |
| November | 584 | 273 | -958 | -266 |
| December | 993 | -975 | -128 | -2243 |
| | 1958 | 1961 | 1964 | 1967 |
| January | 1048 | 398 | -125 | |
| February | 414 | -168 | -180 | |
| March | 760 | -227 | -52 | |
| April | 692 | -379 | -127 | |
| May | 92 | -480 | -590 | |
| June | 87 | +372 | +127 | |
| July | -382 | 613 | -270 | |
| August | -135 | -362 | -242 | |
| September | -460 | +346 | -410 | |
| October | -289 | +6 | +145 | |
| November | -19 | -857 | -355 | |
| December | +103 | 451 | -520 | |

Data Source: Barrons' Weekly, End of Month

## TEST VIII: THE ODL LOT SHORT SALES INDEX

The index was calculated as a modification of G. A. Drew's method. Drew used a daily calculation of the ratio of odd lot shorts to odd lot sales, and then subjected this ratio to a ten day moving average. The writer used the ratio of the odd lot short sales to total odd lot sales for the month, and then performed a three month moving average. This formed the index that is plotted on Charts XX and XXI, and recorded in Table XXVI. The index was then tested in the same manner as the other indexes, and criteria were established for its forecast.

By visual comparison to the S. and P. 500 two situations were construed for testing against the control.

### Situation I

When the value of the index on the upside reaches 1.5 per cent, a sale is indicated.

When the value of the index on the downside reaches 1.8 per cent, a purchase is indicated.

## SITUATION I

A - Investment in the Market (Dates are the end of month)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Apr. 58 | 42.34 + .42 = 42.76 | Apr. 62 | 68.05 - .68 = 67.37 | 24.61 |
| Nov. 62 | 60.04 + .60 = 60.64 | Mar. 66 | 88.88 - .88 = 88.00 | 27.36 |
| | | | Total | 51.97 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Apr. 58 | 28/12 | 45.48 | 3.54 - 3.70 = | (.16) | (.14) |
| Apr. 62 to Nov. 62 | 7/12 | 67.37 | 4.43 - 3.15 = | 1.28 | .54 |
| Mar. 66 to Dec. 66 | 8/12 | 88.00 | 5.34 - 3.68 = | 1.66 | .97 |
| | | | | Total | 1.37 |

Total profit from Situation I is A + B 53.34 points

Control investment is 35.85

Improvement is 17.49/35.85 X 100 = 48.78% better

Situation II

When the value of the index on the upside reaches 1.3 per cent, a sale is indicated.

When the value of the index on the downside reaches 2 per cent, a purchase is indicated.

## SITUATION II

A - Investment in the Market (Dates are the end of month)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Feb. 58 | 41.26 + .41 = 41.67 | Feb. 62 | 70.22 - .70 = 69.52 | 27.85 |
| Dec. 62 | 62.64 + .63 = 63.27 | June 66 | 86.06 - .86 = 85.20 | 21.93 |
| | | | Total | 49.78 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Feb. 58 | 26/12 | 45.48 | 3.54 - 3.70 = | (.16) | (.14) |
| Feb. 62 to Dec. 62 | 10/12 | 69.52 | 4.43 - 3.15 = | 1.28 | .76 |
| June 66 to Dec. 66 | 6/12 | 85.20 | 5.45 - 3.68 = | 1.77 | .77 |
| | | | | Total | 1.39 |

Total profit from Situation II is A + B 51.17 points

Control investment is 35.85

Improvement is 15.32/35.85 X 100 = 42.73% better

Conclusion:

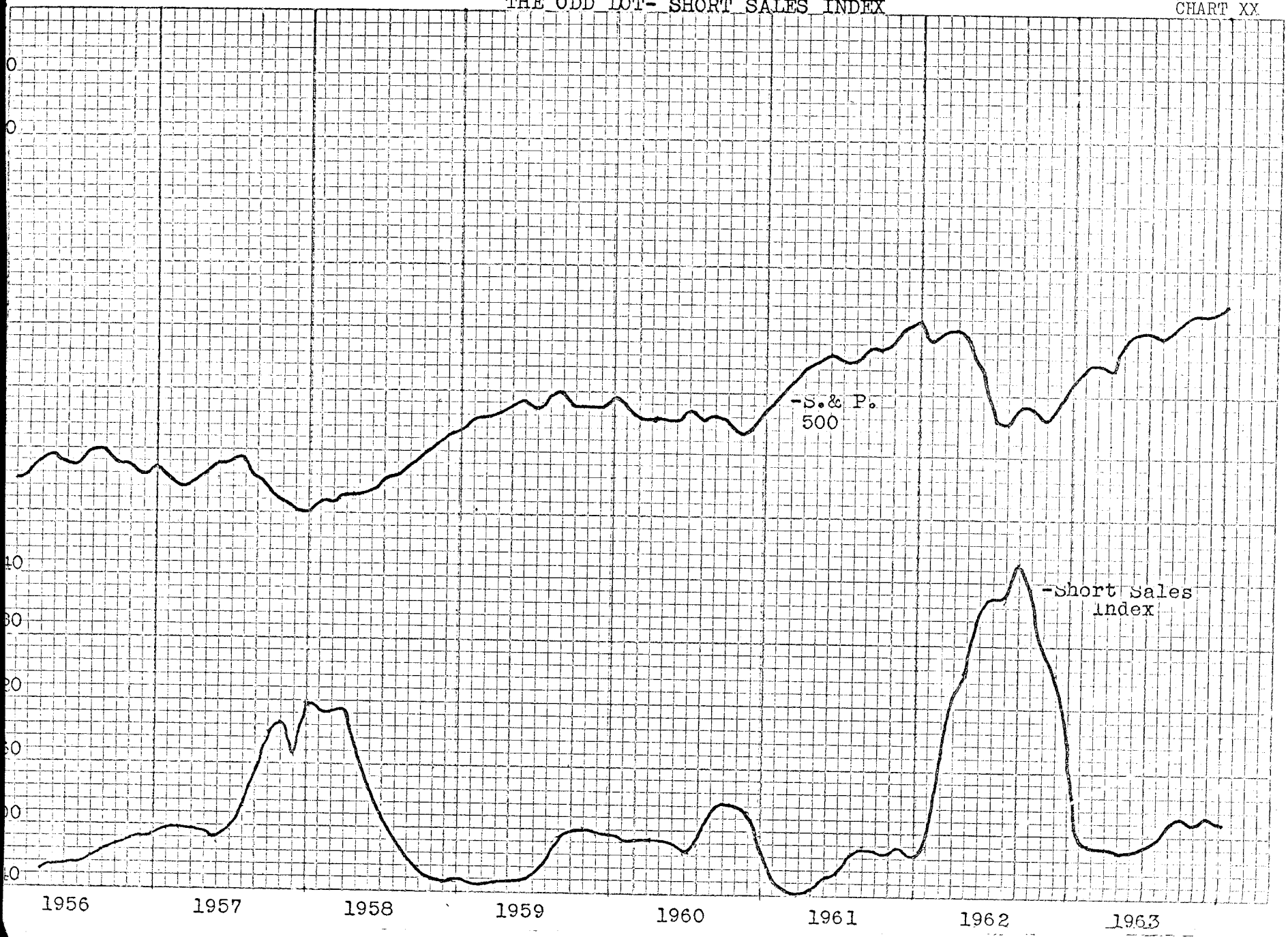
On the basis of the results of these tests, Situation I was accepted as the indicator and criteria selected for the Odd Lot Short Sales Index.

