A STUDY OF HISTORICAL RATES OF RETURN FROM

LOW-PRICED COMMON STOCK PORTFOLIOS:

1965-1970

By

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CHAPTER I

INTRODUCTION

General Introduction and Review

The area of investment returns—always of extreme interest to both

instituitional and individual investors—has over the years experienced

considerable investigation.   Research pertaining to historical evalua-

tion and comparison of returns from alternative investments has been

of particular interest in recent years, especially in the analysis of

common-stock investments.   The initial base for such progress was pro-

vided by Fisher and Lorie's exhaustive study of historic rates of return

from common stock listed on the New York Stock Exchange during the pe-

riod 1926-1960[1] (the results have since been updated to 1965[2]). This

study attempted to answer the question of how much profit or loss an

individual investor might have realized if he had purchased all New

York Stock Exchange common stocks—at five different dates and held

them for varying lengths of time during the 35 years from 1926 through

1960.   Returns were determined for a variety of assumptions pertaining

to individual tax status, dividend reinvestment, and transaction costs.

Their findings for the total 35-year period, assuming reinvestment of

dividends and annual compounding of rate of return, include: a rate

of return of 9 percent for tax-exempt institutions; 8.2 percent for

persons in the $10,000 income class; and 6.8 percent for persons in the

$50,000 income class.   The authors note "these rates are substantially

higher than for alternative investment media for which data are avail-
able."[3]

The significance of these findings stimulated additional investi-
gations of common stock returns. One study, by Brigham and Pappas,[4]
attempted to segregate the rates of return into two components—those
returns attributable to dividends and those attributable to capital
gains. In total they examined data for 658 industrial and utility firms
over the postwar period 1946-1965. As in Fisher and Lorie's study, they
focused on aggregate returns and made no distinctions between the price
classes of the securities or returns available from selected portfolios.
The returns for those years which overlapped Fisher and Lorie's data
were quite similiar. Their segmentation of these returns demonstrated
that although different percentages of the total return came from the
above two components in various years, over the entire period dividends
accounted for about 38 percent of the total before-tax return versus 62
percent for capital gains.

To date little has been done in the areas of either aggregative re-
turns, or selected portfolio returns, from common stock within specific
price groups. It would seem of particular interest to examine returns
from low-priced common stocks due to their risk characteristics, their
affordability by non-wealthy investors, their susceptibility to specula-
tive trading, as well as their convenience as a departure point for
future price-class studies. Of existing studies two indirect discus-
sions of price-group behavior are noteworthy. Volatility as a function
of price has been examined by Clendenin.[5] He analyzed various time pe-
riods and samples of stocks in differing price classes in an attempt to
determine the influence of quality and price on price volatility. His

conclusions were:

> The truth of the matter is that the percentage price fluctua-
> tions in most low-priced stocks are about the same as those
> in high-priced stocks of the same quality.[6] (emphasis in
> original)

Three aspects of the study are particularly relevant. First, his
classification scheme for 'quality' resulted in the exclusion of all
non-dividend yielding securities. This may well have resulted in the
elimination of low-priced stocks which achieved large capital gains
over the periods. Brigham and Pappas' discovery of the important role
capital gains play in total return make this shortcoming more serious.
Second, data were not utilized for stocks priced below $5.00 per share,
perhaps the most obvious class of 'low-priced' stocks. Finally, the
sample sizes used for the study were extremely small for all price
groups, causing one to question the general validity of his results.

Recently, Heins and Allsion[7] have further investigated factors
affecting price volatility, with conclusions similiar to Clendenin's.
However, they too used a quality classification scheme that eliminated
non-dividend paying securities as well as irregular-dividend paying
securities. Although their total sample size was greater than
Clendenin's, the authors chose not to publish a breakdown of the sample
by price classes. Consequently, one is unsure of both the absolute and
relative size of each group. Also, there was never a statement of the
authors definition of 'low-priced', and in order to investigate price
volatility of differing price classes, explicit definitions of bound-
aries seem essential. Graham and Dodd, for example, have argued that
low-priced could plausibly lie anywhere between zero and $20 per share.[8]

The important aspect of these volatility studies in relation to

the present study is that a random group of low-priced stocks will, a priori, not possess the same quality as a random group of high-priced stocks. It is quite plausible that there may be little difference in volatitily when seperated into equivalent quality classes.

These studies have admittedly added to our knowledge of price behavior and potential rates of return available from investments in common stock but, at the same time, leave much unanswered and unexamined. Specifically, what are the rates of return from portfolios of common stock priced at $5 or less; the role of dividends, stock splits or commissions in this price group's performance characteristics, or; the significance of the timing factor in achieving a given rate of return from low-priced securities.

Purpose

The primary purpose of this study is to ascertain historical rates of return available from portfolios of low-priced common stocks (less than $5 per share) selected from the American Stock Exchange during the years 1965-1969. These rate of return data will also be supplemented with information regarding the level of dividends received, the impact of transaction costs, portfolio sizes encountered, total investments required as well as other varied data of interest to investors.

It should be emphasized here that the approach is descriptive rather than normative, that is, no attempt has been made to differentiate between either the low-priced securities selected or the level of investment in each of these securities in order to optimize returns. It is hoped, however, that the foundation provided herein will speed the development of such a normative approach through, perhaps, the

application of fundamental and technical analysis to portfolios of low-priced common stock. Investigations of performance characteristics and price behavior of differing price classes are also sorely needed in order to facilitate the comparison of the returns—this study furnishes a foundation for such investigations as well.

Scope and Methodology

All securities included in the study were listed on the American Stock Exchange and initially priced at or below $5 per share when selected. During the time periods examined, the 20 quarters from January 1, 1965 through January 1, 1970, a total of 386 such securities were included in the sample. From these, portfolios of varying size were generated by selecting those stocks priced at or below $5 per share on the first trading day of the initial quarter while in subsequent quarters stocks are added to the original portfolio if: (1) they were previously unlisted and are currently selling at or below $5, or (2) they were previously listed but selling above $5 per share and are currently selling in the 0–$5 price range. Stocks may be dropped from a portfolio in subsequent quarters only if they are: (1) delisted from the American Stock Exchange (unless simultaneously moving to the New York Stock Exchange); (2) the non-surviving company in an acquisition or merger, or; (3) prevented from trading for a variety of reasons including being called, suspended, or liquidated.

The returns from these particular securities are then evaluated on the basis of three different portfolio models. The first, the Fixed Investment Model, assumes a $1000 investment in each security in the initial quarter as well as a $1000 investment in stocks added in

subsequent quarters. The second model, the Average Investment Model, assumes the same $1000 initial investment; however, the investment in subsequent quarters is equal to the average investment in each security in the portfolio at that time. Third, the Fixed Investment Proportion Maintenance (FIPM) model also assumes the identical $1000 initial investments. An intraportfolio reallocation of these investments is conducted at the end of each quarter so that each security represents the same proportion of the total portfolio value. Any new investments then have this dollar proportion invested in them. All portfolios recognize commissions and assume both a tax-exempt status and non-reinvestment of dividends.

Organization

Following this introductory chapter are two chapters dealing with the study's methodology. Chapter II discusses the methodology employed for determination of time periods, portfolio selection, data collection and handling, and measurement of rate of return. Chapter III, in turn, examines each of the three portfolio models employed as well as the treatment of portfolio disposition in the terminal quarter.

The rate-of-return results for each of these portfolio models are then presented in Chapter IV, along with pertinent supplemental data dealing with portfolio sample sizes encountered, total dividends received, total commissions required and others. Finally, Chapter VI will present the conclusions of the study.

Limitations

The primary limitation present in the study is due to the time

periods examined. It may well be unadvisable to generalize the rate-of-return data presented to time periods of differing length or market conditions. This limitation may only be removed through future research in the area. The second limitation involves the restriction of the universe to the American Stock Exchange. It is quite conceivable that differing results would be discovered if one examined securities listed on regional exchanges or traded in the over-the-counter market. Lastly, the assumption of tax-exempt portfolios and non-reinvestment of dividends may be a limitation. Fisher and Lorie's results demonstrate that the investor's tax status has a significant effect on rate of return achieved, as does the reinvestment of dividends. It may well be, however, that the non-reinvestment of dividends is less a factor in this particular study for the majority of securities examined will, a priori, not be a dividend-yielding security except, perhaps, over long periods of time.

FOOTNOTES

[1]Fisher, Lawrence and Lorie, J. H., "Rates of Return on Investments in Common Stocks," _Journal of Business_, 37(January, 1964), pp. 1-12, 15-17.

[2]Fisher, Lawrence and Lorie, J. H., "Rates of Return on Investments in Common Stock: The Year-by-Year Record, 1926-65," _Journal of Business_, 41(July, 1968) pp. 291-316.

[3]Ibid.

[4]Brigham, Eugene F. and Pappas, James L., "Rates of Return on Common Stock," _Journal of Business_, 42(July, 1969), pp. 302-316.

[5]Clendenin, John C., "Quality Versus Price as Factors Influencing Influencing Common Stock Price Fluctuations," _Journal of Finance_, 6(December, 1951), pp. 398-405.

[6]Ibid.

[7]Heins, A. James and Allison, Stephen L., "Some Factors Affecting Stock Price Variability," _Journal of Business_, 39(January, 1966), pp. 19-23.

[8]Graham, Benjamin and Dodd, David L., _Security Analyses_, (New York: McGraw Hill) 1967, pp. 649-653.

CHAPTER II

METHODOLOGY OF THE STUDY—I

This study requires a somewhat extensive explanation of the meth-
odology employed, primarily due to the large number of variables exam-
ined. To facilitate this explanation, this chapter will concern itself
with those aspects of the methodology which are independent of a par-
ticular portfolio model, while the subsequent chapter will be devoted
to the methodology of the portfolio models themselves.

Time Periods Examined

The particular time periods chosen span the years from January,
1965 to January, 1970, with each interim quarter representing one time
period. Thus, a total of 20 quarters, four in each of the five years,
form the basic time periods. Quarter 21 (January, 1970) will always be
the termination quarter for portfolios not terminated in a previous
quarter. Furthermore, with each of the 20 quarters representing a
possible initiation period or termination period, there exists some 210
combinations of time periods. To illustrate, suppose the initiation
period was quarter 1 in 1965. The termination period could then be
quarter 2, 3, 4, . . ., 21 = 20 combinations. If quarter 2 in 1965
was the initial period, the termination period could then be quarter
3, 4, 5, . . ., 21 = 19 combinations and so on. These particular years
were chosen to facilitate data collection and to provide an analysis of

performance in a current environment.

<h2 style="text-align:center">Criteria for Portfolio Selection</h2>

The various portfolios examined in the above time periods are all initially formed by selecting common stocks listed on the American Stock Exchange which are priced at or below $5.00 per share without regard to such factors as quality, number of shares outstanding, earnings, price-earnings ratio or any variable other than price. In the event a particular stock was not traded on the first trading day of the initial quarter, it is still included in the portfolio if the asked price is at or below $5 per share, or the arithmetic mean of the bid and asked price is at or below $5. The study also makes the simplifying assumption of permitting fractional shares to be bought. The impact of this particular assumption will be tested, however, by examining the returns from one of the portfolio models while permitting only whole shares to be purchased. Tables will be introduced later which point out the difference in achieved rates of return under the two assumptions. With this one exception, a $1000 investment is made in each security in the initial quarter regardless of the particular portfolio model being employed. Purchase commissions will, of course, make the actual investment per security somewhat higher than exactly $1000. To illustrate, for those portfolios initiating in quarter 1 of 1965, a portfolio is generated comprising 278 common stocks. The total initial portfolio investment required would then be 278 x $1000 plus brokerage commissions.

In subsequent quarters, prior to termination, additional stocks are added to the portfolio if: (1) they are stocks which were not listed on the American Stock Exchange in prior quarters, but have since

become listed and are currently priced at or below $5 per share, or; (2)
if they are stocks which have been listed in prior quarters, were pre-
viously selling above $5 per share, but are currently in the 0-$5 price
range. The size of the investment in these new securities is a func-
tion of the portfolio model being employed. Once a particular stock is
added to the portfolio it is retained until the termination period
unless: (1) the stock is delisted from the American Stock Exchange
and is not moving to the New York Stock Exchange; (2) the stock is
being acquired or is the non-surviving firm in a merger, or; (3)
the stock is prevented from trading for a variety of reasons such as
being halted, suspended, liquidated, or called.

The treatment of securities that are disposed of prior to the ter-
mination period follows a general procedure. For stocks involved in a
merger, liquidated, or called, the closing quote on the final day of
trading is taken as the selling price; however, the cash inflow from
the sale is assumed to occur at the end of the quarter. For any par-
ticular quarter, both the absolute number of stocks in these catagories
and the discrepancies in timing of cash flows are not significant
enough to create distortions in the rate of return.

For stocks delisted, halted, or suspended, the information of such
action is assumed unavailable until after the fact. Prices are then
taken from the over-the-counter market. If a price range was avail-
able for the first month after the action the monthly low bid price is
used as the selling price; if no such price is available in the first
month, the same procedure is employed for the second and third months.
All cash inflows are again assumed to occur at the end of the quarter
during which the price is obtained. In the event no price quote is

available at the end of three months, the security is assumed to be a complete loss and a price of $0 is recorded as the final selling price with no commissions being charged for the disposal of these valueless securities.

Data Collection

For each of the 386 securities included in the study, data were collected to enable the valuation of portfolios and determination of rates of return. Specifically, price data were obtained on a quarterly basis from the ISL Stock Price Indices[1] for January 1, 1965 through January 1, 1970. The price recorded was the closing price on the first trading day of each respective quarter with the noted exception of prices being recorded for stocks being dropped from the portfolio.

Since the price quotes were affected by stock splits, reverse splits, and stock dividends, it was necessary to accumulate data on these factors. Standard and Poor's Annual Dividend Records[2] for 1965-1969 were used as the reference source for such data. For ease in computer handling of the data, all figures were recorded as stock dividends, that is, a 2-for-1 stock split would be recorded as a 100 percent stock dividend and a 1-for-5 reverse split would be recorded as a -80 percent stock dividend.

Although cash dividends were not assumed to be reinvested, quarterly data on such cash dividends were collected, again from Standard and Poor's Annual Dividend Records,[3] to enable the comparison of the absolute and relative size of such dividends to the size of transaction costs. The ex-dividend date was used as the date the dividend was paid and all cash inflows were assumed to occur at the end of the respective

quarter in which the ex-dividend date fell.

The only other data required consisted of the particular quarter number in which the securities were sold because of mergers, delisting, etc. These were collected from the ISL Stock Price Indices [4] and/or Standard and Poor's Stock Guides.[5] As mentioned previously, all securities not sold prior to January 1, 1970 were assumed to be sold at that time.

