The Economic Consequences of
the Stock Market

by

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The stock market affects the functioning of the economy in two principal ways. First, market developments may affect the level of and fluctuations in the national income -- and hence economic stability and growth -- through their influence on the aggregate propensities to consume, to save and to invest. Second, even with a given level of realized saving and investment, market arrangements can result in a more or less efficient allocation of investment funds, with a consequent effect on productivity and economic growth. Fluctuations in the stock market affect consumption and investment through their impact on the cost and availability of capital, on the rates of return realized by investors, on consumer wealth, and on business and consumer expectations.

This paper will deal with efficiency of the stock market and related institutional arrangements in allocating investment funds -- which has traditionally been regarded as the most important economic function performed by the market. To many if not most members of the public, the stock market seems to be a legalized gambling casino. To many if not most economists, the stock market seems endowed with an almost mystical degree of efficiency, even if what is meant by efficiency is not always clear. This paper will attempt to present

briefly and to discriminate among several different concepts
of market efficiency, and to summarize the available evidence
for appraising such efficiency, including some new results.

The efficiency of the stock market, it might be noted,
is not necessarily independent of the market's impact on con-
sumption and investment. Speculative excesses are likely to be
associated with unnecessary market volatility which can have un-
desirable consequences for economic stability, would tend to
raise the cost of capital, especially for risky ventures, and
may affect saving in either direction, though the last of those
effects is probably unimportant. It is not necessarily true
that the more efficient the market the less its volatility, but
efficient markets are not likely to be extremely volatile, since
reasonable prospects for the long-run future flow of earnings
and the risks associated with them normally do not change dras-
tically over short periods of time.

It should also be pointed out that, in addition to the
economic role of the stock market, there is an important non-
economic function which a well-performing market might be ex-
pected to fill. That is to provide for equitable arrangements
among different participants in the market, particularly be-
tween members of securities firms or corporate insiders and
public investors but also between small and large investors and

between speculators and long-term investors. The prices at which transactions are consummated in the market may contribute to allocational efficiency, but market arrangements might still be considered unsatisfactory if they permitted the members of securities firms, corporate insiders, or large institutional investors to take undue advantage of the public as a result of imperfect competition, the gross inadequacy of information available to the public, improper use of inside information, or the dissemination of misinformation.

Concepts of market efficiency

Perhaps the most common conception of an efficient market used in recent theoretical and empirical studies of stock market phenomena is one in which every price fully reflects all the relevant information that is available so that any new information relevant to stock price determination is reflected in prices extremely rapidly (and cannot be used to make abnormal returns).[1] There are a number of difficulties with this definition.

First, it is obvious that the market will in some fashion reflect all available information. The important question from the viewpoint of market efficiency is the relevance of the information to the subsequent earnings or riskiness of the stock and the manner in which the information is reflected in stock prices. In other words, how is information to be distinguished

from misinformation? Second, totally apart from the misinformation issue, is a market in which prices fully reflect the scanty information available to be regarded as efficient as a market in which much more information is available and reflected in stock prices? In other words, what is the justification for considering the information set fixed?[2] It could be argued of course that technical operations of the market should be distinguished from the institutional arrangements determining the information set, but this seems to lead to an unduly restrictive view of market arrangements which would make market efficiency of limited interest to economists. Third, is the efficiency of the market independent of the costs incurred to ensure that prices reflect all available information? It seems desirable to have two measures of market efficiency, one measuring the quality of the service rendered (sometimes referred to as "allocational efficiency"), the other its cost (or "operational efficiency"). The two measures are, of course, not independent.

Finally, it should be noted that even if the markets are allocationally efficient according to the above definition of efficiency (i.e., the full reflection of information in price) or according to any other reasonable definition, this would not ensure an actual flow of economic resources into the most productive types of real investment. However, efficient markets on

the basis of an appropriate definition should ensure that the markets are providing the appropriate guidelines for the flow of capital into such investments.