The criteria for use of the index are restated:

1. When the value of the index on the upside reaches 1.5 per cent, a sale is indicated.
2. When the value of the index on the downside reaches 1.8 per cent, a purchase is indicated.

# THE ODD LOT- SHORT SALES INDEX

CHART XX



THE ODD LOT SHORT SALES INDEX

CHART XXI

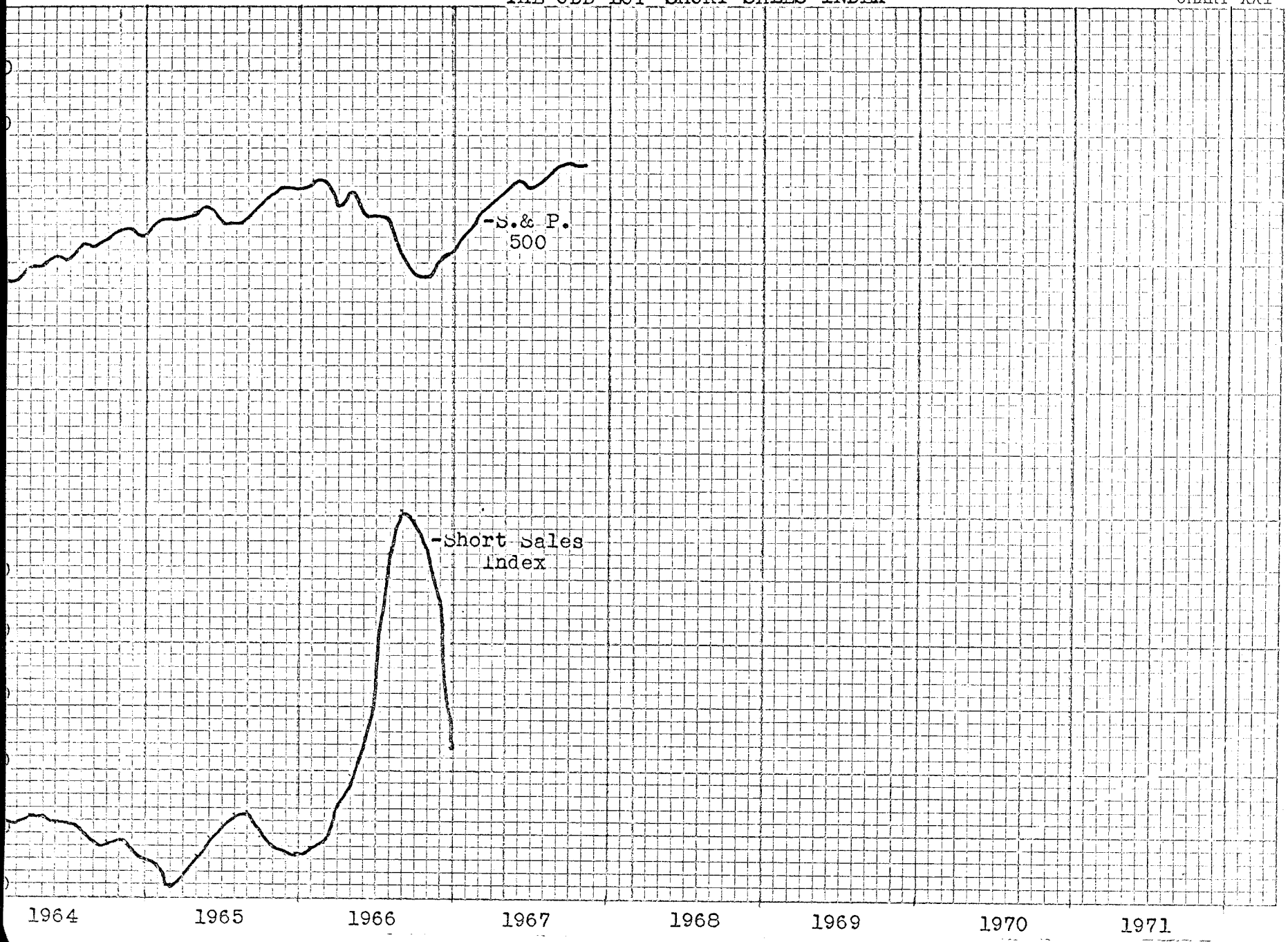


TABLE XXVI

ODD LOT SHORTS TO VOLUME RATIO (Sales)

3 month moving average

| | 1956 | 1959 | 1962 | 1965 |
|---|---|---|---|---|
| January | | .48 | .85 | .66 |
| February | | .45 | 1.70 | .48 |
| March | .56 | .46 | 2.25 | .53 |
| April | .58 | .49 | 2.57 | .81 |
| May | .60 | .47 | 3.11 | .98 |
| June | .61 | .54 | 3.27 | 1.08 |
| July | .66 | .69 | 3.24 | 1.17 |
| August | .73 | .92 | 3.59 | 1.19 |
| September | .79 | .98 | 3.33 | .97 |
| October | .83 | 1.00 | 2.79 | .83 |
| November | .83 | .94 | 2.54 | .79 |
| December | .90 | .93 | 1.87 | .77 |
| | 1957 | 1960 | 1963 | 1966 |
| January | .95 | .81 | .96 | .86 |
| February | .96 | .83 | .87 | .91 |
| March | .97 | .87 | .87 | 1.26 |
| April | .92 | .88 | .85 | 1.45 |
| May | .84 | .80 | .86 | 1.81 |
| June | .96 | .74 | .88 | 2.42 |
| July | 1.19 | .84 | .94 | 3.67 |
| August | 1.50 | 1.13 | 1.06 | 4.03 |
| September | 1.88 | 1.25 | 1.18 | 3.97 |
| October | 1.99 | 1.24 | 1.12 | 3.68 |
| November | 1.67 | 1.17 | 1.19 | 3.03 |
| December | 2.19 | .94 | 1.15 | 1.79 |
| | 1958 | 1961 | 1964 | 1967 |
| January | 2.07 | .58 | 1.09 | |
| February | 1.92 | .41 | 1.07 | |
| March | 1.96 | .39 | 1.15 | |
| April | 1.69 | .42 | 1.13 | |
| May | 1.39 | .54 | 1.09 | |
| June | 1.12 | .60 | 1.09 | |
| July | .87 | .78 | 1.00 | |
| August | .66 | .86 | .87 | |
| September | .60 | .83 | .92 | |
| October | .52 | .79 | .90 | |
| November | .48 | .84 | .79 | |
| December | .49 | .75 | .73 | |