Brokerage Commissions

All portfolios, regardless of the particular model, incorporate transaction costs for both purchasing new securities or selling securities from an existing portfolio. Brokerage commissions were calculated based on the following formulae:

Round Lots—100 shares

Price Between	Commission
$ 0 - $ 1	$6
$ 1 - $ 4	2 times price of 1 share + $3
$ 4 - $24	Price of 1 share + $7
$24 - $50	$\frac{1}{2}$ Price of 1 share + $19
$50 and over	1/10 of price of 1 share + $39

Maximum of $75 per round lot and minimum of $6.

Odd Lots

Amount Involved	Commission
$ 0 - $ 100	$6
$100 - $ 400	2% plus $1
$400 - $2,400	1% plus $5
Maximum of $75 and minimum of $6.	

Again, if the selling price of a security was assumed to be zero, no commissions were charged the portfolio for the elimination of holdings in the security. Also, if the price is under $1.00 (round lot) or the amount involved is less than $100 (odd lot), commissions are generally mutually agreed upon. On trades of this type a $6.00 brokerage fee was assumed even though some, but not all, brokerage firms have recently raised their minimum commission to $15.00.

Measurement of Rate of Return

The method employed to measure portfolio rates of return is of some importance to the validity of a study of this nature. If a portfolio experiences no contributions or withdrawals of capital subsequent to initial investment, the measurement of rate of return over a specified period of time is relatively simple. For example, given a beginning investment cost (C) of $100 and ending portfolio value (V) of

$106.70, the percentage return can be computed by $(V/C)-1= 6.7\%$. Converting this percentage into an annual rate of return, the formula becomes $(V/C)^{1/y}-1$, where y is the time period expressed in years. In more general terms, $V=C(1+r)^y$, where r is the annual rate of return compounding annually.

Unfortunately, two factors eliminate the feasibility of employing this technique: (1) the portfolio is subject to additional contributions or withdrawals of capital during the time periods used in this study, and (2) the portfolio manager is assumed to have no influence over either the timing or the amount of contributions to or withdrawals from the portfolio.

One must also recognize that measurement techniques based on arithmetic combination of percentage changes may be misleading, for this method assigns greater weight to increases than to decreases. For example, a stock declining from $5.00 to $4.00 and subsequently returning to $5.00 would have experienced consecutive percentage changes of −20 percent and +25 percent. Arithmetic combination would have produced a +5 percent—clearly misrepresentative of the actual percentage change!

Robert Levy[6] has suggested an approach which recognizes and accounts for all the factors discussed above. The approach, termed 'unit accounting', will be utilized throughout the study when computing annualized rates of return. This technique may best be explained with the aid of an illustration adapted from Levy. It is assumed that the portfolio is initially invested in 100 units, each with a value of $1.00. The portfolio value per unit is determined prior to each contribution or withdrawal, and again at the end of the period. Thus, it is possible to express contributions and withdrawals in terms of portfolio

PORTFOLIO

Time Periods	Beginning Value	Ending Value	Value Per Unit
1	$100	$106	1.060
8		110	1.100
9	(50)	50	0.917
18		40	0.733
19	250	320	0.809
24		330	0.835

units and to use these units in the computation of ending value on a

per unit basis. The assumed number of initial units is immaterial.

The measurement of return is based upon the relationship between

beginning and ending value per unit and for any given portfolio, this

relationship is independent of the initial units assumed.

The cumulative unit value (R) is determined by division of the

ending unit value (V_n) by the initial unit value (V_o), that is,

$R=V_n/V_o$. The annualized compound rate of return (r) may then be deter-

mined by solving the equation:

$$r = R^{1/y} - 1$$

where y is the length of the time period, expressed in years. In terms

of the above illustration, the annualized compounded rate of return

from period 1 to period 24, assuming the length of each period to be

one month, would be determined by:

$$R = \frac{V_{24}}{V_0} = \frac{0.835}{1.000} = 0.835, \text{ and}$$

$$r = 0.835^{\frac{1}{2}} - 1 = -8.6 \text{ percent}$$

If the same R had been obtained in a period of three months ($\frac{1}{4}$ of a year) the annualized rate of return would then be given by:

$$r = 0.835^{1/\frac{1}{4}} - 1 = 0.835^4 - 1 = -51.4 \text{ percent}$$

This technique is thus quite capable of permitting the investigation of annualized compounded rates of return for the basic quarterly (3 months) time periods utilized in the study as well as simultaneously removing the deficiencies of an arithmetic determination of rates of return.

FOOTNOTES

[1] ISL Daily Stock Price Index: American Stock Exchange (New York: Standard Statistics Company, Inc.), 1965-1970.

[2] Annual Dividend Record (New York: Standard and Poor's Corporation), 1965-1969.

[3] Ibid.

[4] Ibid.

[5] Stock Guide (New York: Standard and Poor's Corporation), various issues, 1965-1969.

[6] Levy, Robert A., "Measurement of Investment Performance, "Journal of Financial and Quantitative Analysis, 3(March, 1968), pp. 35-57.

CHAPTER III

METHODOLOGY OF THE STUDY--II

In this chapter the methodology of the particular portfolio models and valuation strategies are examined. The portfolio models employed are two varieties of the traditional buy-and-hold model, the Fixed Investment model and the Average Investment model, and a portfolio model recently proposed by Evans[1]--the Fixed Investment Proportion Maintenance Model (FIPM). Portfolio valuation strategies are defined as either cash-to-portfolio or cash-to-cash.

The large number of variables present in the various models and strategies makes it desirable to provide definitions in one location so as to facilitate discussion and aid comparisons. The following definitions are employed:

GPV--Gross portfolio value

NPV--Net portfolio value

GPI--Gross portfolio investment

NPI--Net portfolio investment

S--Total sales proceeds

PS--Portfolio adjustment sales

PP--Portfolio adjustment purchases

Cp--Total commissions on purchases

Cs--Total commissions on sales

Cpp--Total commissions on portfolio adjustment purchases

Cps--Total commissions on portfolio adjustment sales

A--Average investment per security

X--The number of shares owned for any security

O--Price per security

N--Number of securities in a portfolio

P--Number of securities purchased

S--Number of securities sold

Fixed Investment Model

The fixed investment portfolio model invests an equal $1000 in each security, regardless of the acquisition quarter, plus purchase commissions. The decision rule is: in the first Quarter when the portfolio is formed invest $1000 in all securities priced at or below $5 per share. If in a subsequent quarter another stock, not presently held, is selling at or below $5 per share invest $1000 in this security. Hold all securities until the entire portfolio is liquidated. The initial (i) gross portfolio investment is:

$$GPI_i = p(\$1000) + Cp \qquad (1)$$

The net portfolio investment (after sales) at the end of a quarter is:

$$NPI_{t+1} = GPI_t - (S + Cs) \qquad (2)$$

The gross portfolio value in any quarter after the first is thus:

$$GPI_{t+1} = NPI_{t+1} + p(\$1000) + Cp \qquad (3)$$

or

$$GPI_{t+1} = GPI_t - (S + Cs) + p (\$1000) + Cp \qquad (4)$$

The value of S in (2) and (4) above represents, for this model, the before-commissions liquidation proceeds for securities being sold due to mergers, delistings, etc.

Average Investment Model

The second portfolio model, the Average Investment Model, assumes the same initial $1000 investment. However, subsequent additions to the portfolio may require more or less than the $1000 investment depending on the portfolio value at the time the new investment is made. The decision rule for this model is: in the first quarter when the portfolio is formed invest exactly $1000 in all securities priced at or below $5 per share. In subsequent quarters the investment for new securities equals the average value per security in the present portfolio. Thus, if a portfolio of 20 stocks is currently valued at $30,000 any current additions require an initial investment of $30,000/20, or $1500. In this model as in the Fixed Investment Model, all securities are held until the entire portfolio holdings are eliminated.

The initial (i) gross portfolio investment is:

$$GPI_i = p(\$1000) + Cp \tag{5}$$

To derive gross portfolio investment (after the first quarter) for the Average Investment Model it is necessary to value the portfolio at the end of the quarter. The gross portfolio value at the end of a quarter is given by:

$$GPV_{t+1} = \sum_{k=1}^{n} (X_k \cdot O_k) \tag{6}$$

The net portfolio value (after sales) is derived by:

$$NPV_{t+1} = GPV_{t+1} - (S + Cs) \tag{7}$$

Thus, after sales, the average investment per security is:

$$A_{t+1} = NPV_{t+1} / (n - s) \tag{8}$$

The gross portfolio investment (for any quarter after the initial quarter) for the Average Investment Model is thus:

$$GPI_{t+1} = NPV_{t+1} + p(A) + Cp \tag{9}$$

where NPV_{t+1} is given by (7) above and A_{t+1} is derived by (6), (7), and (8) above. The difference between the Fixed Investment Model and the Average Investment Model may be seen by examining (3) and (9) above.

Over a period of quarters it is possible for the gross (and net) portfolio investment for the Average Investment Model to be above or below that required by the Fixed Investment Model depending on whether the market is rising or falling. Under either of these two models, the number of stocks and total capital required fluctuates in relation to the number of new additions and the number of stocks sold because of delistings, mergers, etc.

Fixed Investment Proportion Maintenance Model

In a recent article John L. Evans[2] contends that the buy-and-hold criterion is not an adequate standard of comparison for portfolios of securities.

> However, when the investigation is concerned with portfolios of securities this criteria is not sufficient—that is, the buy-and-hold strategy is no longer the appropriate standard against which to measure the performance of alternative policies. It will be shown that a mechanical trading rule exists which, when applied to portfolios of securities consistently leads to significantly greater expected returns than those produced by the naive buy-and-hold strategy.[3]

The FIPM model involves an intraportfolio reallocation at the portfolio value so that each individual security possesses the same percentage value of the total. For example, if at quarter t four securities

constitute equal investment in the portfolio, then at time t+1 (beginning of the next quarter) the portfolio would be reallocated so that the proportion invested in each security is maintained at 25 percent of the total portfolio value. In effect the investor follows a form of 'dollar averaging' by purchasing more shares of securities whose prices have fallen and selling shares of those securities whose prices have risen. According to Evans the FIPM model should yield superior returns to a buy-and-hold model ". . . if (1) there exists some intrinsic value of a security about which the market value fluctuates randomly and (2) the market is characterized by an inherent upward tendency over the long run."[4]

The decision rule for the FIPM is thus: in the first quarter when the portfolio is formed invest exactly $1000 in all securities priced at or below $5.00 per share. At the end of each quarter evaluate the portfolio and reallocate the individual security values so that each possesses the same percentage proportion of the total portfolio value. The investment in new additions to the portfolio in the subsequent quarter will then be the dollar equivalent of this common percentage. Again, the initial portfolio investment is given by:

$$GPI_i = p(\$1000) + Cp \tag{10}$$

And the net portfolio investment (after sales) at the end of a quarter is:

$$NPI_i = GPI_i - (S + Cs) \tag{11}$$

The remainder of the process becomes a bit more complex for the FIPM model due to ackwardness caused by brokerage commissions. The essence of the FIPM model is that the portfolio adjustment sales (PS) should be equal to the portfolio adjustment purchases (PP). Without

commissions this is simply:

$$PP = PS \tag{12}$$

with the average investment (after adjustment) being exactly equal for all securities. However, with the inclusion of brokerage commissions the equation becomes

$$PS - Cps = PP + Cpp \tag{13}$$

so that the average investment is equal. It was found extremely difficult (but not impossible given enough computer time) to satisfy equation (13). Therefore, the requirement was established that equation (12) be fulfilled (PS = PP) and then the commissions (Cps + Cpp) were added as a _gross_ contribution. The gross investment, after the initial quarter, for the FIPM model is then given by:

$$GPI_{t+1} = NPI_{t+1} + [p(A) + Cp] + [-PS + PP + Cps + Cpp] \tag{14}$$

where NPI_{t+1} is given by (11), A is given by (6), (7), and (8) and the portfolio adjustment is handled as outlined above. The gross portfolio investment necessary for the FIPM model therefore contains a slight upward bias (the sum of Cps and Cpp) that the buy-and-hold models do not contain.

In reality, one more minor adjustment was made in the FIPM model. Due to the high cost associated with making very small trades, portfolio rates of return were analyzed under three conditions in an attempt to quantitatively evaluate the impact of these small trades. The FIPM model was first permitted to make portfolio adjustments regardless of the dollar size of any trade; then the adjustments were permitted only if the dollar value of a trade exceeded $50; then only if the dollar value of a trade exceeded $100. Although tables will later present the returns achieved under each of the three conditions, the $100

restriction—FIPM model demonstrates superiority even though equation
(12) is not strictly fulfilled.

Valuation Strategies

With regard to the portfolio models, two valuation strategies were
utilized in determining portfolio values in the terminal quarter. In
accordance with Fisher and Lorie's[5] terminology, these are a Cash-to-
Portfolio strategy and a strategy and a Cash-to-Cash strategy. Both
strategies retain the assumptions of tax-exempt portfolios and non-
reinvestment of dividends.

Cash-to-Portfolio

A Cash-to-Portfolio valuation strategy may be defined as the strat-
egy by which the annualized, compounded rates of return are determined
after interim payments of commissions on transactions involving an addi-
tion or deletion to the portfolio and retaining the portfolio, without
liquidation, at the end of the terminal quarter. Under this strategy
the S term in equations (2), (4), (7), and (11) for the final quarter
represents only the sale of securities being delisted, merged, etc., in
that particular quarter.

Cash-to-Cash

A Cash-to-Cash valuation strategy may be defined as the strategy
by which the annualized, compounded rates of return are determined after
interim payments of commissions on transactions involving an addition
or deletion to the portfolio as well as payment of commissions for con-
version of the entire portfolio holdings into cash at the end of the

terminal quarter. Under this strategy the S term in equations (2), (4), (7), and (11) for the final quarter represents the sale of all stocks in the portfolio and the Cps term represents the commissions necessary for this liquidation of the portfolio, rather than securities being sold because of delisting, mergers, etc.

There are thus six possible combinations of portfolio models and valuation strategies by which to compute the rates of return: Fixed Investment Model—Cash-to-Portfolio; Fixed Investment Model—Cash-to-Cash; Average Investment Model—Cash-to-Portfolio; Average Investment Model—Cash-to-Cash; FIPM Model—Cash-to-Portfolio, and; FIPM Model—Cash-to-Cash. Each of these combinations are utilized.

FOOTNOTES

[1]Evans, John L., "The Random-Walk Hypothesis, Portfolio Analysis and the Buy-and-Hold Criterion," *Journal of Financial and Quantitative Analysis*, 3(September, 1968), pp. 327-342.

[2]Ibid.

[3]Ibid.

[4]Ibid.

[5]Fisher, Lawrence and Lorie, J. H., "Rates of Return on Investments in Common Stocks," *Journal of Business*, 37(January, 1964), pp. 1-12, 15-17.