Another approach to the establishment of theoretical criteria for appraising market efficiency has been to set up two standards of efficiency: (1) the extent to which short-run fluctuations in price -- that is, those not matched by changes in equilibrium price -- are eliminated, or alternatively, the extent to which transaction costs to the public are minimized; and (2) the success with which changes in equilibrium prices are anticipated.[3] The first of these standards may be considered to lead to an appropriate measure of the market's operational efficiency which relates to the cost of providing intermediation between public buyer and seller or between public saver and corporate issuer. For a given volume and quality of services, and for given factor costs, operational efficiency may be measured by, and is an inverse function of , underwriting and other flotation costs of new issues and transaction costs in public transfer of outstanding issues (including any relevant regulatory costs). The transaction costs in the transfer of outstanding issues from a public buyer to a public seller include not only two commissions but also either the bid-ask spread[4] or a fraction of that spread which depends on the proportion of public transactions which in-

volve a specialist or other securities firm acting in a principal capacity.[5]

The second of these standards, which is addressed to the market's allocational efficiency, introduces all of the difficulties in defining, and in attempting to measure, equilibrium price.[6] The latter is apparently taken to represent the intersection of the investors' demand schedule for a security with the amount outstanding -- no matter how temporary or ill-advised retrospectively that price turns out to be. Again, no consideration is given to the market role of misinformation or of the adequacy of the information set.

Probably the most satisfactory way of evaluating the allocational efficiency of decisions made in the securities markets is to inquire whether the outcomes are the best obtainable with the information that was available at the time the decisions were made or that could have been made available at that time (with the costs involved reflected in the measurement of operational efficiency).[7] The best outcomes would be obtained if the markets maintained equivalent rates of return and hence costs of financing on comparable investments. This quality of the markets would help to ensure that funds are channeled from savers to those users who will apply them most profitably and that portfolio shifts can be made to the mutual advantage of different investors. Investment

opportunities with equivalent risks would find equal access to
new funds at the same costs, and the most profitable (or other-
wise most attractive) investments would be able to bid funds
away from investments offering lower rates of return. The effi-
ciency of this allocation process can be assessed in retro-
spect by the extent to which within the market itself there are
variations in return among issues, and by the extent to which
these variations can be explained by differentials in risk.
The smaller the variations in return and the greater the extent
to which they can be explained by risk differentials, the greater
is the internal efficiency of the market. Allocational efficiency
as among markets can be measured by the variations in net returns
on alternative types of assets traded in these markets, allowing
for differences in risk.

   While it is not too difficult to obtain a retrospective
view of allocational efficiency in a market by analyzing returns
and risks associated with different investments, it is virtually
impossible to tell how the outcomes compare with the best obtain-
able at the time the decisions were made. Retrospective data
permit an absolute appraisal of the optimality of outcomes only
with the benefit of hindsight. Yet they do provide an indication
of the departure of outcomes from _ex post_ optimality. Obviously,
if _ex ante_ measures of return and risk at the beginning of a

period bear little relationship to ex post measures at the end

of the period, the value of the ex ante magnitudes would be

quite limited. Indeed, it can be argued that exclusive reliance

on ex ante measures of risk and return for assessing market effi-

ciency would lead to the trivial conclusion that by definition

markets always tend to be efficient.

In spite of the deficiencies in reliance on retrospective

data to supply an adequate measure of absolute market efficiency,

they probably do provide a reasonably satisfactory index of rel-

ative market efficiency which can be used to analyze the impact

on efficiency of different financial developments and practices

(e.g., the impact of securities regulation or of institutional

equity investment). However, in view of the dependence of secur-

ity prices on ex ante return and risk, it is desirable where pos-

sible to consider the relationship between ex ante and ex post

magnitudes.