Data Source: Barron's Weekly

## FORMATION OF THE COMPOSITE INDEX

The Composite Index is to be formed from the indicator series that were tested and found to be suitable for use in this appraisal. The indicators that tested favourably are:

1. The Advance-Decline Line
2. Ten Most Active Stocks to Market Volume
3. Volume of Trading
4. Odd Lot Net Purchases and Sales
5. Odd Lot Sales to Purchases
6. Odd Lot Shorts to Volume

The first step that is followed in the construction, is the weighting of the indicators on the basis of their performance in the earlier tests.(6) The process is described and calculated in Appendix IIa.

The weights are then assigned to the indicators in Appendix IIb. Each of the indicators is examined separately, and monthly signals of + for favourable and - for unfavourable are assigned. The values for each month, as determined by the weights, are then summated to represent a monthly value for the composite. The composite index was plotted on Charts XXII and XXIII with the S. and P. 500. The mechanics of tabulating the indicator values is represented in Appendices II and III.

## TESTING THE COMPOSITE INDEX

The test applied to the other indicators is now applied to the Composite Index. The value of its performance, and the criteria that outline the process of the forecast are determined, so that the best situation may be included in the model. Two situations are construed for testing.

---

(6)The method of weighting was described under "DESCRIPTION" in the early part of this Chapter.

Situation I

When the index value reaches 50 per cent on the upside, a purchase is indicated.

When the index value on the downside reaches 60 per cent, a sale is indicated.

## SITUATION I

A - Investment in the Market

(Dates are the end of month)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Apr. 58 | 42.34 + .43 = 42.77 | Sept.59 | 57.05 - .57 = 56.48 | 13.71 |
| Dec. 60 | 56.80 + .57 = 57.37 | Mar. 62 | 70.29 - .70 = 69.59 | 12.22 |
| Aug. 62 | 58.52 + .59 = 59.11 | July 65 | 84.91 - .85 = 84.05 | 24.94 |
| Aug. 65 | 86.49 + .87 = 87.36 | Feb. 66 | 92.69 - .93 = 91.76 | 4.40 |
| | | | Total | 55.27 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Apr. 58 | 28/12 | 45.48 | 3.54 - 3.70 = | (.16) | (.14) |
| Sept.59 to Dec. 60 | 14/12 | 56.48 | 4.61 - 3.27 = | 1.34 | .90 |
| Mar. 62 to Aug. 62 | 5/12 | 69.59 | 4.52 - 3.34 = | 1.18 | .35 |
| July 65 to Aug. 65 | 1/12 | 84.05 | 4.62 - 3.10 = | 1.52 | .09 |
| Feb. 66 to Dec. 66 | 10/12 | 91.76 | 5.27 - 3.57 = | 2.00 | 1.47 |
| | | | | Total | 2.67 |

Total profit from Situation I is A + B 57.94 points

Control investment is 35.85

Improvement is 22.09/35.85 X 100 = 61.61% better

Situation II

When the index value reaches 50 per cent on the upside, a purchase is indicated.

When the index value reaches 50 per cent on the downside, a sale is indicated.

## SITUATION II

A - Investment in the Market (Dates are the end of month)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Apr. 58 | 42.34 + .43 = 42.77 | Oct. 59 | 57.00 - .57 = 56.43 | 13.66 |
| Dec. 60 | 56.80 + .57 = 57.37 | Apr. 62 | 68.05 - .68 = 67.37 | 10.00 |
| Aug. 62 | 58.52 + .59 = 59.11 | Mar. 66 | 88.88 - .89 = 87.99 | 28.88 |
| | | | Total | 52.54 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Apr. 58 | 28/12 | 45.48 | 3.54 - 3.70 = | (.16) | (.14) |
| Oct. 59 to Dec. 60 | 14/12 | 56.43 | 4.62 - 3.25 = | 1.37 | .90 |
| Apr. 62 to Aug. 62 | 4/12 | 67.37 | 4.48 - 3.73 = | .75 | .20 |
| Mar. 66 to Dec. 66 | 9/12 | 87.99 | 5.37 - 3.56 = | 1.81 | 1.14 |
| | | | | Total | 2.10 |

Total profit from Situation II is A + B 54.64 points

Control investment is 35.85

Improvement is 18.79/35.85 X 100 = 52.41% better

Conclusion:

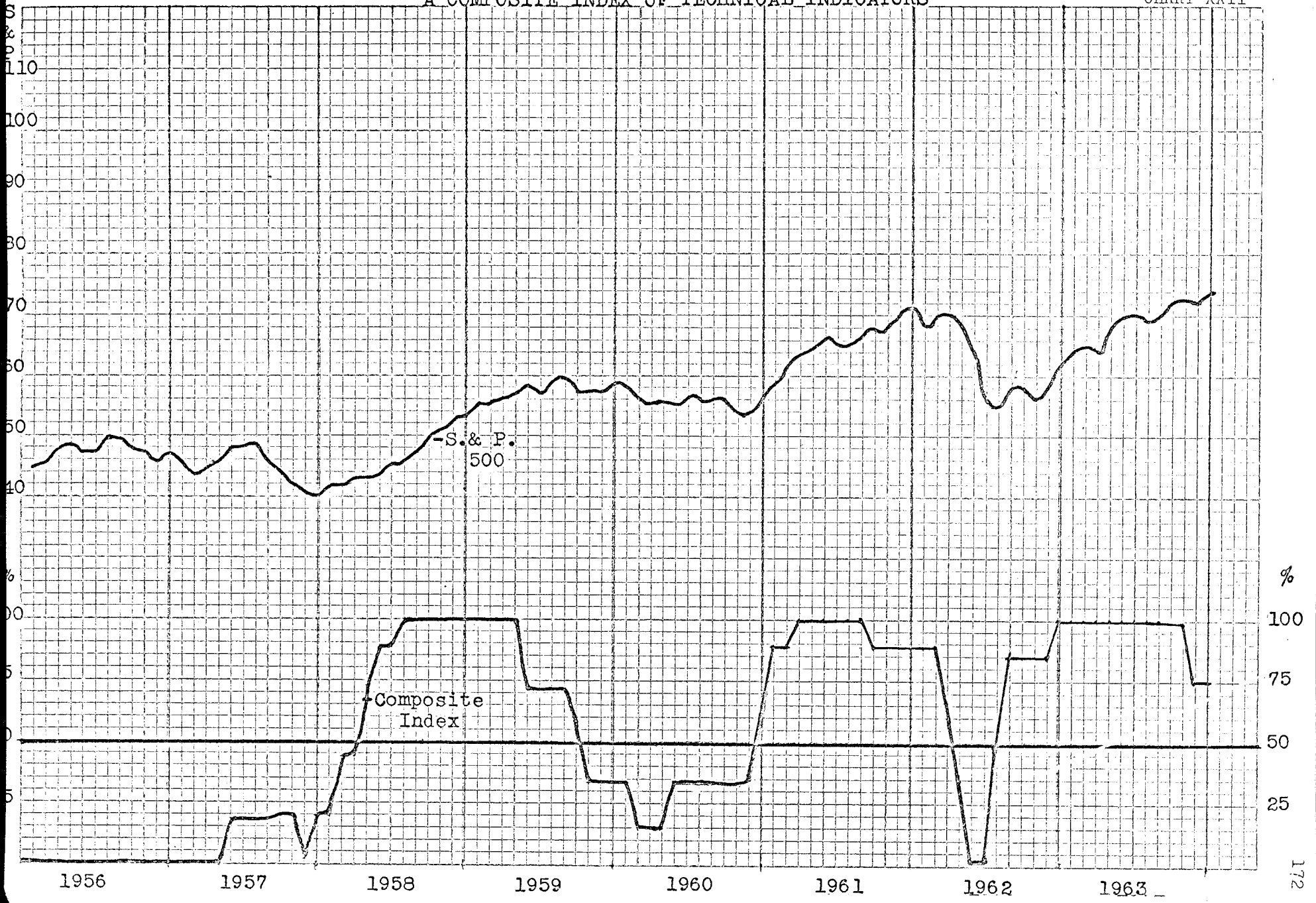
As the results of Situation I were superior, it was chosen as the criteria for the indicator.

The criteria are restated as follows:

1. When the index value reaches 50 per cent on the upside, a purchase is indicated.
2. When the index value reaches 60 per cent on the downside, a sale is indicated.

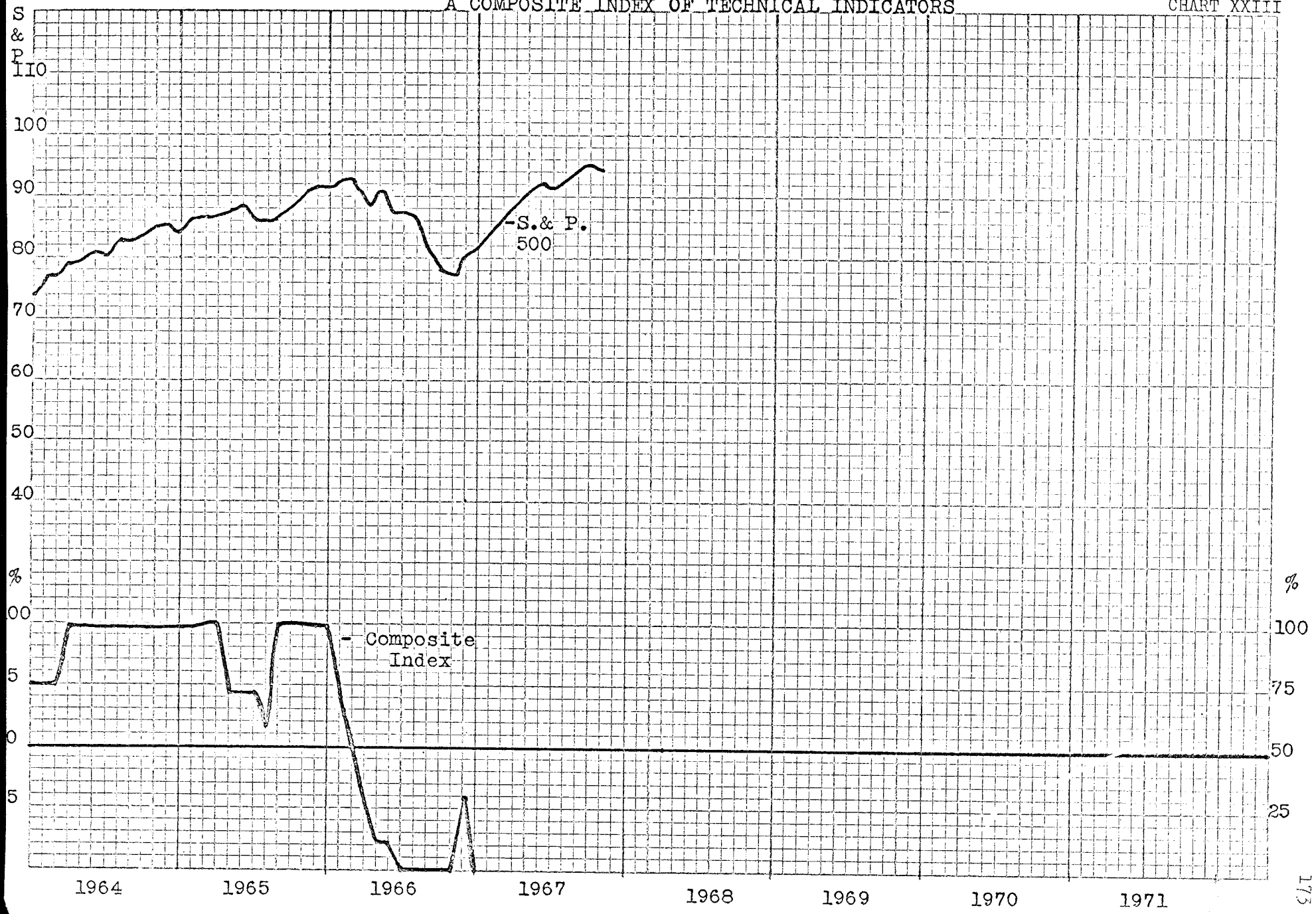
A COMPOSITE INDEX OF TECHNICAL INDICATORS