CHAPTER IV

PRESENTATION OF RESULTS

In this chapter rates of return, dividends, and commissions data are presented, as well as supplemental statistics on portfolio sample sizes and cumulative portfolio investments required. The primary breakdown for presentation of rates of return will be cash-to-portfolio versus cash-to-cash (assuming, in the latter case, complete liquidation of the portfolios). In each of these catagories three situations will be examined: (1) the Fixed Investment Model; (2) the Average Investment Model, and; (3) the FIPM Model employing the $100 minimum adjustment restriction. Deviations from this breakdown will occur, however, when the returns from portfolios possessing fractional shares are compared to returns from portfolios possessing only whole shares, and when returns are compared for the FIPM Model employing a zero, $50, and $100 adjustment restriction. Whenever possible (e.g., for cumulative commissions), the presentation of the supplemental data will also follow this format; however, in some cases (e.g., for cash dividends) the differentiation between cash-to-portfolio and cash-to-cash is unnecessary. For such data, tables are merely presented by portfolio model or, if even this differentiation is unnecessary (e.g. portfolio sample sizes) as a common, all-encompassing table. While the results of the supplementary data are analyzed herein, the actual tables for such data are presented in Appendix B.

Cash-to-Portfolio Rates of Return

The tax-exempt cash-to-portfolio returns are presented in Tables I, II, and III. The annualized, compounded rate of return for any quarter, or combinations of quarters, may be determined by selecting the initial quarter from the vertical column and moving horizontally to the desired termination quarter. For example, if the initial quarter was April, 1965 (1965-2) and the termination quarter was July, 1968 (1968-3) the rate of return, compounded annually, would be 53 percent. The first diagonal row indicates the returns on all portfolios of only one quarter in duration and, because of the identical initial $1000 investments, are the same returns regardless of the portfolio model chosen.

An examination of these tables indicate, first, the fairly high, positive rates of return achieved for most holding periods except portfolios formed in 1969. While data indicating the rates of return for all stocks listed on the American Stock Exchange are unavailable, the average price of a share of stock (the American Stock Exchange index) is known. Compared with the price on January 1, 1965, the average price at January 1, 1966 and 1967 had increased about 40 percent, as of January, 1968 about 140 percent, and by 1969 about 200 percent. Note that these percentages are neither annualized nor compounded. For most comparable time periods the portfolio rates of return (for all three models) exceeded the returns on an average share of stock on the American Stock Exchange. Although unavailable at the present time, returns for this 1965-1969 time period from Fisher and Lorie's study[1] should provide interesting comparisons.

The second factor shown by the tables is the extreme volatility in

TABLE I

CASH-TO-PORTFOLIO ANNUAL RATES OF RETURN--FIXED INVESTMENT MODEL

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	84.3	21.3	21.4	49.0	72.6	46.2	20.8	20.0	35.3	45.6	52.5	54.5	46.2	55.8	56.0	56.2	48.5	40.9	32.9	29.9
1965 2		-28.5	-8.1	32.0	63.3	34.2	8.4	8.8	26.4	38.4	47.1	50.2	42.2	53.0	54.0	54.8	46.7	39.5	31.2	27.7
1965 3			-0.4	64.7	103.9	50.0	13.0	11.8	33.8	47.8	57.5	59.9	49.4	61.2	61.6	61.2	51.3	42.9	33.8	30.0
1965 4				143.4	190.3	70.6	15.9	13.6	39.6	54.7	66.2	68.3	55.2	68.6	68.7	68.3	56.9	47.3	37.0	32.6
1966 1					247.1	40.4	-9.2	-7.4	22.3	39.9	56.2	59.7	48.7	64.5	65.2	65.9	54.0	44.5	34.5	29.6
1966 2						-46.3	-53.3	-40.7	-6.6	16.0	36.5	41.7	34.0	51.2	53.4	54.7	44.2	35.0	25.7	21.4
1966 3							-64.6	-42.4	7.5	38.7	63.8	67.2	52.0	71.8	72.2	72.3	58.0	45.7	33.7	28.2
1966 4								-14.4	83.3	111.3	129.6	120.3	87.9	108.5	103.0	99.8	78.8	62.2	46.8	39.3
1967 1									261.8	217.1	212.9	181.2	122.8	145.1	134.9	125.9	96.5	74.8	55.7	45.5
1967 2										106.1	168.9	135.3	91.3	125.4	122.5	118.5	89.6	67.2	46.6	35.6
1967 3											269.0	147.5	87.7	136.4	134.4	130.1	95.9	71.8	48.4	35.9
1967 4												49.1	30.2	95.1	114.4	114.8	80.5	54.3	31.5	22.4
1968 1													14.6	145.6	148.9	132.2	83.4	50.3	25.9	15.9
1968 2														347.7	228.6	182.4	100.5	57.8	26.6	14.5
1968 3															47.1	129.9	39.8	7.8	1.1	-10.4
1968 4																307.5	54.9	3.0	1.5	-16.4
1969 1																	-41.3	-46.8	-46.7	-53.5
1969 2																		-56.6	-28.9	-43.9
1969 3																			-49.4	-45.1
1969 4																				-31.6

TABLE II

CASH-TO-PORTFOLIO ANNUAL RATES OF RETURN—AVERAGE INVESTMENT MODEL

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	84.3	21.3	21.3	48.7	72.1	45.8	20.4	19.6	34.9	45.1	52.2	54.3	46.4	55.9	56.2	56.4	48.6	41.1	33.2	30.0
1965 2		-28.5	-8.0	32.1	63.5	34.2	8.4	8.8	26.3	38.3	47.0	50.2	42.3	53.1	54.1	54.9	46.8	39.5	31.3	27.7
1965 3			-0.4	64.6	103.9	49.9	12.8	11.7	33.6	47.4	57.2	59.7	49.4	61.2	61.7	61.3	51.4	43.0	34.0	30.0
1965 4				143.4	190.3	70.5	15.7	13.5	39.3	54.3	65.9	68.1	55.3	68.6	68.7	68.3	57.0	47.3	37.1	32.5
1966 1					247.1	40.3	-9.2	-7.4	22.2	39.7	55.9	59.4	48.5	64.2	64.9	65.7	53.9	44.4	34.4	29.3
1966 2						-46.3	-53.2	-40.6	-6.5	16.0	36.0	41.1	33.4	50.5	53.0	54.4	44.1	34.9	25.6	20.9
1966 3							-64.6	-42.4	7.5	38.7	63.5	66.9	51.7	71.3	71.8	72.2	58.0	45.6	33.6	27.8
1966 4								-14.4	83.3	111.2	129.2	120.0	87.7	108.2	102.7	99.5	78.5	61.9	46.6	38.9
1967 1									261.8	216.8	212.3	180.7	122.6	144.7	134.4	125.5	96.2	74.4	55.4	45.0
1967 2										106.1	168.7	135.1	91.2	125.1	122.1	118.2	89.3	66.9	46.4	35.2
1967 3											269.0	147.5	87.7	136.1	134.1	129.9	95.7	71.4	48.1	35.3
1967 4												49.1	30.2	95.0	114.3	114.6	80.4	53.9	31.4	21.7
1968 1													14.6	145.6	148.9	132.2	83.4	50.0	25.8	15.3
1968 2														347.7	228.6	182.4	100.5	57.4	26.6	13.9
1968 3															47.1	129.9	39.8	7.4	0.7	-11.2
1968 4																307.5	54.9	2.5	1.0	-17.2
1969 1																	-41.3	-46.6	-46.6	-53.9
1969 2																		-56.6	-28.5	-43.8
1969 3																			-49.4	-45.0
1969 4																				-31.6

TABLE III

CASH-TO-PORTFOLIO ANNUAL RATES OF RETURN--FIPM MODEL ($100 RESTRICTION)

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	84.3	20.4	21.9	48.6	71.4	48.0	22.1	19.3	36.5	45.4	54.5	55.8	49.1	59.4	60.2	60.9	52.9	44.5	36.2	32.6
1965 2		-28.5	-5.9	33.8	66.2	40.2	12.8	11.3	30.5	40.8	51.6	53.5	47.0	58.2	59.6	60.8	52.3	43.3	34.6	31.1
1965 3			-0.4	64.1	105.1	56.7	17.9	14.5	37.4	48.9	60.6	61.9	53.5	65.9	66.7	67.4	57.4	47.4	37.8	33.8
1965 4				143.4	188.5	80.1	22.0	16.5	43.8	56.0	69.7	70.5	59.6	73.4	73.8	74.0	62.6	51.2	40.5	36.0
1966 1					247.1	55.0	-2.3	-3.6	28.9	44.4	61.9	64.1	54.7	70.9	72.3	73.1	61.2	49.4	38.2	33.4
1966 2						-46.3	-54.0	-42.0	-4.4	15.7	37.8	42.5	36.2	53.8	57.5	59.9	49.2	38.1	27.5	23.3
1966 3							-64.6	-42.8	12.2	38.9	66.4	67.4	54.7	75.3	77.1	77.7	63.3	48.8	35.7	30.2
1966 4								-14.4	91.2	111.2	132.3	119.5	90.4	111.7	107.4	105.1	83.5	64.6	48.2	41.1
1967 1									261.8	205.1	208.9	170.8	119.5	142.7	133.2	126.6	98.3	75.2	54.8	45.7
1967 2										106.1	171.9	134.2	91.7	125.9	122.3	121.2	92.8	66.9	45.9	35.9
1967 3											269.0	144.8	88.1	135.4	133.2	134.2	100.8	72.7	47.8	36.3
1967 4												49.1	35.0	97.1	112.4	120.2	86.8	56.1	32.3	23.6
1968 1													14.6	141.1	143.7	144.4	94.7	56.3	29.6	19.9
1968 2														347.7	218.6	202.2	114.0	61.9	29.3	17.8
1968 3															47.1	128.1	46.1	10.0	-1.5	-9.9
1968 4																307.5	52.6	-0.1	-3.3	-16.5
1969 1																	-41.3	-47.2	-46.6	-53.6
1969 2																		-56.6	-31.1	-41.7
1969 3																			-49.4	-41.2
1969 4																				-31.6

portfolio returns. Note that the level of returns range from a -64.6 percent to a positive 347.7 percent. Most of the volatility also appears in the earlier quarters while returns stabilize somewhat over the longer time periods. Third, both of the buy-and-hold models' rate of returns were closely similiar. Excluding the first diagonal row, leaving 190 quarter combinations, the Average Investment Model and the Fixed Investment Model Returns were within 0.1 percent of each other 90 times, and were within 0.5 percent 180 of the 190 combinations. The Fixed Investment Model does, however, appear to possess a consistent, though mild, superiority for in the 100 combinatons differing by more than 0.1 percent, the Fixed Investment Model's return is higher for 93 combinations, with the Average Investment Model outperforming the Fixed Investment Model in only 7.

The general superiority of the FIPM Model (as compared with the Fixed Investment and Average Investment Models) is also demonstrated. Again eliminating the first diagonal row, returns from the FIPM Model exceeded the returns from both of the other models 150 times, often by 6 percent or more. Note also that of the 40 times the returns from the FIPM Model were not superior, 12 of these were in the immediate quarter after initiation of the portfolio, indicating the FIPM Model becomes more superior than the other models with time. In general, these find-ings support some earlier findings that timing is essential in deter-mining rates of return, and that portfolio returns tend to stabilize over longer time periods.

Cash-to-Cash Portfolio Rates of Return

Tables IV, V, and VI present cash-to-cash rates of return for the

three different models. The same relative tendencies found in Tables

I, II, and III are also evident in these tables. The impact of final

brokerage commissions on the absolute rates of return, however, is, in

some cases, very substantial. For example, the rate of return for the

Fixed Investment Model for the period 1965-1 to 1965-2 was 84.3 percent

under a cash-to-portfolio valuation strategy, while it was only 61.5

percent under the cash-to-cash assumption. However, for longer time

periods the differences decrease, and in many cases the rates of re-

turn (for the two situations) differ by as little as 0.1 to 0.4 per-

cent. This provides ample evidence of the importance of commissions

(both in and out) on common stock returns, particularly when returns

on low-priced common stocks are examined.

Portfolio and Stock Characteristics

The relatively high portfolio returns presented in Tables I

through VI coupled with the variability of returns requires further

examination. Inorder to evaluate why these results occurred, the

following are examined: (1) total portfolio size; (2) total portfolio

investment; (3) total portfolio commissions and cash dividends, and;

(4) some characteristics of the low-priced common stocks forming the

portfolios.

Total Portfolio Size

The number of securities included in various portfolios was by no

means constant over the time periods. It should be noted, however, that

the respective portfolio sample sizes are identical for the three models

(under either the cash-to-portfolio or cash-to-cash valuation

TABLE IV

CASH-TO-CASH ANNUAL RATES OF RETURN--FIXED INVESTMENT MODEL

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	61.5	13.3	15.9	44.5	69.0	43.6	18.7	18.1	33.7	44.2	51.3	53.5	45.3	55.0	55.4	55.6	47.9	40.5	32.5	29.5
1965 2		-38.5	-14.8	26.1	58.6	30.9	5.9	6.6	24.4	36.7	45.6	48.9	41.1	52.0	53.1	54.1	46.0	38.9	30.6	27.2
1965 3			-13.4	54.8	97.0	46.0	10.2	9.4	31.7	46.0	56.0	58.7	48.3	60.3	60.9	60.5	50.7	42.4	33.3	29.5
1965 4				114.1	175.7	64.5	12.2	10.6	36.9	52.5	64.5	66.9	54.0	67.6	67.9	67.6	56.3	46.7	36.5	32.1
1966 1					209.4	32.0	-13.4	-10.9	19.0	37.2	53.9	57.8	47.1	63.2	64.0	64.9	53.1	43.8	33.8	29.0
1966 2						-53.2	-56.9	-44.1	-10.3	12.7	33.5	39.3	31.9	49.4	51.9	53.4	43.0	34.0	24.8	20.5
1966 3							-69.5	-47.0	2.2	34.2	60.0	64.3	49.7	69.8	70.5	70.9	56.8	44.6	32.8	27.3
1966 4								-25.4	72.7	104.2	124.5	116.8	85.4	106.5	101.5	98.6	77.8	61.3	46.1	38.6
1967 1									222.5	201.9	204.4	176.1	119.6	142.8	133.3	124.7	95.5	74.0	54.9	44.8
1967 2										83.4	156.2	128.5	87.3	122.5	120.4	117.1	88.4	66.3	45.7	34.8
1967 3											231.8	135.6	81.8	132.2	131.5	128.3	94.5	70.7	47.4	35.0
1967 4												32.1	22.8	89.2	110.5	112.2	78.6	52.7	30.3	21.3
1968 1													1.4	134.2	142.3	128.3	80.9	48.4	24.4	14.6
1968 2														306.1	215.5	176.1	97.0	55.4	24.9	13.1
1968 3															30.6	120.7	35.8	5.0	-1.1	-12.3
1968 4																268.9	46.8	-1.4	-1.9	-19.0
1969 1																	-48.2	-51.0	-50.0	-56.2
1969 2																		-61.8	-33.5	-47.0
1969 3																			-55.3	-48.7
1969 4																				-39.2