Indirect tests of allocational efficiency

Numerous indirect tests of allocational efficiency of the

market have been carried out by various types of "random walk"

and related models which correlate past price changes (or past

returns) of individual stocks or of the market as a whole with

future price changes (or returns) to determine whether knowledge

of the past by itself provides useful insights into the future

trend in the market. These random-walk models have typically found that knowledge of the past history of stock prices does not provide any significant basis for earning above-average returns in the market.[8] This is an extremely interesting result for stock market practitioners since it casts doubt on the usefulness of so-called "technical analysis" in the market -- which is a widely-practiced art by market professionals devoted to forecasting prospective trends in stock prices based on patterns or configurations of past prices. There does not appear to be any scientific justification for the activity of these market chartists. However, while random-walk tests have been useful from this viewpoint, their interpretation as implying a high degree of allocational efficiency is more dubious.

It is true that the random-walk results can be interpreted to imply that any new information relevant to stock price determination is reflected in prices extremely rapidly, but they might also indicate the speed with which misinformation is reflected in price. Thus, the application of random-walk tests to ten stocks (mainly on the Amex) alleged to have been manipulated in the mid-1960's, with indictments obtained for two of the ten, did not show any significant differences in randomness of price behavior from other control stocks during the same periods.[9]

A second set of tests of market allocational efficiency

which have been carried out in recent years has attempted to determine whether individual stock prices adjust efficiently to obviously relevant information (e.g., earnings announcements) which becomes publicly available.[10] The efficiency of the response of the stock prices to new information is usually measured by comparing the monthly returns on these stocks to the monthly returns on all stocks of comparable risk in the periods before and after the information is made available to determine whether the market makes unbiased forecasts of the impact of this information and whether these forecasts are fully reflected in stock prices by the month the announcement is made. A study of the effects of annual earnings announcements on stock prices concludes that no more than about 10% to 15% of the information in such announcements has not been anticipated by the month of their public release. A similar study of stock splits concludes that the information in such announcements is fully reflected in stock prices by the end of the month of the split and that the returns implicit in prices at that time are unbiased forecasts of future returns. These and other studies of this type have been interpreted as pointing to a high degree of market efficiency.

There is little doubt that such direct tests of the way in which the market responds to relevant information provide more useful evidence on market efficiency than the indirect random-walk tests. However, even these direct market-response tests do

not really answer the basic question of allocational efficiency;
viz., how well do current stock prices reflect future return with
appropriate allowance for risk and thus provide appropriate guide-
lines for channeling funds into their most profitable uses?

A third set of studies which have recently been cited as
bearing on the allocational efficiency of the stock market are
those dealing with the relationship of market profitability and
access to inside information. The reasoning seems to be that
if groups which have special access to inside market or corporate
data tend to have substantially better investment performance
than other investors, there are imperfections in the reflection
of information in prices -- the more groups of this type and
the more substantial the profits, the greater the imperfections.
However, these imperfections might be of two types: They could
be associated with long time lags before price fully reflects
the information available to a select few, in which case the
market might be significantly inefficient in its allocational
signals; or they could be associated with very short time lags
in which case the allocational inefficiencies might be minor
even though the associated profits to the groups with inside
information might be large. In the latter instance, market ar-
rangements might be considered inequitable -- but not necessarily
allocationally inefficient -- if certain groups had monopolistic
advantages over others. Even in the first instance, it may not

be possible to distinguish between above-average profitability
of trading which reflects inside information and that which re-
flects trading acumen.

It may be noted here that only two groups of investors
for which information is available seem to have above-average
trading profitability. These are the specialists on an exchange,
who of course have access to inside trading information, and the
corporate officers, directors and principal stockholders, who
have access to inside corporate information.[11] Institutional
investors for which performance data are available (notably the
mutual funds) have not been able as a group to earn above-average
return on their investments, in spite of their substantial expen-
ditures for professional advice and their greater access to cor-
porate management due to the actual or potential size of their
holdings. Similarly, though the data are not nearly so conclusive,
large individual investors appear to do no better than the
smaller investors. It is difficult to draw any very useful con-
clusions on stock market efficiency from these findings, but they
suggest that the possession of monopolistic trading advantages
is confined to relatively small groups in the market.