CHART XXII



# A COMPOSITE INDEX OF TECHNICAL INDICATORS

CHART XXIII



# APPENDIX II

## WEIGHTING THE INDICATORS

| 1956 through 1966 Profit in S. and P. 500 - INDEX POINTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| Profit Source | Benchmark Buy and Hold | Index 1 | Index 2 | Index 3 | Index 4 | Index 5 | Index 6 |
| Stock Market | 35.85 | 60.72 | 33.01 | 47.65 | 56.29 | 68.05 | 51.97 |
| Bonds | | 2.21 | 4.45 | 2.82 | 1.77 | 1.93 | 1.37 |
| Profit | 35.85 | 62.93 | 37.46 | 50.47 | 58.06 | 69.98 | 53.34 |
| Index Profit as % improvement of the Benchmark 35.85 = 100% | | 75.53 | 4.49 | 40.78 | 61.95 | 95.20 | 48.78 |
| $\sum_{i=1}^{n=7}$ of Index % = 100 points<br>or 326.73% = 100 points | | | | | | | |
| Point for indicators | | 23.12 | 1.37 | 12.48 | 18.96 | 29.14 | 14.93 |
| Rounded | | 24 | 1 | 12 | 19 | 29 | 15 |

Indexes

#1 Advance-Decline Line
#2 Ten Most Active Stocks to Volume
#3 Volume of Trading
#4 Odd Lot Net Purchases and Sales
#5 Odd Lot Sales to Purchases
#6 Odd Lot Shorts to Volume

## APPENDIX III

## THE COMPOSITE INDEX

+ = Favourable

- = Unfavourable

| | | 1956 | | | | | | | | | | | | 1957 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| % Indication Favourable | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 19 | 19 | 19 | 20 | 20 | 1 | 20 |
| Advance-Decline Line | 24 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ten Most Active to Market Volume | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Volume of Trading | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + | + | + | + |
| Odd Lot Net Purchases and Sales | 19 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Odd Lot Sales to Purchases | 29 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + | + | + | + | + | + | - | + |
| Odd Lot Shorts to Volume | 15 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 100 | 1958 | | | | | | | | | | | | 1959 | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| % Indication Favourable | | 20 | 44 | 44 | 73 | 88 | 88 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 71 | 71 | 71 | 71 | 58 | 34 | 34 | 34 |
| Advance-Decline Line | 24 | - | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | - | - | - |
| Ten Most Active to Market Volume | 1 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | - | - | - | - |
| Volume of Trading | 12 | - | - | - | - | - | - | + | + | + | + | + | + | + | + | + | + | + | + | + | + | - | - | - | - |
| Odd Lot Net Purchases and Sales | 19 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | - | - | - | - |
| Odd Lot Sales to Purchases | 29 | - | - | - | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Odd Lot Shorts to Volume | 15 | - | - | - | - | + | + | + | + | + | + | + | + | + | + | + | + | - | - | - | - | - | - | - | - |
| | 100 | 1960 | | | | | | | | | | | | 1961 | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| % Indication Favourable | | 34 | 15 | 15 | 15 | 34 | 34 | 34 | 34 | 34 | 34 | 35 | 59 | 88 | 88 | 100 | 100 | 100 | 100 | 100 | 100 | 88 | 88 | 88 | 88 |
| Advance-Decline Line | 24 | - | - | - | - | - | - | - | - | - | - | - | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Ten Most Active to Market Volume | 1 | - | - | - | - | - | - | - | - | - | - | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Volume of Trading | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + | + | + | + | + | + | - | - | - | - |
| Odd Lot Net Purchases and Sales | 19 | + | - | - | - | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Odd Lot Sales to Purchases | 29 | - | - | - | - | - | - | - | - | - | - | - | - | + | + | + | + | + | + | + | + | + | + | + | + |
| Odd Lot Shorts to Volume | 15 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| | 100 | | | | | | | | | | | | | | | | | | | | | | | | |

APPENDIX III

THE COMPOSITE INDEX (cont)

\+ = Favourable

\- = Unfavourable

| | | 1962 | | | | | | | | | | | | 1963 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| % Indication Favourable | | 88 | 88 | 59 | 35 | 1 | 1 | 47 | 85 | 85 | 85 | 85 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 99 | 75 | 75 |
| dvance-Decline Line | 24 | + | + | + | - | - | - | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | - | - |
| en Most Active to Market Volume | 1 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | - | - | - | - |
| olume of Trading | 12 | - | - | - | - | - | - | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| id Lot Net Purchases and Sales | 19 | + | + | + | + | - | - | - | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| id Lot Sales to Purchases | 29 | + | + | - | - | - | - | - | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| id Lot Shorts to Volume | 15 | + | + | + | + | - | - | - | - | - | - | - | + | + | + | + | + | + | + | + | + | + | + | + | + |
| | 100 | 1964 | | | | | | | | | | | | 1965 | | | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| % Indication Favourable | | 75 | 75 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 100 | 100 | 71 | 71 | 71 | 71 | 100 | 100 | 100 | 99 | 99 |
| dvance-Decline Line | 24 | - | - | + | + | + | + | + | + | + | + | + | + | + | + | + | - | - | - | - | + | + | + | + | + |
| en Most Active to Market Volume | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | + | + | + | + | + | + | + | + | + | - | - |
| olume of Trading | 12 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| id Lot Net Purchases and Sales | 19 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| id Lot Sales to Purchases | 29 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| id Lot Shorts to Volume | 15 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| | 100 | 1966 | | | | | | | | | | | | 1967 | | | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| % Indication Favourable | | 70 | 51 | 27 | 12 | 12 | 0 | 0 | 0 | 0 | 0 | 29 | 0 | | | | | | | | | | | | |
| dvance-Decline Line | 24 | + | + | - | - | - | - | - | - | - | - | - | - | | | | | | | | | | | | |
| en Most Active to Market Volume | 1 | - | - | - | - | - | - | - | - | - | - | - | - | | | | | | | | | | | | |
| olume of Trading | 12 | + | + | + | + | + | - | - | - | - | - | - | - | | | | | | | | | | | | |
| id Lot Net Purchases and Sales | 19 | + | - | - | - | - | - | - | - | - | - | - | - | | | | | | | | | | | | |
| id Lot Sales to Purchases | 29 | - | - | - | - | - | - | - | - | - | - | + | - | | | | | | | | | | | | |
| id Lot Shorts to Volume | 15 | + | + | + | - | - | - | - | - | - | - | - | - | | | | | | | | | | | | |
| | 100 | | | | | | | | | | | | | | | | | | | | | | | | |

# CHAPTER VI

## TESTING THE HYPOTHESIS AND THE CONCLUSION

In this Chapter we will gather together the components that have been developed for the model to be used for the test of the null hypothesis, that it is not possible to make predictions about turning points in the stock market averages, with a better than .50 probability that this would improve investment performance over what you would have achieved by a buy and hold decision of the averages. The components are then weighted, for inclusion in the model, on the basis of their past performance. Criteria are then developed for the forecast, by the method of testing that was used for the Diffusion Index and the Composite Index. The results of the test are used to develop criteria for the model, and then in the test of the hypothesis.