TABLE V

CASH-TO-CASH ANNUAL RATES OF RETURN--AVERAGE INVESTMENT MODEL

From Quarter	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	61.5	13.2	15.9	44.2	68.5	43.2	18.2	17.6	33.1	43.6	50.9	53.2	45.4	55.1	55.5	55.7	48.0	40.6	32.7	29.5
1965 2		-38.5	-14.8	26.2	58.7	30.9	5.9	6.5	24.2	36.5	45.5	48.8	41.2	52.1	53.2	54.1	46.1	38.9	30.7	27.1
1965 3			-13.4	54.8	97.0	45.9	10.0	9.2	31.3	45.5	55.6	58.4	48.3	60.2	60.9	60.6	50.8	42.4	33.4	29.5
1965 4				114.1	175.7	64.3	12.0	10.5	36.5	52.0	64.1	66.6	54.0	67.5	67.8	67.5	56.3	46.6	36.5	32.0
1966 1					209.4	32.0	-13.5	-10.9	18.9	36.9	53.5	57.5	46.9	62.9	63.8	64.8	53.0	43.6	33.7	28.7
1966 2						-53.2	-56.8	-43.9	-10.0	12.9	33.3	38.8	31.5	48.8	51.5	53.2	43.0	33.9	24.7	20.1
1966 3							-69.5	-46.9	2.5	34.4	59.9	64.0	49.4	69.3	70.2	70.9	56.8	44.6	32.7	26.9
1966 4								-25.4	72.6	104.1	124.2	116.5	85.2	106.2	101.2	98.3	77.5	61.0	45.8	38.2
1967 1									222.5	201.7	203.8	175.7	119.3	142.3	132.7	124.2	95.1	73.6	54.7	44.3
1967 2										83.4	156.0	128.4	87.2	122.1	120.1	116.8	88.1	65.9	45.5	34.3
1967 3											231.8	135.6	81.8	131.9	131.2	128.0	94.3	70.2	47.1	34.4
1967 4												32.1	22.8	89.0	110.3	112.0	78.4	52.3	30.1	20.5
1968 1													1.4	134.2	142.3	128.3	80.9	48.1	24.3	13.9
1968 2														306.1	215.5	176.1	97.0	55.0	24.8	12.4
1968 3															30.6	120.7	35.8	4.6	-1.5	-13.1
1968 4																268.9	46.8	-2.0	-2.5	-19.9
1969 1																	-48.2	-50.8	-49.8	-56.4
1969 2																		-61.8	-33.1	-46.7
1969 3																			-55.3	-48.5
1969 4																				-39.2

TABLE VI

CASH-TO-CASH ANNUAL RATES OF RETURN--FIPM MODEL ($100 RESTRICTION)

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	61.5	12.1	16.2	43.8	67.5	45.1	19.7	17.1	34.5	43.7	53.1	54.5	48.0	58.4	59.4	60.2	52.2	43.8	35.6	32.0
1965 2		-38.5	-12.8	27.7	61.4	36.7	10.2	8.9	28.4	38.9	49.9	52.0	45.8	57.1	58.6	60.0	51.5	42.6	33.9	30.4
1965 3			-13.4	54.1	98.0	52.4	14.8	11.9	35.1	46.8	58.9	60.4	52.2	64.8	65.8	66.6	56.7	46.7	37.2	33.2
1965 4				114.1	173.7	73.5	18.0	13.2	40.9	53.5	67.7	68.8	58.2	72.2	72.8	73.2	61.8	50.4	39.8	35.3
1966 1					209.4	46.1	-6.7	-7.3	25.5	41.5	59.5	62.0	53.0	69.4	71.0	72.0	60.3	48.5	37.3	32.6
1966 2						-53.2	-57.6	-45.3	-8.0	12.5	35.0	40.0	34.1	52.0	55.9	58.5	48.0	37.0	26.4	22.3
1966 3							-69.5	-47.3	7.0	34.5	62.6	64.3	52.2	73.2	75.3	76.2	62.0	47.6	34.6	29.2
1966 4								-25.4	80.2	103.9	127.0	115.7	87.7	109.5	105.7	103.8	82.4	63.6	47.2	40.3
1967 1									222.5	189.9	199.9	165.2	115.8	140.0	131.2	125.1	97.1	74.1	53.8	44.8
1967 2										83.4	158.8	126.8	87.1	122.4	119.8	119.3	91.3	65.5	44.7	34.8
1967 3											231.8	132.3	81.6	130.6	129.7	131.8	99.0	71.1	46.4	35.1
1967 4												32.1	27.2	90.8	108.1	117.1	84.6	54.2	30.8	22.2
1968 1													1.4	130.0	136.7	140.3	91.9	54.1	27.8	18.4
1968 2														306.1	204.9	195.3	110.1	59.2	27.3	16.1
1968 3															30.6	118.6	41.8	7.1	-3.8	-11.9
1968 4																268.9	44.4	-4.6	-6.7	-19.2
1969 1																	-48.2	-51.5	-49.8	-56.1
1969 2																		-61.8	-35.5	-44.7
1969 3																			-55.3	-44.8
1969 4																				-39.2

strategies). The inconsistency in portfolio sizes was due in large part to the general increase in market prices of stocks listed on the American Stock Exchange during the 1965-1969 period. While stock prices declined in 1969, the general increase in prices during prior years meant that fewer securities were trading in the 0-$5 price range. Table VII indicates all new portfolios formed after the thrid quarter of 1967 contained less than 100 securities and all new portfolios (except 1969-4) formed after the third quarter of 1968 contained less than 50 securities (In interpreting Table VII it is important to remember that securities may enter into the portfolios after the initial quarter, but may not be sold except for mergers, delistings, etc.). The number of securities included in the porfolios ranged from a high of 341 to a low of seven. Due to the relatively small portfolio sizes in 1968 and 1969, there is somewhat less confidence in these returns being indicative of returns from low-priced stocks during this time period.

Portfolio Investment Levels

Not only is the number of securities subject to change, but the three models also require different total dollar investments. Supplemental Tables I, II, and III (see Appendix B) present the cumulative investment required for the Fixed Investment Model, Average Investment Model, and FIPM Model, respectively. The smallest investment for any of the quarter-combinations was $7200, while the largest cumulative investment was $386,000. The first diagonal row is again the same for all three models. In general, the FIPM Model required the largest investment, the Average Investment Model required less than the FIPM Model, and the Fixed Investment Model required the least. This occurred,

TABLE VII

TOTAL PORTFOLIO SIZE FOR THE MODELS

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	278	283	307	312	306	305	307	329	341	339	333	324	320	315	305	296	289	288	282	280
1965 2		242	266	271	265	265	267	289	303	301	296	287	283	280	271	264	258	259	253	251
1965 3			276	281	276	276	278	300	312	310	305	296	292	289	279	273	267	267	261	259
1965 4				252	247	247	249	272	284	282	277	269	265	262	252	245	241	241	235	233
1966 1					205	205	208	231	243	241	236	228	226	223	215	209	207	209	203	201
1966 2						173	177	200	212	210	206	199	197	195	188	181	179	181	178	177
1966 3							197	220	232	230	226	219	217	214	207	200	199	200	196	194
1966 4								262	274	272	268	259	255	251	242	234	231	232	227	225
1967 1									260	258	254	245	243	240	231	223	220	221	217	215
1967 2										178	174	167	165	163	157	151	150	151	149	149
1967 3											132	128	127	125	119	112	111	112	111	111
1967 4												80	80	79	73	68	67	69	69	69
1968 1													73	72	66	61	60	62	62	62
1968 2														76	70	65	65	67	66	67
1968 3															26	22	22	24	25	27
1968 4																14	14	16	17	19
1969 1																	7	9	10	13
1969 2																		12	13	16
1969 3																			30	31
1969 4																				61

in large part, because the Average Investment and FIPM Models often required initial investments in excess of $1000 for securities purchased subsequent to the initial quarter. In addition, the FIPM Model required even greater investment due to treatment of commissions necessitated when intraportfolio adjustment occurred (See Chapter III, equations (12), (13), and (14).

Brokerage Commissions and Cash Dividends

Supplemental Tables IV through IX (Appendix B) present the cumulative brokerage commissions for the three models under the cash-to-portfolio and cash-to-cash strategies, respectively. The amount of cash dividends received are then shown in Supplemental Tables X, XI, and XII (Appendix B). Under the cash-to-portfolio strategy, with only nine exceptions (in 210 periods) cumulative commissions exceeded cumulative dividends in the Fixed Investment Model; in the Average Investment Model there were eleven exceptions, and; in the FIPM Model, commissions were considerably larger than dividends in all 210 periods. However, for both the Fixed Investment and Average Investment Models, the slope (when graphed) of the 'dividends curve' appears to be greater than the slope of the 'commissions curve', with 18 to 20 quarters required for the former to overtake the latter. No such statement can be made for the FIPM Model. In the cash-to-cash situation, commission charges (for all models) always exceeded cash dividends.

An aggregrate comparison actually understates the magnitude of the difference if the time value of money is recognized. While most commission charges were incurred early in the portfolios, dividends tended to flow in more rapidly as the length of the period was extended. The

relatively low level of cash dividends to brokerage commissions was primarily due to: (1) relatively higher brokerage charges on low-priced common stocks than on higher priced stocks and (2) the fact that only 125 (out of 386) stocks paid any cash dividends during the examination period.

Characteristics of the Low-Priced Stocks

The characteristics presented in this section include: (1) the stocks that had to be sold and (2) the relationship between the initial purchase price and the maximum (highest) price attained. One hundred and six stocks had to be sold or dropped from the portfolios. Table VIII indicates that 40 stocks disappeared because of mergers, one was

TABLE VIII

DISPOSITION OF LOW-PRICED STOCKS
SOLD FROM PORTFOLIOS

Selling Price Relative to Purchase Price	Reason Why Sold				
	Acquired or Merged	Called	Dropped, Halted or Suspended	Liquidated	TOTAL
Selling price equal to or greater than purchase price	38	1	18	1	58
Selling price less than purchase price but greater than zero	2	--	14	--	16
Selling price equals zero	--	--	32	--	32
TOTAL	40	1	64	1	106

called, 64 were dropped, halted or suspended, and one was liquidated.

Of these 106 stocks, gains were posted on 58, partial losses on 16, and

32 were treated as complete losses.

Table IX indicates the relationship between the initial purchase

TABLE IX

HIGH PRICE RELATIVE TO PURCHASE
PRICE FOR LOW-PRICED STOCKS[a]

Percentage Increase from Purchase Price to High Price	Purchase Price					
	0 to 1.00	1.01 to 2.00	2.01 to 3.00	3.01 to 4.00	4.01 to 5.00	TOTAL
0	1	1	2	5	9	18
0 to 50	4	3	4	8	15	34
50 to 100	2	5	2	2	14	25
100 to 200	2	2	7	10	26	47
200 to 300	—	4	11	15	30	60
300 to 400	1	5	6	11	18	41
400 to 500	—	5	16	9	16	46
500 to 700	2	8	6	6	12	34
700 to 1000	4	14	5	6	12	41
1000 to 2000	3	6	5	1	5	20
over 2000	7	6	3	1	3	20
TOTAL	26	59	67	74	160	386

[a]Time period is not the same for all stocks.

price of stocks included in the portfolios and the highest price during

the period examined. The percentage increases for many of the stocks

ranged as high as 2000 to 4000 percent. However, eighteen stocks

included in the portfolios never rose above their purchase price. Note, too, that the time periods over which these changes occurred are not the same for all stocks. Many of the securities first bought in latter 1968 or in 1969 are described in the lower columns. Given more time these may or may not have experienced larger percentage changes. In general these findings indicate that, under favorable circumstances, it is not unusual for many low-priced stocks to increase in excess of 300 percent during the 1965-1969 time period.

FIPM Adjustment Restrictions

As mentioned earlier, the FIPM Model whose rates of return are presented in Tables III and VI employed a $100 minimum adjustment restriction. This model was initially tested, however, with both no restriction and again with a $50 trading restriction. The results of these tests are presented in Appendix B, as Supplemental Tables XIII, and XIV. While the difference in returns for the 0-$50-$100 restrictions were occasionally negligible, the consisent overall superiority of the $100 restriction prompted its use. Additional investigation of intraportfolio adjustment procedures remains needed however. The particular restrictions tested were arbitrarily selected and differing restrictions could quite conceivably improve the model.

Whole Versus Fractional Shares

Another simplifying assumption made in the study was the allowance of fractional share purchases when investing in securities. Due to the limited number of transactions in the Fixed Investment and Average Investment Models this assumption is less critical than for the FIPM

Model. Consequently, a test run was made using the cash-to-portfolio FIPM Model (with the $100 restriction) which permitted only whole shares to be purchased. Supplementary Table XV in Appendix B presents the rates of return for the whole-share assumption. It appears that the returns, while often similiar, are generally somewhat higher than those from the fractional share run. Consequently, the rates of return presented in Tables III and VI (FIPM Model) may be slightly upward biased.

FOOTNOTES

[1]Fisher, Lawrence and Lorie, James H., "Rates of Return on Investments in Common Stock: The Year-by-Year Record, 1926-1965, "Journal of Business, 41(July, 1968), pp. 1-26.

CHAPTER V

CONCLUSIONS

The primary purpose of this study was to ascertain historical rates
of return from portfolios of low-priced stock listed on the American
Stock Exchange during 1965 to 1969. In addition the study examined the
impact of transaction costs, receipt of dividends, portfolio sizes, and
required portfolio investments along with supplementary characteristics
of the low-priced stocks themselves. Returns were presented for three
different portfolio models on both a cash-to-portfolio and a cash-to-
cash basis.

The major findings of the study may be summarized as follows.
First, the annualized, tax-exempt rates of return on portfolios of low-
priced stock were fairly high and positive although portfolios formed
during the last year of the study (1969) produced negative rates of
return. Second, the rates of return exhibit extreme volatility. The
returns ranged from 347.7 percent to -64.6 percent for the cash-to-
portfolio strategy, and from 306.1 percent to -69.5 percent for cash-to-
cash portfolios. Negative returns were found in approximately twenty-
seven portfolios (out of 210).

All models were based on the basic decision rule of adding, each
quarter, all stocks that met the 0-$5 criteria. In general, the most
superior returns were yielded by the FIPM Model, with the two buy-and-
hold models, Fixed Investment and Average Investment, yielding quite

similiar returns to each other. The same pattern occurred even after inclusion of brokerage commissions in the FIPM Model. Further research is needed on how to effectively integrate brokerage commissions into the FIPM Model. This is particularly true when the intraportfolio adjustments are made at the end of each quarter. The $100 minimum trading range employed in this study means that portfolio adjustment purchases will not, in general, equal portfolio adjustment sales. Accordingly, net contributions (to the gross portfolio investment) or net withdrawals are required each quarter for the FIPM Model.