Direct tests of allocational efficiency

One important attribute of an efficient market in which
investors are not indifferent to risk is that the risk of in-

vesting in a specific asset as perceived by the investor when he is
making his decision should correspond fairly closely to the risk
which actually materializes. There is some presumption that this
condition for efficiency may be met in the stock market since
such measures of risk as the relative variability of return on
a stock or its relative covariability of return with the market
as a whole tend to be reasonably invariant over time for the same
security, at least when combined in portfolios of say ten stocks
or more.[12] Similar results were obtained with quality ratings
of New York Stock Exchange stocks.[13]

Another important attribute of an efficient market is
that average realized return over a reasonably long period should
increase with the level of risk if, as is generally assumed,
investors are risk averse. The empirical evidence generally con-
firms that there is a positive relationship between risk and re-
turn, but the results are by no means uniform or strong. During
the last century, bonds have on the average yielded much less than
stock -- roughly 10% for common stock and 5% for bonds. In recent
years, the very substantial differential between the realized,
and probably also the required, yields on stocks and on bonds has

narrowed appreciably. Both of these results are at least

qualitatively consistent with expectations in efficient markets

in the presence of risk aversion associated with institutional

developments which tended to reduce the market price of risk (e.g.,

the growth of equity-oriented financial institutions which can

diversify away a large part of the risk involved in investment

in individual stocks).

For stocks alone, which are our major concern in this paper,

the evidence on the relation of risk to return is less clear.

If returns on New York Stock Exchange stocks are related to

their risk for the years 1926 to 1968, the longest period of

time for which data are readily available, the results are sensi-

tive to how returns are measured but not to the measure of risk.[14]

Beta and variance measures of risk and quality ratings all give

similar results, with a humped-shape relationship between realized

return and risk, i.e., with return first rising and subsequently

declining as risk increases. However, the point in the risk

scale at which return levels off and declines is greatly de-

pendent on the measure of return. An average[15] of arithmetic

means of monthly returns for individual stocks indicates

that except for a relatively small number of highly risky issues

(from 5% to 15% of the NYSE issues depending on the risk measures

used) return is positively associated with risk. An average of

geometric means suggests that except for the low-risk stocks
(representing from 20% to 25% of the issues) there is a negative
correlation between return and risk. It can be shown that, even
apart from transactions costs, the arithmetic mean provides an
upward biased estimate of the expected value of return over this
period, while the geometric mean is a downward biased estimate.
A buy and hold policy, which invests an equal amount in each stock
in each risk class at the beginning of the period, yields a result
intermediate between those obtained from the arithmetic and
geometric means but closer to the latter.

So far as these results covering the longest possible
period of time are concerned, there is no consistent evidence
that investors were generally able to obtain the positive risk
differential which would be expected under the assumption of
risk aversion. For the post-World War II period alone there is
somewhat more indication of a positive risk differential asso-
ciated with long-run rates of return on NYSE stocks, but the
differentials are not very large and there is still evidence of
a decline in return on the riskiest issues. There are three
possible explanations of these results, all three of which prob-
ably have some degree of validity. First, investors -- at least
those who invest in stock -- may not be as risk averse as com-
monly thought. Second, they may like positive skewness of re-

turns, i.e., they may be willing to accept a lower expected

rate of return on at least part of their investment portfolio

for a small chance of making a killing.[16] Third, they may tend

to overestimate systematically the probable return from a risky

investment, with the degree of overstatement sufficiently great

to offset the rising risk premium.[17] This may reflect not only

the extreme difficulty of assessing the likely return on a risky

investment, but perhaps also the extent to which investors rely

on the brokerage community for such an assessment.