In the testing of the indexes and the model, in the period from 1956 to 1966 inclusive, the writer realizes that data for testing the hypothesis was generated from the same period on which the hypothesis was developed. However, to support the use of this method, it may be argued that:

1. The period of the test was sufficiently long to justify a test for consistency in the indicators and the combinations that are used.
2. The indexes chosen are those from a group that are generally proposed for the task.
3. The Diffusion Index and its components have authority by the nature of economic theory.

## DESCRIPTION OF THE MODEL CONSTRUCTION

The components of the model for the forecast are the Diffusion Index, the Composite Index, and criteria for performance. The model is formed by combining the two indexes, into one series, by utilization of a system of weights. These weights are developed from the relative performance of each index as compared to the control measure that was used in the testing of the Diffusion Index and Composite Index in Chapters III and V respectively. The system, of weighting the indexes and for combining them into a single series, is described as follows:

An assumption is made, that when both indexes have all indicators positive, this value will be represented by 100 per cent. To combine the monthly percentages of each indicator into the one, an apportionment, on the basis of their relative performance to the control measure over the entire test period, is applied to the monthly data of each indicator.

The Diffusion Index performance is

58.04 per cent better than the control.(1)

The Composite Index performance is

61.61 per cent better than the control.(2)

$\frac{58.04}{58.04 + 61.61} = 48.51\%$ is the monthly weight adjustment for the Diffusion Index

then $\frac{61.61}{58.04 + 61.61} = 51.49\%$ is the monthly weight adjustment for the Composite Index

The monthly figures for each index are adjusted by these weights, and the resulting percentages are combined to form monthly values for the single

---

(1) In Chapter III, page 51, the Diffusion Index tested as 58.04% better than the control.

(2) In Chapter V, page 168, the Composite Index tested as 61.61% better than the control.

series, which we will refer to as the Model Index. The calculations and values for this index are found in Appendix IV and the index is plotted on Charts XXIV and XXV.

## TESTING THE MODEL INDEX

The method of testing is the same as that used for testing the previous index series. Hypothetical buy and sell decisions are made by the Model Index, on the basis of various situations of criteria, and the best performance is judged as that with the larger profit over that of the control, a buy and hold investment in the S. and P. 500 averages. In this manner, ideal criteria are established for the Model Index and are also included in the test of the hypothesis.

### Situation I

When the index on the upside reaches 50 per cent, a buy is indicated.

When the index on the downside reaches 50 per cent, a sale is indicated.

SITUATION I

A - Investment in the Market (Dates are at the end of month)

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Apr. 58 | 42.34 + .43 = 42.77 | June 59 | 57.46 - .58 = 56.88 | 14.11 |
| Dec. 60 | 56.80 + .57 = 57.37 | Mar. 62 | 70.29 - .70 = 69.59 | 12.22 |
| July 62 | 56.97 + .57 = 57.54 | Mar. 66 | 88.88 - .89 = 87.99 | 30.45 |
| | | | Total | 56.78 |

B - Investment

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) = | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Apr. 58 | 28/12 | 45.48 | 3.54 - 3.70 = | (.16) | (.14) |
| June 59 to Dec. 60 | 18/12 | 56.88 | 4.55 - 3.25 = | 1.30 | 1.08 |
| Mar. 62 to July 62 | 4/12 | 69.59 | 4.52 - 3.31 = | 1.21 | .28 |
| Mar. 66 to Dec. 66 | 9/12 | 87.99 | 5.37 - 3.56 = | 1.81 | 1.14 |
| | | | | Total | 2.36 |

Total profit from Situation I is A + B 59.14 points

Control investment is 35.85

Improvement is 23.29/35.85 X 100 = 64.96% better

Situation II

When the index on the upside reaches 50 per cent, a buy is indicated.

When the index on the downside reaches 55 per cent, a sale is indicated.

SITUATION II

A - Investment in the Market

| Date | Purchase + Commission | Date | Sale - Commission | Profit (Pts) |
|---|---|---|---|---|
| Apr. 58 | 42.34 + .43 = 42.77 | June 59 | 57.46 - .58 = 56.88 | 14.11 |
| Dec. 60 | 56.80 + .57 = 57.37 | Jan. 62 | 69.07 - .69 = 68.38 | 11.01 |
| July 62 | 56.97 + .57 = 57.54 | Feb. 66 | 92.69 - .93 = 91.76 | 34.22 |
| | | | Total | 59.34 |

B - Investment in Bonds

| Period out of Market | Years | Amount (Pts) | Av.Int. (%) - Av.Dividend (%) | Rate (%) | Profit (Pts) |
|---|---|---|---|---|---|
| Dec. 55 to Apr. 58 | 28/12 | 45.48 | 3.54 - 3.70 = | (.16) | (.14) |
| June 59 to Dec. 60 | 18/12 | 56.88 | 455 - 3.25 = | 1.30 | 1.08 |
| Jan. 62 to July 62 | 6/12 | 68.38 | 4.51 - 3.34 = | 1.17 | .27 |
| Feb. 66 to Dec. 66 | 10/12 | 91.76 | 5.27 - 3.57 = | 1.70 | 1.29 |
| | | | | Total | 2.50 |