Cash dividends were usually much less than commissions for all 3 models on either a cash-to-portfolio or cash-to-cash basis. For the buy-and-hold models, however, dividends begin to compensate for the commissions after approximately 18-20 quarters. The impact of brokerage commissions themselves on the cash-to-cash returns was substantial for short holding periods, but diminished over longer periods.

Of the 386 stocks included in the study, 106 had to be disposed of and 32 (of the 106) were assumed a complete loss. These figures are indicative of the susceptability of low-priced stocks to merger, delisting, or liquidation. Many stocks, however, experienced considerable appreciation in price. Some 202 (of 386) securities increased above the initial purchase price by 300 percent or more, with 40 stocks increasing greater than 1000 percent, and 20 more than 2000 percent. Additional research may be quite helpful (and perhaps quite profitable) in segregating these high-potential securities from those which do not appreciate in value. Some additional suggestions for further research are also provided. First, the FIPM Model needs considerable investigation both in the role of dividends as well as adjustment commissions. The superior returns of

this model suggest that research may be more rewarding here than for the traditional buy-and-hold models. Second, examination of differing time periods and market environments are required to discover if the returns presented in the study are representative. Along these same lines, the study of low-priced stocks from other exchanges and the over-the-counter market would provide valuable comparisons of returns. Lastly, thorough, historical studies of rates of return from stocks in other price classes are now needed. The investor will then be able to objectively evaluate potential return from a low, medium, or high-priced common stock investment.

It is appropriate to conclude with a caveat: In this study, as in others attempting to measure investment performance, a number of assumptions are required. First a time period must be selected. Next, investment models or procedures must be specified. Finally, a decision has to be made on the treatment of commissions and dividends. The problems were carefully considered (especially with reference to the FIPM Model) and what seemed reasonable assumptions were made. While others might wish for slightly different assumptions, confidence is expressed in the basic accuracy and validity of the results.

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APPENDIX A

STOCKS INCLUDED IN THE STUDY

Code Letters

C = Called

D = Delisted

L = Liquidated

M = Merged

N = Name Change (See end of Appendix A)

S = Suspended

X = Stock assumed to be total loss

Company	Initial Quarter in Study	Terminal Quarter in Study	Data Card No.
1. Aberdeen Petroleum	1	21	1
2. ABKCO Ind. (N)	1	14(S)	46
3. Acme Hamilton Mfg.	1	21	2
4. Acme Precision	1	21	3
5. Aeroflow Dynamics	1	21	4
6. Aid Investment	1	2(M)	5
7. AIM Co. (N)	1	21	16
8. Airlift International	19	21	383
9. Alaska Airlines	1	21	6
10. Allegheny Airlines	1	21	8
11. Allian TR	8	21	336
12. Allied Artists Pictures	1	21	9
13. All-State Properties	1	5(D)	7
14. Almar Rainwear	1	7(M)	10
15. Alsco	1	21(M)	11
16. Amco Industries	1	21	12
17. American Beverage	1	14(M)	13
18. American Book-Stratford	4	21	313
19. American Business Systems	1	18(M)	14
20. American Electron	1	11(S)(X)	15
21. American Israeli Paper Mills	3	21	286

Company	Initial Quarter in Study	Terminal Quarter in Study	Data Card No.
22. American MARC	1	7(M)	17
23. Amrep Corp (N)	1	21	18
24. Andy Gard Corp	3	21	287
25. Anglo Laurto	10	21	377
26. Anthony Pools	7	21	329
27. AO Industries (N)	3	21	288
28. Apollo Industries	9	21	361
29. Applied Devices (N)	1	3(S)	35
30. Argus	1	21	19
31. Arrow Electronics	1	21	20
32. Asamera Oil Corp	1	21	21
33. Assoc. Food Stores	1	21	22
34. Astrex	1	21	24
35. ATCO Chemical-Ind. Prod.	1	21	25
36. Atlas Sewing Centers	1	5(D)(X)	26
37. Automatic Radio Mfg.	1	21	27
38. Avien	1	21	28
39. BACM Industries (N)	8	21	337
40. Baldwin Securities	1	21	29
41. Banff Oil	1	21	30
42. Banner Industries	1	21	31
43. Barnwell Industries	4	21	314
44. Bartell Media	3	21	289
45. Barth-Spencer Corp	10	21	378
46. Barton's Candy	5	21	323
47. Baruch-Foster	1	21	33
48. Bell Electronics	1	21	34
49. Bethlehem Corp	3	21	290
50. Birdsboro	3	17(M)	291
51. Bloomfield Bldg. Ind.	1	21	37
52. Blossman Hydratane Gas	9	16(S)	362
53. Bluebird (N)	1	21	232
54. Brad Foote Gear Works	1	19(M)	39
55. Brascan Ltd. (N)	1	21	40
56. Brewster Industries (N)	1	8(D)	132
57. BSF Co.	1	15(D)(X)	41
58. Buell Industries	1	21	42
59. Bunko Ramo	8	21	338
60. Burma Mines	1	16(S)	43
61. Burnell Co.	1	8(M)	44
62. Burrough, J. P.	1	21	45
63. Butler Aviation (N)	1	21	135
64. Butte Gas & Oil	8	21	339
65. Campbell Chib Mines	1	21	47
66. Canada South Petroleum	1	15(D)(X)	48
67. Canadian Export Gas & Oil	1	21	50
68. Canadian Gridoil	6	21	326
69. Canadian Homestead Oils	1	21	51
70. Canadian Marconi Co.	1	21	53
71. Canadianwide Properties	1	11(D)(X)	54

Company	Initial Quarter in Study	Terminal Quarter in Study	Data Card No.
72. Canadian Williston Min.	1	6(D)	55
73. Canaveral International	1	21	56
74. Carreras	1	16(S)	57
75. Carter, J. W.	1	12(M)	58
76. Castleton Industries (N)	1	21	261
77. Catalin	1	6(M)	59
78. CBK Industries	9	21	363
79. CCI Corp	1	21	60
80. CDRH, Ltd. (N)	1	4(D)	49
81. Century Geophysical	1	21	62
82. Charon Industries (N)	1	21	38
83. Charter Oil	1	17(S)	63
84. Chief Consolidated Mining	1	17(S)	64
85. Christiana Oil Corp	3	21	292
86. Cinerama	1	21	65
87. Clark Cable	1	21	66
88. Clary Corp	1	21	67
89. Clopay Corp	1	21	68
90. Cohu Electronics	1	21	69
91. Commonwealth United Corp	2	20(D)	279
92. Community Discount Centers	1	14(M)	70
93. Compudyne	1	21	71
94. Condec Corp	1	21	72
95. Connelly Containers	1	21	73
96. Conroy (N)	9	21	364
97. Consol. Cdn. Faraday (N)	1	21	51
98. Consolidated Oil & Gas	1	21	74
99. Continental Connector Corp	3	21	293
100. Continental Materials Corp	1	21	76
101. Countrywide Realty	4	13(M)	315
102. Courtaulds, Ltd.	1	21	77
103. Crestmont	6	21	327
104. Crown Aluminum Corp	1	13(M)	78
105. Crown Drug Corp.	1	19(S)	79
106. Daitch Crystal Dairies	4	21	316
107. Daryl Industries	1	21	80
108. DC Tran	13	21	380
109. Defiance Industries	3	17(S)	295
110. Deltown Foods	9	21	365
111. Detecto Systems	8	21	340
112. Devon-Palmer Oils, Ltd.	1	10(M)	81
113. Dielectric Prod Eng.	1	16(M)	82
114. Distillers Co, Ltd.	1	21	83
115. Dixilyn-Class A	1	5(C)	84
116. Dixilyn Corp	1	21	85
117. DMH Corp	4	21	317
118. Dunlop Rubber, Ltd.	1	21	86
119. Duraloy Company	1	21	87
120. Dynalectron Corp	1	21	88
121. Eastern Air Devices	1	21	89
122. Eastern Can	8	15(M)	341

Company	Initial Quarter in Study	Terminal Quarter in Study	Data Card No.
123. Eastern Freight Ways	3	21	296
124. Eckmar Corp (N)	3	21	305
125. Electronic Acctg. Card	5	15(M)	324
126. Electronic Assistance	3	21	297
127. Electronic Research	1	21	91
128. El-Tronics	1	21	92
129. Emenee Corp	1	21	93
130. Equity Corp	1	21	94
131. Erie Forge & Steel Corp	1	20(S)(X)	95
132. Ero Industries (N)	1	21	96
133. Espey Mfg.	1	21	97
134. Esquire Radio & Elec.	3	21	298
135. Essex Chemical Corp	8	21	342
136. Ets-Hokin Corp	1	21	98
137. Evan Aristocrat Ind.	1	21	99
138. Exquisite Form Ind.	1	21	100
139. Fairmont Chemical Co.	1	21	101
140. Fargo Oils, Ltd.	1	15(M)	102
141. Federal Resource Corp	2	21	280
142. Federals, Inc. (N)	3	21	294
143. Federated Purchaser	1	20(D)	103
144. Fields Plastics and Chem.	2	21	281
145. First National Realty	1	21	104
146. Firth Sterling	1	13(M)	105
147. Florida Capital	1	21	106
148. Forest City Enterprises	2	21	282
149. Friendly Frost	1	21	107
150. Gale Industries	1	19(D)	108
151. Gearhart-Owens	1	21	109
152. General Alloys	1	21	110
153. General Builders Corp	1	21	111
154. General Development Corp	1	21	112
155. General Elec. Eng., Ltd.	18	21(X)	382
156. GF Industries (N)	1	21	75
157. Gluckin Women's Hosiery	20	21	384
158. Goldfield Corp	1	21	115
159. Goodway Printing Co.	1	21	116
160. Great American Ind.	1	6(S)	117
161. Great Basin Petroleum	1	21	118
162. Great Lakes Chemical	1	21	120
163. Great Lakes Recreation(N)	1	21	119
164. Great Western Producers	1	7(L)	121
165. Gruen Corp	8	21	343
166. GSC Enterprises (N)	1	21	113
167. GTI Corp	1	21	114
168. Guerdon Industries	3	21	299
169. Gulf American Land Co.	1	18(M)	122
170. H & B American Corp	1	21	123
171. Harn Corp	1	9(S)	125
172. Hartfield-Zody's (N)	1	21	126
173. Harvard Industries	1	21	127

Company	Initial Quarter in Study	Terminal Quarter in Study	Data Card No.
174. Harvard Stores	1	21	128
175. Harvey Group (N)	1	21	129
176. Hebrew Nat'l Kosher Fds.	3	19(M)	300
177. Highway Trailer Ind.	1	6(D)	130
178. Hitco Corp	8	21(M)	344
179. Hoe, R.H. & Co.	1	19(S)	131
180. Hofman Industries	1	21	133
181. Holly Corp	1	21	134
182. House of Fabrics	4	21	318
183. Hydromatics	1	21	136
184. IMC Magnetics Corp	1	21	137
185. IHC Corp (N)	7	21	330
186. Imperical Chemical	9	21	366
187. Imperical Tobacco Group	18	21	381
188. Industrial Elec. Hardware	1	21	138
189. Industrial Instruments	2	5(M)	283
190. Inland Credit Corp	3	21	301
191. Intercont'l Ind. (N)	1	19(S)	145
192. Investment Properties	1	5(D)	141
193. Investors Royalty Co.	1	21	142
194. Iroquois Industries (N)	1	21	140
195. ITI Corp (N)	1	21	143
196. Jetronic Industries	1	21	146
197. John's Bargain Stores	9	21	367
198. Jupiter Corp	1	21	147
199. Kalvex Corp (N)	1	21	148
200. Kane-Miller Corp	8	21	345
201. Keltec Industries	7	12(S)(X)	331
202. Kin-Ark Oil	3	21	302
203. Kingsford Co.	1	21	149
204. Kingston Products	1	15(M)	150
205. Kissel	4	21	319
206. Kleer-Vu Industries	1	21	151
207. Klion, H.L.	1	4(D)(X)	152
208. Kropp Forge Co.	1	12(M)	153
209. Lake Shore Mines,Ltd.	1	21	154
210. Lamb Industries	1	11(D)(X)	155
211. Leader Int'l Ind. (N)	1	21	124
212. Lee Motor Products	1	19(S)	156
213. Lily Lynn Co.	6	21	328
214. Lockwood, Kess & Bart	1	21	157
215. Lodge and Shipley Co.	1	21	158
216. Logistics Ind. Corp (N)	1	21	144
217. Louis Sherry Preserves	1	21	160
218. Macoid Industries	1	21	161
219. Magellan Petroleum	1	15(S)	162
220. Magic Marker Corp (N)	1	11(D)(X)	235
221. Magna Oil Corp	3	21	303
222. Mallory Randall Corp	1	21	163
223. Marconi Int'l Marine	1	15(S)	164
224. Marrud	7	10(D)(X)	332

Company		Initial Quarter in Study	Terminal Quarter in Study	Data Card No.
225.	Maule Industries	1	21	165
226.	Merrill Island Mining	1	21	166
227.	Miami Extruders	1	5(D)	167
228.	Michigan Sugar Co	1	21	168
229.	Midwestern Financial Corp	1	21	169
230.	Milgo Electronics	8	21	347
231.	Miller-Wohl Co	2	21	284
232.	Milo Electronics Corp	1	21	170
233.	Molybdenite of Canada	1	21	171
234.	Monogram Ind.	1	21	172
235.	Morse Electronic Prod.	1	21	173
236.	Muter Co	1	21	175
237.	Napco Ind.	1	21	176
238.	National Bell Hess	8	21	348
239.	National Equipment Rental	8	20(M)	349
240.	National Nast	1	7(D)(X)	177
241.	National Petroleum	1	12(D)(X)	179
242.	NBO Industries (N)	1	21	178
243.	Needham	8	21	350
244.	New Idria Mining & Chem.	1	21	181
245.	New Park Mining Co.	3	21	304
246.	NMS Ind. (N)	1	21	218
247.	Noramco	1	5(S)	182
248.	North American Royalties	1	21	183
249.	North Canadian Oils	1	21	184
250.	Northeast Airlines	1	21	185
251.	Nuclear Corp of America	1	21	186
252.	Ormand Ind. (N)	1	21	223
253.	Oxford Electric Corp	1	21	187
254.	Oxford Finance	8	21	352
255.	P & F Industries	20	21	385
256.	Pacific Asbestos	1	9(S)(X)	188
257.	Pacific Ind.	1	21	189
258.	Pacific North Airlines	1	11(M)	190
259.	Packer's Supermarkets	1	17(M)	191
260.	Pancoastal Petroleum	1	15(S)	192
261.	Park Electronics	8	21	353
262.	Pato Con. Gold Dredging	1	21	193
263.	Penrose Ind.	1	12(D)(X)	194
264.	Pentron Electronics Corp	1	21	195
265.	Perfect Photo	1	7(S)(X)	196
266.	Peru Oils and Minerals	1	12(D)(X)	197
267.	Phillips Screw Co	1	21	198
268.	Pilot Radio & TV Corp (N)	1	12(D)(X)	246
269.	Pioneer Systems (N)	1	21	199
270.	Plant Ind.	1	21	200
271.	Plaza Group (N)	1	21	90
272.	Ply-Gem Ind. (N)	1	21	139
273.	Polorad Electronics	1	21	201
274.	Poloron Products	1	21	202
275.	Polycast Corp	1	10(D)(X)	203