A comparison of the rate of return on new vs. outstanding

stock provides some additional support to the existence of a

humped-shape relation between return and risk. For all groups

of new stock issues tested from the 1920's to the mid-1960's

(classified by industry, size and seasoning), the price perform-

ance and rates of return for new issues over five-and ten-year

periods subsequent to their offering were inferior to those for

outstanding issues, though in view of the greater subjective

risk usually attributed to new issues, the opposite result might

have been anticipated.[18] When new issues were segregated between

seasoned and unseasoned issues, the unseasoned issues had a worse

relative performance subsequent to flotation, again suggesting

a comparative over-pricing of risky new issues. This does not

mean, of course, that in periods of great market buoyancy, new

issues were not good short-run investments. On the contrary,
there were few classes of investment more profitable than pur-
chasing new, and especially unseasoned stock in fashionable
industries during "hot" new issues periods (particularly at the
original offering prices), if the investor was wise enough not
to hold on too long.

It does mean -- despite statements to the contrary by
members of the financial community -- that on the average new
issues (even purchased at the original offering prices) have not
been good long-run investments for investors who are not willing
to suffer a lower return for the pleasure of assuming a greater
risk. When instead of the usual measure of return one is used
which relates end of period earnings to initial price, thus abstract-
ing from possibly transitory changes in the price-earnings ratio
and perhaps getting closer to an ex ante measure of return, part
of the difference in market behavior of new and outstanding stock
issues seems to disappear. The comparative over-pricing of new
issues was reduced in the post-World War II period suggesting an
improvement in market efficiency after the 1920's. This improve-
ment was probably attributable in part to the disclosure require-
ments and other changes in market bahavior associated with the
Federal securities legislation of the mid-1930's.[19] The inferior
price performance of new -- and especially unseasoned -- stock

issues as compared with outstanding securities may reflect, among
other factors, investors' taste for positive skewness, their ex-
aggerated views of profit potentialities on new ventures, the
intensive selling effort associated with the distribution of new
issues, managements' success in recognizing periods of relative
over-valuation of their stock issues, and probably to a limited
extent personal tax considerations favoring risky investments.

Additional direct tests of the market's relative alloca-
tional efficiency in different periods can be derived from market
equilibrium theory which demonstrates that under certain plau-
sible assumptions the return on an individual stock over time
should bear a simple linear relation to the return on the stock
market as a whole (or more accurately the return on all risky
assets), while the return of an individual stock in a cross-
section should be linearly related to its risk as measured by
the covariance of its return with that on the market. The resi-
dual variation in these relationships provides a basis for assess-
ing the efficiency implications of changes in the market struc-
ture. Thus a study which regresses the monthly individual re-
turns for 251 NYSE stocks against the average market return for
all of them finds that the variance of the residuals for 247 is-
sues was smaller in the post-World War II period than in the
period from 1926 through the 1930's.[20] The total variance of

return on these 247 issues, which measures variance in the market return as well as residual variance, was also smaller in the post-war period.

A supplementary analysis that I carried out for this paper, which regresses on time the standard deviation of residuals from a series of cross-section relationships of portfolio monthly return and risk for 21 periods of 24 months each from July, 1926 through June, 1968, finds a significant downward time-trend in these residuals. Each of the 21 cross-sectional relationships regressed the average monthly return on the estimated Beta of 10 or so portfolios, each consisting of approximately 80 NYSE stocks stratified by Beta in a preceding period.[21] The 21 standard deviations of residuals obtained from these relationships were then regressed on time.[22]

Both of these last two tests derived from market equilibrium theory suggest an improvement in market structure from the 1920's to the period after World War II. Since they abstract from factors affecting return on the market as a whole, they supply some support to the thesis that changes in securities regulation may have improved efficiency in the market for outstanding stock. However,

the evidence here is not so strong as for new issues.[23]

More meaningful tests of the allocational efficiency of the market than any of the foregoing can be obtained by deriving the ratios of subsequent earnings (say one year, two years, five years, and ten years in the future) to initial prices for individual stocks and measuring the variation in these ratios which cannot be explained by differences in risk and payout policy (the other relevant variables determining the expected relationship between initial prices and prospective earnings). The smaller this unexplained variation the more efficient the market in that it is pricing comparable investments in the same manner and hence ensuring the same cost of capital for productive activities of equivalent risk. Tests previously carried out indicate that initial prices showed very little ability to predict subsequent earnings of NYSE stocks in the 1958-68 period, with little change in this respect over the period.[24] This is not the result which might have been anticipated if the allocational efficiency of the stock market was very high, or if it had been changing during these years when institutional trading was becoming increasingly important. Unfortunately, data are not available for carrying out similar tests for the period preceding World War II.