Total profit from Situation II is A + B 61.84 points

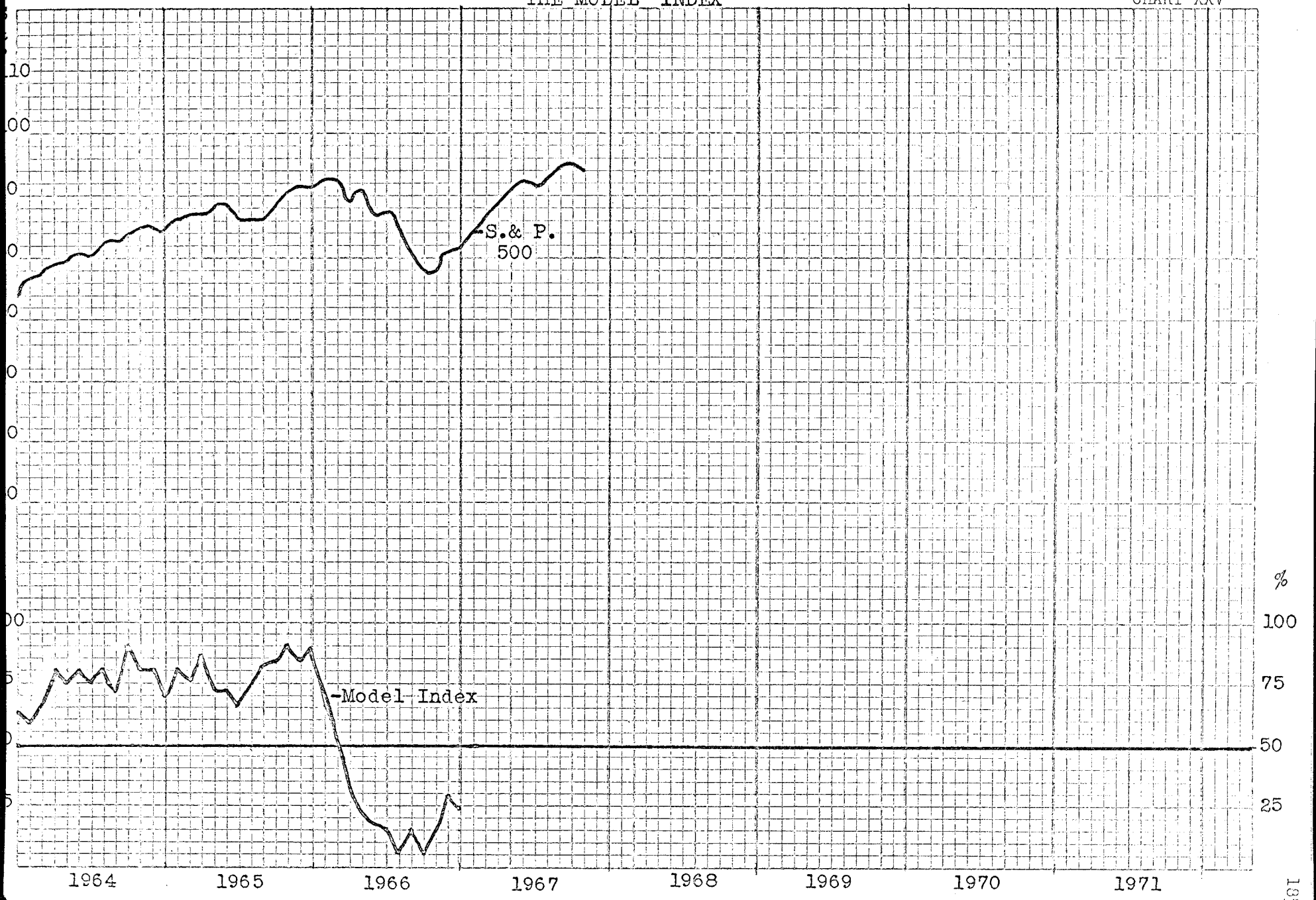
The control investment is 35.85

The improvement is 25.99/35.85 X 100 = 72.49% better

Conclusion:

As situation II provides the most favourable results, it was selected as the test for the hypothesis.


THE MODEL INDEX
CHART XXIV
S & P
110
100
90
80
70
60
50
40
%
100
75
50
25
-S.& P. 500
-Model Index
1956
1957
1958
1959
1960
1961
1962
1963


THE MODEL INDEX
CHART XXV
S.& P.
500
Model Index
%
100
75
50
25
1964
1965
1966
1967
1968
1969
1970
1971

# APPENDIX IV

## THE MODEL INDEX

| | | 1956 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D |
| Diffusion Index + | 48.5 | | | | 16.0 | 8.3 | 8.3 | 27.7 | 44.1 | 44.1 | 44.1 | 32.5 | 16.0 |
| Composite Index | 51.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| = THE MODEL INDEX | 100.0 | 0 | 0 | 0 | 16 | 8 | 8 | 28 | 44 | 44 | 44 | 33 | 16 |
| | | 1957 | | | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D |
| Diffusion Index + | 48.5 | 0 | 8.3 | 7.3 | 14.1 | 14.1 | 20.8 | 14.1 | 7.3 | 7.3 | 7.3 | 0 | 0 |
| Composite Index | 51.5 | 0 | 0 | 0 | 0 | 9.8 | 9.8 | 9.8 | 9.8 | 10.3 | 10.3 | .5 | 10.3 |
| = THE MODEL INDEX | 100.0 | 0 | 8 | 7 | 14 | 14 | 21 | 24 | 17 | 18 | 18 | 1 | 10 |
| | | 1958 | | | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D |
| Diffusion Index + | 48.5 | 0 | 14.1 | 8.3 | 37.8 | 43.2 | 48.5 | 48.5 | 48.5 | 37.8 | 36.4 | 48.5 | 36.4 |
| Composite Index | 51.5 | 10.3 | 22.7 | 22.7 | 37.6 | 45.3 | 45.3 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 |
| = THE MODEL INDEX | 100.0 | 10 | 37 | 31 | 75 | 89 | 94 | 100 | 100 | 100 | 88 | 100 | 88 |
| | | 1959 | | | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D |
| Diffusion Index + | 48.5 | 30.6 | 30.6 | 36.4 | 24.3 | 24.3 | 12.1 | 12.1 | 7.3 | 12.1 | 16.0 | 17.9 | 24.3 |
| Composite Index | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 36.6 | 36.6 | 36.6 | 36.6 | 29.9 | 17.5 | 17.5 | 17.5 |
| = THE MODEL INDEX | 100.0 | 82 | 82 | 82 | 76 | 61 | 49 | 49 | 44 | 42 | 34 | 35 | 42 |
| | | 1960 | | | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D |
| Diffusion Index + | 48.5 | 17.9 | 21.3 | 5.3 | 4.9 | 10.7 | 9.8 | 4.9 | 4.9 | 9.8 | 9.8 | 24.3 | 24.3 |
| Composite Index | 51.5 | 17.5 | 7.7 | 7.7 | 7.7 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 18.0 | 30.4 |
| = THE MODEL INDEX | 100.0 | 35 | 29 | 13 | 13 | 28 | 27 | 22 | 22 | 27 | 27 | 42 | 55 |
| | | 1961 | | | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D |
| Diffusion Index + | 48.5 | 32.5 | 38.8 | 38.8 | 34.0 | 34.0 | 34.0 | 29.1 | 48.5 | 38.8 | 24.3 | 29.1 | 24.3 |
| Composite Index | 51.5 | 45.3 | 45.3 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 45.3 | 45.3 | 45.3 | 45.3 |
| = THE MODEL INDEX | 100.0 | 78 | 84 | 90 | 86 | 86 | 86 | 81 | 100 | 84 | 80 | 74 | 70 |