Company	Initial Quarter in Study	Terminal Quarter in Study	Data Card No.
276. Prairie Oil Royalties	1	21	204
277. Precisionware	3	4(M)	306
278. Quebec Lithium Corp	1	20(M)	205
279. Ramer Ind.	1	21	206
280. Ramo	1	9(D)(X)	207
281. REDM Corp	1	21	208
282. Redman Ind.	9	21	368
283. Reeves Ind.	1	21	210
284. Reeves Telecom. Corp (N)	1	21	209
285. Remco Ind.	1	21	211
286. Republic Transport. Ind.	1	5(D)(X)	212
287. Resorts International (N)	8	21	346
288. Restaurant Associates (N)	8	21	354
289. Retail Centers of Amer.(N)	1	16(M)	32
290. RIC International Ind. (N)	1	21	213
291. Rico Argentine Mining Co.	3	21	307
292. Ritt Finance	9	21	369
293. Robinson Technical Prod.	1	21	214
294. Roblin Steel Corp	9	21	370
295. Rodney Metals	1	14(M)	215
296. Rolls-Royce, Ltd.	1	21	216
297. Roosevelt Field	1	3(D)	217
298. Royal American Ind.	1	21	220
299. Royal Bus. Funds (N)	1	21	264
300. Royal School Labs	1	17(M)	219
301. Rusco Industries	1	21	221
302. Russeks	1	21	222
303. Ryerson & Haynes	8	21	355
304. Salem Brosius	3	21	308
305. San Carlos	8	21	356
306. Saxon Ind. (N)	4	21	320
307. Sayre and Fisher Co.	1	21	224
308. Seaboard Milling	8	21	357
309. Seaboard Plywood	1	21	226
310. Sealectro Corp	1	21	227
311. Season-All Ind.	1	21	228
312. Seeman Brothers	1	21	229
313. Siboney Corp	1	21	230
314. Silver Creek Precision	1	3(D)	231
315. Simkins Ind. (N)	8	21	351
316. Slick Corp	3	21	309
317. Sonotone Corp	1	13(M)	233
318. Southern Realty and Util.	1	21	234
319. Sport Arenas	1	9(D)(X)	236
320. Standard Metals Corp	3	21	310
321. Standard Prudential	3	8(D)(X)	311
322. Standard-Thomson	1	21	237
323. Standard Tube	1	2(M)	225
324. Stanley Aviation	1	21	238
325. Stanrock Uranium Mines	1	21	239
326. Stephan Co.	1	16(M)	240

Company		Initial Quarter in Study	Terminal Quarter in Study	Data Card No.
327.	Sterling Precision Corp	1	21	241
328.	Stylon Corp	9	21	371
329.	Sunair Electronics	1	21	242
330.	Supercrete, Ltd.	1	21	243
331.	Supronics Corp	1	21	244
332.	Swanee Paper Corp	4	17(M)	321
333.	Technical Measurement	8	13(S)	358
334.	Technical Tape	1	21	245
335.	Tel-A-Sign	5	12(D)(X)	325
336.	TV Manufacters of Amer.(N)	1	21	174
337.	Tenney Engin. Co	1	21	248
338.	Tensor Corp	9	21	372
339.	Terminal Hudson Elec. Co	1	21	249
340.	Texstar Corp	1	21	250
341.	Tobacco Securities, Ltd.	1	16(S)(X)	252
342.	Tower Credit Corp	1	10(D)(X)	253
343.	Transairco Corp (N)	1	21	260
344.	Trans-Beacon Corp (N)	1	21	247
345.	Transcon. Investing	1	21	254
346.	Transogram Corp	9	21	373
347.	TST Ind. (N)	1	18(M)	251
348.	Tubos-Class A	8	11(D)(X)	359
349.	Tubos-Class B	8	11(D)(X)	360
350.	Tubos Mexico	11	21	379
351.	UIP Corp (N)	1	21	258
352.	United Aircraft Prod.	1	21	255
353.	United Asbestos Corp	1	21	256
354.	United Canso Oil & Gas	1	15(D)	257
355.	United Foods	9	21	374
356.	United Molasses	1	5(D)(X)	259
357.	Un. Piece Dye Works	7	21	333
358.	U. S. Filter Corp (N)	1	21	61
359.	U. S. Leasing	3	21	312
360.	U. S. Rubber Reclaiming	7	21	334
361.	Universal Cigar	1	21	262
362.	Universal Container	9	21	375
363.	Universal Controls	1	12(M)	263
364.	Valspar Corp	9	21	376
365.	Vanguard International (N)	1	21	23
366.	Viewlex	1	21	265
367.	VTR	7	21	335
368.	Waitt & Bond (N)	1	14(S)(X)	36
369.	Waltham Precision Ins. (N)	1	21	180
370.	Webb & Knapp	1	4(D)(X)	266
371.	Weiman	4	21	322
372.	Wentworth Mfg.	1	21	267
373.	Westates Petro. Co.	1	21	269
374.	Westbury Fashions	1	21	268
375.	Westec Corp	20	21	386
376.	Western Nucleur	1	21	270

Company	Initial Quarter in Study	Terminal Quarter in Study	Data Card No.
377. Western Orbis (N)	1	21	159
378. Western Stock Inv. Trust	2	16(S)	285
379. White Eagle International	1	21	271
380. Wichita Ind. (N)	1	21	272
381. Williams, R. C.	1	5(D)	273
382. Wilshire Oil of Texas	1	21	274
383. Woolworth, F. W., Ltd.	1	21	275
384. Wright–Hargreaves Mining	1	21	276
385. Yonker's Raceway	1	21	277
386. Zion Foods Corp	1	21	278

NAME CHANGES:

Company

2.	formerly Cameo–Parkway Records
7.	formerly Amer. Int'l Alum
23.	formerly Amer. Realty and Petroleum
27.	formerly Assoc. Oil and Gas
29.	formerly Belock Instruments
39.	formerly British Amer. Consolidated
53.	formerly Silvray–Litecraft
55.	formerly Brazilian Light and Power
56.	formerly Hoffman Int'l
63.	formerly Howell Int'l
76.	formerly Univ. Auto. Industries
80.	formerly Canadian Dredging
82.	formerly Bowl Corp.
96.	formerly Consolidated Royalties
97.	formerly Canadian Faraday
124.	formerly Phillips–Eckardt
132.	formerly Ero Mfg.
142.	formerly Davidson Bros.
156.	formerly Construction Products
163.	formerly Great Lakes Bowling
166.	formerly General Stores Corp
172.	formerly Hartfield Stores
175.	formerly Harvey Radio
185.	formerly Inland Homes Corp
191.	formerly Jefferson Construction
194.	formerly International Breweries
195.	formerly Isram
199.	formerly Kaltman
211.	formerly Hall Lamp
216.	formerly J. E. Plastics
220.	formerly Speedry Chem
242.	formerly Natl Bowl–O–Mat
246.	formerly Ross Products

NAME CHANGES:

Company

252.	formerly Ryan Cons. Pet
268.	formerly Telectro
269.	formerly Pioneer Aerodynamics
271.	formerly Elec. and Missle Factory
272.	formerly Indust. Plywood
284.	formerly Reeves Broadcasting
287.	formerly Mary Carter Paint
288.	formerly Restaurant Waldorf
289.	formerly Bargain Town
290.	formerly RIC Group
299.	formerly Venture Capital
306.	formerly Saxon Paper
315.	formerly New Haven Board
336.	formerly Muntz TV
343.	formerly U. S. Air Conditioner
344.	formerly Television Ind.
347.	formerly Thompson-Starrett
351.	formerly United Improvement and Investment
358.	formerly Central Hadley
365.	formerly Assoc. Laundries
368.	formerly Blackstone Cigar
369.	formerly Newal
377.	formerly Louis Lesser
380.	formerly Wichita River Oil

APPENDIX B

SUPPLEMENTARY DATA TABLES

This Appendix contains tables for that data considered supplementary to the rate of return figures. Tables I through III present the cumulative investment required for each of the three portfolio models. Tables IV through IX list the cumulative brokerage commissions paid for each of the models under both the cash-to-portfolio and cash-to-cash strategies. The cash dividends received by the models are contained in Tables X, XI, and XII. Both Tables XIII and XIV give rate of return figures for the FIPM Model—the former for no restrictions on adjustments and the latter for a $50 restriction. Lastly, Table XV presents the rates of return for the FIPM Model which restricted the $1000 security investments to the nearest whole share.

SUPPLEMENTAL TABLE I

CUMULATIVE INVESTMENT--FIXED INVESTMENT MODEL

From Quarter		To Quarter																			
		1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965	1	288.2	292.2	318.9	326.9	322.3	300.9	304.1	328.4	344.7	345.0	339.8	330.6	319.9	276.3	262.2	243.1	220.4	209.5	188.3	172.9
	2		260.8	277.4	285.6	281.3	270.5	274.2	298.9	315.4	315.7	316.8	306.8	297.8	275.3	263.0	251.1	231.7	228.4	209.4	194.4
	3			285.9	293.9	291.4	278.5	282.0	306.1	322.5	322.8	323.8	313.1	302.9	279.0	264.6	255.2	236.8	230.5	208.4	193.2
	4				261.2	257.8	246.6	250.4	274.7	290.8	291.0	292.0	282.6	272.6	248.2	233.5	222.6	209.4	205.9	183.4	167.8
1966	1					212.1	205.4	210.5	235.0	251.3	251.8	252.8	246.8	242.0	217.6	206.9	198.3	193.0	195.0	181.4	165.8
	2						178.5	184.8	209.4	225.7	226.7	227.8	222.6	219.1	199.9	192.4	184.9	183.0	185.0	177.7	163.8
	3							203.5	227.8	243.9	244.9	246.0	240.7	236.8	212.7	204.4	195.6	194.4	194.8	183.8	169.0
	4								271.1	287.0	287.9	289.0	281.1	271.4	234.6	221.2	206.4	197.8	197.9	177.2	161.3
1967	1									269.1	270.1	271.1	264.6	259.3	222.9	208.9	192.1	187.2	186.8	171.5	154.1
	2										183.8	184.9	180.6	176.8	151.5	145.2	136.7	135.3	135.8	128.3	129.0
	3											136.3	136.3	134.1	117.3	112.5	105.0	104.0	104.1	98.8	99.6
	4												82.6	82.7	82.7	78.3	74.1	73.1	75.1	75.4	76.6
1968	1													75.3	75.3	72.5	67.8	66.9	69.0	69.0	70.1
	2														78.4	75.3	70.7	70.7	72.7	70.1	71.8
	3															26.8	24.8	24.8	26.9	27.9	30.1
	4																14.4	14.4	16.5	17.5	19.8
1969	1																	7.2	9.3	10.3	13.4
	2																		12.3	13.4	16.5
	3																			30.9	33.1
	4																				62.8

CUMULATIVE INVESTMENT--AVERAGE INVESTMENT MODEL

From Quarter		1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965	1	288.2	293.7	324.4	334.5	331.4	313.2	322.5	358.7	383.9	386.5	383.2	374.0	365.6	322.0	305.4	285.4	260.4	260.2	243.3	231.7
	2		250.8	276.3	284.6	281.4	272.7	280.4	310.4	331.0	332.9	335.3	325.4	318.5	296.1	282.4	270.3	251.2	257.0	242.2	233.4
	3			285.9	294.4	292.9	282.4	290.0	320.1	340.7	342.7	345.1	334.4	326.6	362.6	286.8	277.2	258.5	261.5	243.4	234.2
	4				261.2	258.9	249.8	257.6	287.2	307.3	309.0	311.4	302.0	294.4	269.9	254.0	242.9	229.7	235.6	217.3	208.2
1966	1					212.1	206.6	213.2	236.7	252.5	253.8	255.6	249.6	246.7	222.4	211.7	203.1	197.8	207.3	197.0	189.8
	2						178.5	184.0	201.3	213.0	214.1	215.5	210.4	208.4	189.2	182.4	175.2	173.2	180.4	175.2	170.1
	3							203.5	222.5	235.3	236.6	238.1	232.9	230.8	206.6	198.9	190.3	189.1	195.6	187.2	181.5
	4								271.1	287.2	289.0	290.9	283.1	275.4	238.6	225.2	210.4	201.8	209.6	192.3	184.3
1967	1									269.1	271.0	272.9	266.4	263.2	226.8	212.8	196.1	191.2	199.1	187.4	178.5
	2										183.8	185.1	180.8	178.2	152.9	146.6	138.1	136.7	143.0	138.1	144.5
	3											136.3	136.3	134.8	118.0	113.2	105.7	104.7	109.9	106.8	112.8
	4												82.6	82.9	82.9	78.5	74.2	73.2	79.0	80.8	88.3
1968	1													75.3	75.3	72.5	67.8	66.9	72.1	73.4	77.0
	2														78.4	75.3	70.7	70.7	75.3	73.7	77.4
	3															26.8	24.8	24.8	27.9	29.1	31.8
	4																14.4	14.4	17.1	18.1	20.6
1969	1																	7.2	9.1	9.8	11.8
	2																		12.3	13.2	15.9
	3																			30.9	32.7
	4																				62.8

To Quarter

SUPPLEMENTAL TABLE III

CUMULATIVE INVESTMENT—FIPM MODEL ($100 RESTRICTION)