The available data also permit a related test of the contribution of one major group of instituional investors

to market efficiency, viz., the mutual funds. An earlier

study related net purchases of individual stocks by all mutual

funds for a number of different periods (years and quarters)

during 1954-68) both to the ratio of subsequent earnings to

initial price, holding constant risk and payout, and to the

ratio of subsequent earnings to subsequent price, again holding

constant risk and payout.[25] There was little evidence that mu-

tual funds as a whole had any significant ability to guide

capital into the more profitable stock investments as determined

by the subsequent trend in the ratio of concurrent earnings to

price. Similar results were obtained when the initial ratio of

earnings to price was held constant.

The same type of analysis of year-end holdings for each

year during 1954-68 was carried out for this paper to avoid the

danger in the earlier study that the average price attributed to

the fund's net purchases during a period might give rise to

biased results.[26] The findings were identical, confirming that

on the whole trading by mutual funds neither contributed to nor

detracted from market efficiency. There was some evidence that

funds may have been able to select stocks with a relatively favor-

able trend in the subsequent relationship of price to earnings

· but about as strong evidence that they tended to hold stocks

with a relatively unfavorable subsequent earnings record (rela-

tive to initial price).

Other data pointing to allocational inefficiencies in the market include evidence that estimates of anticipated earnings growth by security analysts do a very poor job of forecasting the actual growth rates realized;[27] the numerous sharp fluctuations in stock prices that appear to be unwarranted retrospectively either by the subsequent trend in prices or by changes in the basic economic variables underlying the level of prices;[28] and the extensive documentation of examples of misrepresentation and manipulation affecting stock prices.[29] Together with the stronger evidence discussed previously, it seems clear that no convincing case can be made for the position held by many economists that the stock market possesses a high degree of allocational efficiency, though the market does appear to transmit information rather rapidly. The data do suggest that the allocational performance of the market has improved from the 1920's to the post-World War II period.[30]

Operational efficiency

An earlier analysis indicates that since the 1920's there has been a decline in the percentage underwriting compensation on corporate new issues but an increase in commission rates on outstanding stock (at least on the NYSE for which the information is readily available).[31] It appears that securities regulation has stimulated

competition in the new issues markets but not on exchanges.

Both competitive commission rates and an expanded NASDAQ covering

all stocks and open to all market makers satisfying certain

minimum criteria would probably reduce transactions costs on

outstanding stock issues.

Concluding remarks

It is clear that the market's ability to set up appropriate

guidelines for channelling investment funds to their optimal use

is not impressive, at least when viewed with the advantage of

hindsight. What is not so clear is whether specific steps can

be instituted to make major strides towards this end. However,

even moderate improvements would have a large payoff, and it

is important to analyze carefully the possibility of improving

the market's valuation mechanism through appropriate institutional

changes. Thus the securities legislation as a whole seems to have

improved market efficiency, but it is not clear whether a number

of specific regulatory requirements have been beneficial.[32] Further

exploration of the impact of such requirements on market efficiency

would be highly desirable. Also useful would be a comprehensive

analysis of the predictive ability of different groups in the mar-

ket to determine the characteristics of any groups which show

superior ability in forecasting the future flow of earnings and

associated risks.[33]

FOOTNOTES

*Richard K. Mellon Professor of Finance, University of Pennsylvania. The author wishes to thank the Rodney L. White Center for Financial Research of the Wharton School for financial support.

[1] E.g., see Benoit B. Mandelbrot, "When Can Price be Arbitraged Efficiently? A Limit to the Validity of the Random Walk and Martingale Models," Review of Economics and Statistics, August 1971; and Eugene F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," Journal of Finance, May 1970.