# APPENDIX IV

## THE MODEL INDEX (cont)

| | | 1962 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D |
| Diffusion Index + | 48.5 | 19.4 | 19.4 | 19.4 | 19.4 | 11.2 | 11.2 | 29.1 | 29.1 | 19.4 | 34.0 | 29.1 | 34.0 |
| Composite Index | 51.5 | 45.3 | 45.3 | 30.4 | 18.0 | .5 | .5 | 24.2 | 43.8 | 43.8 | 43.8 | 43.8 | 51.5 |
| = THE MODEL INDEX | 100.0 | 65 | 65 | 50 | 37 | 12 | 12 | 53 | 73 | 63 | 78 | 73 | 86 |
| | | 1963 | | | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D |
| Diffusion Index + | 48.5 | 21.3 | 29.3 | 37.8 | 34.0 | 21.8 | 29.1 | 24.3 | 24.3 | 38.8 | 38.8 | 24.3 | 24.3 |
| Composite Index | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 51.0 | 51.0 | 38.6 | 38.6 |
| = THE MODEL INDEX | 100.0 | 73 | 81 | 89 | 86 | 73 | 81 | 76 | 76 | 90 | 90 | 63 | 63 |
| | | 1964 | | | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D |
| Diffusion Index + | 48.5 | 19.4 | 34.0 | 29.1 | 24.3 | 29.1 | 24.3 | 29.1 | 21.3 | 38.8 | 29.1 | 29.1 | 19.4 |
| Composite Index | 51.5 | 38.6 | 38.6 | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 |
| = THE MODEL INDEX | 100.0 | 58 | 73 | 80 | 75 | 80 | 75 | 80 | 72 | 90 | 80 | 80 | 70 |
| | | 1965 | | | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D |
| Diffusion Index + | 48.5 | 29.1 | 24.3 | 34.0 | 34.0 | 34.0 | 29.1 | 19.4 | 29.1 | 32.0 | 38.8 | 29.1 | 34.0 |
| Composite Index | 51.5 | 51.0 | 51.5 | 51.5 | 36.6 | 36.6 | 36.6 | 36.6 | 51.5 | 51.5 | 51.5 | 51.0 | 51.0 |
| = THE MODEL INDEX | 100.0 | 80 | 76 | 86 | 71 | 71 | 66 | 56 | 81 | 84 | 90 | 80 | 84 |
| | | 1966 | | | | | | | | | | | |
| | Weights | J | F | M | A | M | J | J | A | S | O | N | D |
| Diffusion Index + | 48.5 | 29.1 | 24.3 | 16.0 | 14.6 | 9.7 | 14.6 | 5.3 | 14.6 | 4.9 | 14.6 | 14.6 | 24.3 |
| Composite Index | 51.5 | 36.1 | 26.3 | 13.9 | 6.2 | 6.2 | 0 | 0 | 0 | 0 | 0 | 14.9 | 0 |
| = THE MODEL INDEX | 100.0 | 65 | 51 | 30 | 21 | 16 | 15 | 5 | 15 | 5 | 15 | 29 | 24 |

## TESTING THE HYPOTHESIS

The hypothesis to be tested is restated from Chapter I: "It is not possible to make predictions about turning points of prices in the stock market averages with a better than .50 probability that would improve investment performance over what you would have achieved by a buy and hold decision of the averages". This hypothesis is to be tested by the model formed from, the Diffusion Index of economic indicators, the Composite Index of technical indicators, and suitable criteria that are developed for the performance of the model. The structure of the model was developed in this Chapter, as one, the Model Index, and two, criteria that were selected from the test of the index.

For the statistical data to substantiate a statement concerning the validity of the null hypothesis, the writer refers to the final tests, which were made on the Model Index.(3) The control investment, represents the buy and hold decision of the averages, and it is the benchmark against which we test whether there is a better than .50 probability of improving investment results by timing stock market purchases and sales. If, over the eleven years being tested, the investment decisions performed with the Model Index of this appraisal are significantly better than the control, the rejection of the null hypothesis will be substantiated.(4)

In the test of the Model Index, Situation II was the performance selected.

---

(3)Refer to Testing the Model Index in this Chapter.

(4)The writer makes the assumption that the degree of significance is 10 per cent.

The criteria are:

When the index on the upside reaches 50 per cent, a buy is indicated.

When the index on the downside reaches 55 per cent, a sale is indicated.

The performance is:

that the profit from the investment decisions of timing purchases and sales is 72.49% better than the buy and hold decision.

## CONCLUSION

The results of the test of the hypothesis indicate a rejection of the null hypothesis, and substantiate the statement that: "It is possible to make predictions, about turning points of prices in the stock market with a better than .50 probability, that would improve investment performance over what you would have achieved by a buy and hold decision of the averages".

# BIBLIOGRAPHICAL ENTRIES

## A. BOOKS

Cohen, Jerome B. and Zinbarg, Edward D. Investment Analysis and Portfolio Management. Homewood Illinois: Richard D. Irwin Inc., 1967.

Edwards, Robert D. and Magee, John. Technical Analysis of Stock Trends. Springfield, Massachusetts: John Magee, 1966.

Katona, George. The Mass Consumption Society. New York: McGraw Hill Co., 1964.

Hansen, Alvin Harvey. Business Cycles and National Income. New York: W.W. Norton and Co. Inc., 1951.

Bolton, Arthur Hamilton. Money and Investment Profits. Homewood, Illinois: Dow Jones - Irwin, 1967.

Drew, Garfield A. New Methods for Profit in the Stock Market. Wells, Vermont: Fraser Publishing, 1966.

Eiteman, W.J., Dice, Charles A., and Eiteman, D.K. The Stock Market - 4th edition. New York: McGraw Hill, 1966.

Sprinkel, Beryl W. Money and Stock Prices. Homewood, Illinois: Richard D. Irwin Inc., 1964.

## B. ARTICLES

Gartley, H.M. "Volume of Trading - A Forecasting Factor". A Treasury of Wall Street Wisdom, Hand Shultz, Coslow S. New York: Investors Press, 1965.

Lempert, L.H. "Do the leading Business Indicators Lead?" The Financial Analyst Journal, Nov/Dec. 1967.

Moore, G.H. "Analyzing Business Cycles". The American Statistician, p. 15. April/May 1954.

Mueller, Eva. "Ten Years of Consumer Attitude Surveys". Journal of the American Statistical Association, 1963.

Freeman, G.K. "Advance-Decline Line". Elements of Investments, A.J. Zakon et al. 1965: Holt Rhinehart and Winston.

"Is the Odd Lotter Always Wrong?". Business Week, May 6th, 1967.

## C. PAPERS

Shiskin, Julius. "The Known and the Unknown". Business Cycle Developments. September 1963: U.S. Department of Commerce.

Moore, G.H. and Shiskin, J. N.B.E.R. Occasional Paper No. 103.

## D. PUBLICATIONS

Business Cycle Developments published monthly by the U.S. Department of Commerce, Bureau of the Census.