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	288.2	294.4	318.9	326.3	325.1	298.3	308.6	346.8	365.6	373.4	379.0	376.1	371.2	364.4	349.9	316.1	279.3	284.7	280.3	288.8
2		250.8	270.1	276.5	275.8	253.9	261.7	293.4	308.1	313.7	319.7	316.9	312.0	312.3	301.6	280.0	253.0	269.6	262.6	270.0
3			285.9	292.2	292.7	270.1	278.3	311.5	325.8	331.9	338.3	335.4	330.3	331.1	316.5	299.3	271.6	281.9	274.8	282.4
4				261.2	260.6	238.0	245.9	278.1	291.8	297.1	303.2	302.2	297.3	298.1	281.6	272.7	254.8	264.7	252.3	259.6
1966 1					212.1	195.6	203.2	228.5	238.3	241.1	245.3	244.7	245.3	244.3	234.9	229.5	224.4	243.4	232.5	238.3
2						178.5	184.4	201.9	208.4	209.9	213.0	212.4	212.3	213.1	206.7	197.3	194.1	207.3	207.1	216.7
3							203.5	223.8	231.8	233.8	237.2	236.5	236.5	235.4	228.2	217.4	217.2	228.1	223.7	228.1
4								271.1	280.6	284.9	289.6	287.1	281.3	277.3	262.1	233.7	223.4	236.4	226.9	232.5
1967 1									269.1	273.6	278.0	275.7	276.5	276.4	260.8	235.0	226.0	239.3	235.7	241.7
2										183.8	186.3	185.4	185.0	183.8	180.7	161.2	160.6	170.5	172.2	178.6
3											136.3	137.2	137.0	135.4	132.6	114.6	112.9	121.9	123.9	129.1
4												82.6	83.4	83.2	81.1	70.4	68.1	76.6	79.0	82.7
1968 1													75.3	74.9	74.1	63.9	62.3	68.7	70.8	74.0
2														78.4	76.3	66.7	65.7	71.2	70.8	74.3
3															26.8	24.9	24.0	27.6	29.0	31.3
4																14.4	14.5	17.1	18.1	20.2
1969 1																	7.2	9.0	9.5	11.4
2																		12.3	13.0	15.5
3																			30.9	32.1
4																				62.8

SUPPLEMENTAL TABLE IV

CUMULATIVE CASH-TO-PORTFOLIO BROKERAGE COMMISSIONS--FIXED INVESTMENT MODEL

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	10.2	10.5	11.3	11.7	12.1	12.4	12.7	13.5	14.0	14.1	14.2	14.3	14.6	14.8	15.2	15.6	16.0	16.2	16.7	16.9
2		8.8	9.6	10.0	10.3	10.6	10.9	11.7	12.1	12.3	12.3	12.4	12.7	12.8	13.1	13.5	13.8	13.9	14.3	14.5
3			9.9	10.2	10.6	10.9	11.2	12.0	12.5	12.6	12.6	12.8	13.0	13.1	13.5	13.8	14.1	14.3	14.6	14.9
4				9.2	9.6	9.9	10.2	11.0	11.4	11.6	11.6	11.7	12.0	12.1	12.5	12.8	13.0	13.2	13.6	13.9
1966 1					7.1	7.4	7.7	8.4	8.9	9.0	9.0	9.2	9.3	9.5	9.7	10.0	10.1	10.2	10.5	10.8
2						5.5	5.8	6.5	7.0	7.1	7.1	7.2	7.3	7.5	7.7	8.0	8.0	8.1	8.3	8.5
3							6.5	7.3	7.8	7.9	7.9	8.0	8.1	8.3	8.5	8.9	8.9	9.0	9.2	9.5
4								9.1	9.5	9.6	9.7	9.8	10.1	10.3	10.6	11.0	11.2	11.3	11.6	11.9
1967 1									9.1	9.2	9.2	9.3	9.5	9.7	10.0	10.5	10.6	10.7	10.9	11.3
2										5.8	5.9	5.9	6.1	6.2	6.4	6.7	6.8	6.9	7.1	7.2
3											4.3	4.3	4.4	4.6	4.7	5.1	5.1	5.2	5.3	5.5
4												2.6	2.6	2.6	2.8	3.0	3.0	3.1	3.1	3.3
1968 1													2.3	2.3	2.4	2.6	2.7	2.7	2.8	2.9
2														2.4	2.5	2.7	2.7	2.7	2.8	2.9
3															0.8	1.0	1.0	1.1	1.1	1.2
4																0.4	0.4	0.4	0.5	0.6
1969 1																	0.2	0.3	0.3	0.4
2																		0.3	0.4	0.5
3																			0.9	1.0
4																				1.8

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CUMULATIVE CASH-TO-PORTFOLIO BROKERAGE COMMISSIONS--AVERAGE INVESTMENT MODEL

(Thousands)

From Quarter		1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965	1	10.2	10.5	11.5	11.8	12.3	12.7	13.1	14.2	14.9	15.0	15.2	15.4	15.7	16.0	16.3	16.8	17.2	17.5	18.0	18.5
	2		8.8	9.6	9.9	10.3	10.6	11.0	11.9	12.4	12.5	12.6	12.8	13.1	13.2	13.4	13.9	14.2	14.4	14.8	15.2
	3			9.9	10.3	10.6	11.0	11.4	12.3	12.8	13.0	13.0	13.2	13.5	13.6	14.0	14.3	14.6	14.9	15.3	15.7
	4				9.2	9.6	9.9	10.3	11.2	11.7	11.9	11.9	12.1	12.4	12.6	12.9	13.3	13.5	13.7	14.2	14.6
1966	1					7.1	7.4	7.7	8.5	8.9	9.0	9.1	9.2	9.4	9.6	9.8	10.1	10.2	10.4	10.7	11.2
	2						5.5	5.7	6.3	6.6	6.7	6.7	6.8	7.0	7.1	7.3	7.6	7.6	7.8	8.0	8.3
	3							6.5	7.1	7.4	7.5	7.6	7.7	7.9	8.0	8.2	8.6	8.6	8.8	9.1	9.5
	4								9.1	9.6	9.7	9.7	9.9	10.2	10.4	10.7	11.1	11.3	11.5	11.8	12.3
1967	1									9.1	9.2	9.2	9.4	9.6	9.8	10.1	10.5	10.7	10.9	11.2	11.7
	2										5.8	5.9	6.0	6.1	6.3	6.5	6.8	6.8	7.0	7.2	7.5
	3											4.3	4.3	4.5	4.6	4.8	5.1	5.1	5.3	5.5	5.8
	4												2.6	2.6	2.6	2.8	3.0	3.0	3.2	3.3	3.5
1968	1													2.3	2.3	2.4	2.6	2.7	2.8	2.9	3.1
	2														2.4	2.6	2.7	2.7	2.8	2.9	3.1
	3															0.8	1.0	1.0	1.1	1.1	1.2
	4																0.4	0.4	0.5	0.5	0.6
1969	1																	0.2	0.3	0.3	0.3
	2																		0.3	0.4	0.4
	3																			0.9	1.0
	4																				1.8

SUPPLEMENTAL TABLE VI

CUMULATIVE CASH-TO-PORTFOLIO BROKERAGE COMMISSIONS--FIPM MODEL ($100 RESTRICTION)

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	10.2	13.1	16.2	18.7	22.2	26.7	29.7	32.9	36.1	40.2	45.2	50.1	57.2	62.1	67.0	76.8	83.6	89.0	94.8	99.4
1965 2		8.8	11.3	13.2	16.0	19.5	21.8	24.4	26.9	30.0	33.9	38.3	43.4	47.2	52.8	59.0	64.6	68.9	73.5	77.3
1965 3			9.9	11.9	14.8	18.5	21.0	23.7	26.3	29.8	33.9	38.6	44.0	48.1	54.2	60.8	66.8	71.3	76.3	80.4
1965 4				9.2	11.9	15.3	17.6	20.1	22.5	25.6	29.2	33.5	38.6	42.3	47.8	53.9	59.3	63.6	68.1	71.8
1966 1					7.1	9.7	11.2	13.0	14.8	17.0	19.5	22.7	26.2	28.9	33.1	37.7	41.7	45.0	48.5	51.4
1966 2						5.5	6.5	7.7	8.9	10.4	12.1	14.3	16.7	18.4	21.2	24.4	27.1	29.3	31.5	33.5
1966 3							6.5	7.8	9.3	11.1	13.3	15.9	18.8	21.0	24.4	28.1	31.4	34.1	36.9	39.3
1966 4								9.1	10.9	13.3	16.3	19.9	23.8	26.8	31.3	36.3	40.6	43.9	47.6	50.6
1967 1									9.1	11.5	14.4	17.8	21.6	24.5	29.0	34.0	38.2	41.6	45.2	48.2
1967 2										5.8	7.3	9.2	11.3	12.8	15.4	18.3	20.6	22.7	24.7	26.4
1967 3											4.3	5.6	7.0	7.9	9.7	11.9	13.5	15.1	16.7	18.0
1967 4												2.6	3.3	3.7	4.6	5.8	6.6	7.5	8.2	9.0
1968 1													2.3	2.6	3.5	4.5	5.2	5.9	6.6	7.2
1968 2														2.4	3.2	4.1	4.7	5.3	6.0	6.6
1968 3															0.8	1.1	1.3	1.5	1.6	1.9
1968 4																0.4	0.5	0.6	0.7	0.9
1969 1																	0.2	0.3	0.3	0.4
1969 2																		0.3	0.4	0.6
1969 3																			0.9	1.0
1969 4																				1.8

SUPPLEMENTAL TABLE VII

CUMULATIVE CASH-TO-CASH BROKERAGE COMMISSIONS--FIXED INVESTMENT MODEL

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	21.1	21.2	22.6	24.4	26.0	25.3	24.4	25.8	28.5	30.0	31.3	32.1	31.7	34.0	34.6	35.2	34.3	33.3	32.1	31.8
1965 2		17.3	18.7	20.2	21.7	21.1	20.4	21.8	24.2	25.5	26.8	27.5	27.3	29.3	29.9	30.5	29.7	28.8	27.7	27.5
1965 3			19.7	21.3	22.9	22.4	21.5	22.9	25.4	26.8	28.1	28.9	28.6	30.6	31.3	31.8	31.1	30.2	29.0	29.0
1965 4				19.5	20.9	20.4	19.7	21.1	23.5	24.6	25.9	26.5	26.3	28.0	28.7	29.3	28.5	27.5	26.6	26.5
1966 1					15.3	15.0	14.6	15.8	17.9	18.8	20.0	20.6	20.5	22.1	22.7	23.2	22.7	22.0	21.1	20.9
1966 2						10.7	10.5	11.9	13.6	14.4	15.3	15.8	15.7	17.2	17.8	18.4	18.0	17.4	16.6	16.3
1966 3							12.4	13.7	15.6	16.6	17.8	18.3	18.2	19.9	20.6	21.3	20.8	20.1	19.0	18.9
1966 4								17.9	20.2	21.5	22.8	23.5	23.4	25.2	26.0	26.6	25.8	25.0	23.9	23.7
1967 1									19.6	20.7	22.1	22.8	22.6	24.4	25.1	25.7	25.0	24.4	23.3	22.9
1967 2										12.1	13.0	13.5	13.5	14.7	15.3	15.7	15.4	15.0	14.3	14.1
1967 3											9.3	9.6	9.6	10.5	11.0	11.3	11.2	11.0	10.5	10.4
1967 4												5.3	5.3	5.8	6.1	6.3	6.3	6.1	5.8	5.9
1968 1													4.7	5.1	5.4	5.6	5.5	5.4	5.1	5.1
1968 2														5.1	5.3	5.6	5.5	5.4	5.1	5.2
1968 3															1.7	1.8	1.8	1.8	1.8	1.9
1968 4																0.9	0.9	1.0	1.0	1.1
1969 1																	0.4	0.5	0.5	0.6
1969 2																		0.7	0.7	0.8
1969 3																			1.6	1.7
1969 4																				3.4

SUPPLEMENTAL TABLE VIII

CUMULATIVE CASH-TO-CASH BROKERAGE COMMISSIONS--AVERAGE INVESTMENT MODEL

From Quarter	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	21.1	21.3	22.9	24.7	26.4	25.9	25.2	27.1	30.4	32.1	33.6	34.4	34.1	36.5	37.2	37.8	36.9	36.2	34.8	34.7
2		17.3	18.6	20.2	21.6	21.1	20.6	22.2	24.8	26.2	27.6	28.4	28.2	30.5	31.1	31.7	30.8	30.0	29.0	29.0
3			19.7	21.4	23.0	22.5	21.9	23.4	26.2	27.7	29.2	30.0	29.7	32.0	32.7	33.3	32.4	31.6	30.5	30.6
4				19.5	21.0	20.5	20.0	21.5	24.1	25.4	26.8	27.5	27.3	29.3	30.0	30.6	29.6	28.8	27.9	28.1
1966 1					15.3	15.0	14.7	15.9	17.9	18.9	20.1	20.7	20.7	22.3	23.0	23.5	23.0	22.4	21.6	21.6
2						10.7	10.5	11.3	12.7	13.5	14.5	14.9	14.9	16.3	17.0	17.7	17.2	16.8	16.0	16.0
3							12.4	13.2	14.9	15.9	17.1	17.7	17.6	19.5	20.3	20.9	20.3	19.8	18.7	18.9
4								17.9	20.3	21.5	22.9	23.7	23.6	25.5	26.3	26.8	26.0	25.4	24.4	24.5
1967 1									19.6	20.8	22.1	22.9	22.8	24.6	25.3	25.9	25.3	24.7	23.7	23.6
2										12.1	13.0	13.5	13.6	14.8	15.4	15.8	15.5	15.3	14.7	14.7
3											9.3	9.6	9.7	10.6	11.0	11.3	11.1	11.2	10.8	10.9
4												5.3	5.3	5.8	6.1	6.3	6.3	6.3	6.0	6.2
1968 1													4.7	5.1	5.4	5.6	5.5	5.5	5.3	5.4
2														5.1	5.3	5.6	5.5	5.5	5.3	5.4
3															1.7	1.8	1.8	1.9	1.9	2.0
4																0.9	0.9	1.0	1.0	1.1
1969 1																	0.4	0.5	0.5	0.6
2																		0.7	0.7	0.8
3																			1.6	1.7
4																				3.4

SUPPLEMENTAL TABLE IX

CUMULATIVE CASH-TO-CASH BROKERAGE COMMISSIONS--FIPM MODEL ($100 RESTRICTION)

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	21.1	24.2	28.2	32.5	37.7	41.7	43.3	47.4	53.6	60.0	66.8	74.3	79.8	87.3	94.4	102.4	108.5	113.0	117.2	121.3
2		17.3	20.4	23.9	27.9	30.9	32.3	35.6	40.5	45.6	51.2	57.2	61.9	68.4	74.2	81.4	86.2	89.7	92.9	96.1
3			19.7	23.1	27.5	30.7	32.2	35.7	40.9	46.2	52.1	58.6	63.6	70.3	76.8	81.2	89.4	93.1	96.5	100.1
4				19.5	23.4	26.4	27.9	31.0	35.8	40.6	45.9	51.8	56.4	62.4	68.1	74.7	79.7	83.3	86.4	88.6
1966 1					15.3	17.4	18.4	20.7	24.2	27.5	31.6	36.0	39.6	44.4	49.1	54.5	58.2	61.2	63.0	65.6
2						10.7	11.4	12.9	15.2	17.5	20.4	23.4	25.9	29.2	32.8	36.7	39.1	40.8	42.0	43.7
3							12.4	14.0	16.9	19.7	25.5	27.0	30.1	34.1	38.3	42.8	46.0	48.1	49.4	51.4
4								17.9	21.8	25.5	30.2	35.2	38.9	44.3	49.3	55.2	58.9	61.6	63.7	66.2
1967 1									19.6	23.3	28.0	32.7	36.6	41.6	46.5	52.3	55.9	59.0	61.0	63.5
2										12.1	14.7	17.4	19.7	22.6	25.9	29.2	31.4	33.2	34.1	35.6
3											9.3	11.1	12.6	14.6	17.0	19.5	21.0	22.5	23.4	24.5
4												5.3	6.1	7.0	8.2	9.7	10.3	11.2	11.6	12.3
1968 1													4.7	5.4	6.7	7.7	8.3	9.1	9.3	9.9
2														5.1	6.2	7.2	7.8	8.4	8.7	9.1
3															1.7	1.9	2.1	2.3	2.4	2.6
4																0.9	1.0	1.2	1.2	1.4
1969 1																	0.4	0.5	0.5	0.6
2																		0.7	0.7	0.9
3																			1.6	1.8
4																				3.4

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SUPPLEMENTAL TABLE X

CUMULATIVE CASH DIVIDENDS--FIXED INVESTMENT MODEL

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	0.4	1.1	1.6	3.1	4.1	5.2	6.0	7.7	8.9	10.1	11.0	13.0	14.0	15.1	16.0	17.5	18.8	20.0	20.9	22.4
2		0.4	0.7	1.8	2.4	3.0	3.5	4.8	5.5	6.4	7.0	8.5	9.2	10.0	10.6	11.8	12.7	13.6	14.2	15.4
3			0.4	1.5	2.2	2.8	3.2	4.6	5.4	6.3	7.0	8.5	9.3	10.2	10.8	12.1	13.0	14.0	14.6	16.0
4				0.9	1.5	2.0	2.4	3.5	4.2	4.9	5.4	6.8	7.5	8.2	8.8	9.9	10.8	11.7	12.2	13.4
1966 1					0.4	0.8	1.0	1.7	2.2	2.6	3.0	4.0	4.5	5.1	5.5	6.5	7.2	7.9	8.3	9.3
2						0.3	0.5	1.0	1.4	1.8	2.1	3.1	3.5	4.0	4.3	5.2	5.7	6.4	6.7	7.7
3							0.2	0.9	1.3	1.8	2.1	3.2	3.6	4.2	4.7	5.6	6.1	6.9	7.3	8.3
4								1.0	1.6	2.3	2.7	4.1	4.7	5.4	5.9	7.1	7.8	8.7	9.3	10.6
1967 1									0.5	1.1	1.6	2.9	3.5	4.1	4.6	5.6	6.3	7.1	7.6	8.8
2										0.3	0.5	1.2	1.6	1.9	2.2	2.9	3.1	3.7	4.0	4.8
3											0.1	0.6	0.8	1.0	1.2	1.6	1.7	2.1	2.3	2.8
4												0.1	0.2	0.3	0.5	0.5	0.6	0.9	1.0	1.3
1968 1													0.2	0.2	0.3	0.4	0.4	0.6	0.7	0.9
2														0.1	0.1	0.2	0.3	0.3	0.4	0.5
3															---	0.1	0.1	0.1	0.1	0.2
4																---	---	---	---	0.1
1969 1																	---	---	---	0.1
2																		---	---	0.1
3																			---	0.1
4																				0.2

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SUPPLEMENTAL TABLE XI

CUMULATIVE CASH DIVIDENDS--AVERAGE INVESTMENT MODEL

							To Quarter											
1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	196 4
0.4	1.1	1.6	3.1	4.1	5.3	6.1	8.0	9.3	10.7	11.7	13.9	15.0	16.4	17.4	19.3	20.7	22.1	23.
	0.4	0.7	1.8	2.4	3.0	3.5	4.8	5.6	6.5	7.1	8.8	9.5	10.4	11.1	12.4	13.4	14.4	15.
		0.4	1.5	2.2	2.8	3.2	4.6	5.5	6.5	7.2	8.9	9.7	10.7	11.4	12.9	13.9	14.9	15.
			0.9	1.5	2.0	2.4	3.5	4.3	5.0	5.6	7.1	7.8	8.7	9.3	10.6	11.5	12.5	13.
				0.4	0.8	1.1	1.7	2.1	2.6	3.0	4.0	4.5	5.1	5.5	6.5	7.2	7.9	8.
					0.3	0.5	0.9	1.3	1.7	1.9	2.7	3.1	3.6	3.9	4.6	5.0	5.6	6.
						0.2	0.8	1.2	1.7	2.0	2.9	3.4	3.9	4.3	5.1	5.7	6.4	6.
							1.0	1.6	2.3	2.7	4.1	4.7	5.4	6.0	7.1	7.9	8.8	9.
								0.5	1.1	1.6	2.9	3.5	4.1	4.6	5.7	6.3	7.2	7.
									0.3	0.5	1.2	1.6	1.9	2.2	2.9	3.1	3.7	4.
										0.1	0.7	0.8	1.0	1.2	1.6	1.7	2.1	2.
											0.1	0.2	0.3	0.5	0.5	0.6	0.9	1.
												0.2	0.2	0.3	0.4	0.4	0.6	0.
													0.1	0.1	0.2	0.3	0.3	0.
														----	0.1	0.1	0.1	0.
															----	----	----	---
																	----	---
																	----	---

SUPPLEMENTAL TABLE XII

CUMULATIVE CASH DIVIDENDS--FIPM MODEL ($100 RESTRICTION)

From Quarter	To Quarter 1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	0.4	1.0	1.5	2.8	3.7	4.8	5.6	7.4	8.6	10.0	11.3	14.2	16.0	17.8	19.2	22.1	23.9	26.7	28.2	32.0
2		0.4	0.7	1.7	2.3	3.1	3.6	5.0	5.7	6.7	7.5	9.6	11.0	12.2	13.3	15.5	16.9	19.0	20.2	22.9
3			0.4	1.5	2.2	3.0	3.6	5.1	6.0	7.1	8.0	10.4	11.8	13.2	14.3	16.7	18.2	20.4	21.7	24.7
4				0.9	1.5	2.2	2.7	4.0	4.8	5.7	6.5	8.4	9.8	11.0	12.0	14.2	15.6	17.6	18.7	21.3
1966 1					0.4	0.8	1.1	1.8	2.3	2.8	3.3	4.6	5.5	6.3	7.0	8.6	9.6	11.2	12.1	14.1
2						0.3	0.5	0.9	1.2	1.6	1.9	2.8	3.5	4.0	4.5	5.5	6.2	7.4	7.9	9.3
3							0.2	0.8	1.2	1.7	2.8	3.2	4.0	4.7	5.4	6.7	7.6	7.0	9.7	11.4
4								1.0	1.6	2.3	2.9	4.7	5.7	6.7	7.5	9.4	10.5	12.2	13.1	15.5
1967 1									0.5	1.2	1.8	3.4	4.4	5.3	6.1	7.6	8.6	10.3	11.1	13.2
2										0.3	0.5	1.4	1.9	2.3	2.7	3.6	4.0	5.1	5.6	6.9
3											0.1	0.6	0.9	1.1	1.4	1.8	2.0	2.7	3.1	3.9
4												0.1	0.3	0.4	0.5	0.6	0.6	1.1	1.3	1.7
1968 1													0.2	0.2	0.3	0.4	0.5	0.9	1.0	1.3
2														0.1	0.2	0.2	0.3	0.3	0.4	0.7
3															----	0.1	0.1	0.1	0.1	0.2
4																----	----	----	----	0.1
1969 1																	----	----	----	0.1
2																		----	----	0.1
3																			----	0.1
4																				0.2

CASH-TO-PORTFOLIO ANNUAL RATES OF RETURN--FIPM MODEL (NO RESTRICTION)

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	84.3	20.2	21.4	47.9	70.6	47.2	21.5	18.7	35.8	44.7	53.9	55.1	48.6	58.8	59.9	60.6	52.7	44.2	36.0	32.4
1965 2		-28.5	-6.4	33.0	65.3	39.3	12.2	10.6	29.7	40.0	50.8	52.7	46.4	57.5	59.3	60.5	52.0	43.1	34.4	30.9
1965 3			-0.4	63.4	104.3	56.0	17.3	13.9	36.7	48.1	59.8	61.2	52.9	65.3	66.1	66.9	56.9	47.0	37.4	33.5
1965 4				143.4	187.3	79.2	21.4	15.9	43.0	55.2	68.9	69.8	59.0	72.7	73.2	73.5	62.1	50.8	40.1	35.7
1966 1					247.1	54.8	-2.6	-4.1	28.1	43.6	61.2	63.4	54.1	70.2	71.7	72.5	60.8	49.0	37.8	33.0
1966 2						-46.3	-54.2	-42.5	-5.4	14.5	36.3	41.1	35.0	52.6	56.3	58.8	48.3	37.3	26.8	22.7
1966 3							-64.6	-43.2	11.2	37.8	65.2	66.4	53.9	74.4	76.3	77.0	62.7	48.3	35.2	29.8
1966 4								-14.4	90.8	110.7	131.8	119.0	90.1	111.3	107.1	104.8	83.3	64.4	48.0	41.0
1967 1									261.8	204.3	208.3	170.4	119.1	142.3	132.8	126.3	98.1	75.0	54.7	45.5
1967 2										106.1	171.3	133.8	91.4	125.5	122.0	120.9	92.6	66.7	45.8	35.7
1967 3											269.0	144.9	88.0	135.3	132.1	133.4	100.2	72.1	47.4	36.0
1967 4												49.1	34.9	95.8	109.9	118.1	85.2	54.9	31.4	22.9
1968 1													14.6	139.8	142.8	143.8	94.2	55.9	29.3	19.6
1968 2														347.7	217.8	201.7	113.6	61.6	29.0	17.6
1968 3															47.1	127.4	46.0	10.0	-1.6	-10.0
1968 4																307.5	52.2	-0.4	-3.8	-16.9
1969 1																	-41.3	-47.5	-47.0	-54.1
1969 2																		-56.6	-31.9	-42.4
1969 3																			-49.4	-40.9
1969 4																				-31.6

SUPPLEMENTAL TABLE XIV

CASH-TO-PORTFOLIO ANNUAL RATES OF RETURN--FIPM MODEL ($50 RESTRICTION)

From Quarter	To Quarter																			
	1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4	1970 1
1965 1	84.3	20.4	21.6	48.2	70.1	47.0	21.1	18.3	35.2	44.1	53.3	54.7	48.0	58.2	59.1	59.5	51.5	43.2	35.1	31.6
2		-28.5	-6.1	33.5	64.1	38.6	11.5	10.1	29.2	39.5	50.4	52.3	45.9	57.0	58.3	59.3	50.9	42.1	33.5	30.1
3			-0.4	63.9	103.9	55.9	17.3	13.8	36.3	47.8	59.5	60.9	52.5	64.8	65.6	66.3	56.4	46.6	37.1	33.0
4				143.4	187.6	79.6	21.6	16.1	43.0	55.2	69.0	69.8	58.8	72.5	72.8	73.1	61.8	50.5	39.9	35.5
1966 1					247.1	54.9	-2.5	-3.9	28.0	43.5	61.1	63.4	54.1	70.2	71.7	72.5	60.8	49.0	37.8	32.9
2						-46.3	-54.1	-42.2	-5.2	14.3	36.1	40.9	34.6	52.2	55.9	58.1	47.7	36.8	26.4	22.1
3							-64.6	-43.0	11.0	37.7	65.2	66.4	53.8	74.4	76.3	76.7	62.4	48.1	35.0	29.6
4								-14.4	91.3	111.2	132.2	119.4	90.4	111.1	106.9	103.9	82.5	63.8	47.5	40.6
1967 1									261.8	204.7	208.6	170.6	119.2	142.5	132.9	125.4	97.4	74.5	54.2	45.0
2										106.1	171.7	134.1	91.5	125.7	122.2	121.0	92.7	66.8	45.9	35.8
3											269.0	145.0	88.2	135.5	131.7	130.2	97.9	70.4	46.1	34.9
4												49.1	35.1	96.1	108.9	117.2	84.6	54.5	31.2	22.7
1968 1													14.6	140.4	143.3	144.2	94.5	56.1	28.2	18.8
2														347.7	218.1	201.9	113.7	61.7	27.8	16.6
3															47.1	127.8	46.2	10.1	-1.5	-9.8
4																307.5	52.4	-0.2	-3.5	-16.7
1969 1																	-41.3	-47.2	-46.7	-53.8
2																		-56.6	-31.6	-42.3
3																			-49.4	-40.6
4																				-31.6

CASH-TO-PORTFOLIO ANNUAL RATES OF RETURN--FIPM MODEL (WHOLE SHARES, $100 RESTRICTION)

									To Quarter									
1965 2	1965 3	1965 4	1966 1	1966 2	1966 3	1966 4	1967 1	1967 2	1967 3	1967 4	1968 1	1968 2	1968 3	1968 4	1969 1	1969 2	1969 3	1969 4
4.3	20.5	21.9	48.1	69.6	46.7	20.9	18.1	35.1	43.9	53.1	54.5	47.9	57.9	58.7	58.8	50.9	42.7	34.
	-28.5	-5.9	33.9	64.7	38.5	11.4	9.9	29.1	39.2	50.0	52.1	45.6	56.8	58.1	59.0	50.5	41.7	33.
		-0.4	64.1	104.2	56.2	17.2	13.7	36.3	47.6	59.4	60.8	52.4	64.8	65.5	65.9	56.1	46.3	36.
			143.4	188.6	78.9	21.4	16.0	43.0	54.9	68.7	69.6	58.7	72.4	72.7	72.6	61.4	50.1	39.
				247.2	55.1	-2.2	-3.6	28.5	44.0	61.6	63.4	53.9	70.0	71.2	71.8	60.2	48.5	37.
					-46.3	-53.9	-42.0	-4.8	15.3	37.4	42.1	35.9	53.5	57.2	58.9	48.2	37.2	26.
						-64.6	-42.8	11.5	38.3	65.8	66.4	53.9	74.5	76.4	76.7	62.5	48.1	35.
							-14.4	91.2	110.3	131.5	118.2	88.6	109.4	105.1	101.6	80.6	62.3	46.
								261.8	205.3	209.0	169.8	118.1	141.5	131.6	123.3	95.7	73.1	53.
									106.1	172.0	134.2	91.7	125.9	122.4	119.5	91.5	65.9	44.
										268.9	144.7	88.1	135.5	131.7	130.2	97.9	70.4	46.
											49.1	35.0	97.2	109.6	117.8	85.1	54.9	30.
												14.6	141.1	143.8	144.4	94.6	56.3	28.
													347.8	218.6	202.1	113.9	61.9	28.
														47.0	128.0	46.0	10.0	-1.
															307.4	52.6	-0.1	-3.
																-41.4	-47.1	-46.
																	-56.6	-31.
																		-49.

VITA

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