[2] Obviously, the information set consists of many items ranging from reliable and highly relevant data to data designed to be misleading, so that there is no simple dichotomy between information and misinformation. One can view the set as consisting of data to which market participants attribute different degrees of reliability and pertinance that may vary widely from their true values. These disparities may be lessened by additions to the set through changes in institutional arrangements, e.g., by securities regulation.

[3] George J. Stigler, "Public Regulation of the Securities Markets," Journal of Business, April 1964.

[4] The effective bid-ask spread may of course vary with the size of the transaction.

[5] Whether the entire bid-ask spread or a fraction is used depends on whether the service provided by intermediation is assumed to involve immediate transfer between public buyer and seller or the average time involved in actual transactions.

[6] Irwin Friend and Edward S. Herman, "The S.E.C. Through a Glass Darkly," Journal of Business, October 1964 and Professor Stigler on Securities Regulation: A Further Comment," January 1965.

[7] Part of this discussion of market efficiency is taken from a forthcoming book on The Stock Market by Irwin Friend and Marshall Blume to be published by Norton.

[8] See Fama, op. cit. One recent notable exception is Pao F. Cheng and M. King Deets, "Portfolio Returns and the Random Walk

Theory," The Journal of Finance, March 1971. However, the extremely large differences in returns between "rebalancing" and "buy and hold" strategies found by Cheng and Deets may reflect differences in transaction costs and effective taxation. A forthcoming paper by Marshall Blume and myself will discuss these differences at some length.

[9]Harry C.B. Blaine, A Statistical Investigation Into the Manipulation of Stock Prices, MBA Advanced Study Project, University of Pennsylvania, 1968.

[10]See Fama, op. cit.

[11]See Irwin Friend and John de Cani, "Stock Market Experience of Different Investor Groups," Business and Economics Statistics Section, Proceedings of the American Statistical Association, 1966 for early references to data on specialists, corporate insiders, mutual funds, and large and small individual investors, More recent references to one or more of these groups are contained in Fama, op. cit.; Irwin Friend, Marshall Blume, and Jean Crockett, Mutual Funds and Other Institutional Investors: A New Perspective, McGraw Hill, 1970; and the S.E.C. Institutional Investor Study, Government Printing Office, 1971.

[12]See Marshall Blume, "On the Assessment of Risk," The Journal of Finance, March 1971 for stability of relative covariability, i.e. the Beta coefficient.

[13]These ratings were available for the years 1929, 1948, and 1956, and were assigned numerical values for correlation analysis. Thus, for individual stocks, the adjusted coefficients of determination between the Fitch ratings of 1948 and 1956 was .51.

[14]In this analysis, the proceeds from stocks which are delisted are considered invested in the remaining stocks in the same risk class as of the date of delisting. Risk is measured as of the beginning of the period.

[15]Arithmetic mean with equal weights applied to each of the stocks.

[16]Rather surprisingly, this may be true even for diversified portfolios. See Fred Arditti, "Another Look at Mutual Fund Performance," Journal of Financial and Quantitative Analysis, June 1971.

[17] *Ex ante* measures of return have been used in an attempt to test this hypothesis, but they are not conveniently available for the 1920's and are quite deficient even for the postwar period.

[18] Irwin Friend and J.R. Longstreet, "Price Experience and Return on New Stock Issues," _Investment Banking and the New Issues Market_, World Publishing Company, 1967. The average _ex post_ Beta coefficient for unseasoned new issues may have been less than one, but probably not by enough to explain the substantial negative risk premium associated with them.

[19] Additional evidence that the Federal securities legislation improved market efficiency, particularly for new issues, is provided in Friend and Herman, October 1964 and January 1965, _op. cit._

[20] Marshall E. Blume, _The Assessment of Portfolio Performance: An Application to Portfolio Theory_, Ph. D. Dissertation, University of Chicago, 1967. On the other hand, the coefficient of correlation was also generally smaller over this period.

[21] The manner in which these portfolios were selected is described in Marshall Blume and Irwin Friend, _A New Look at the Capital Asset Pricing Model_, Working Paper No. 1-71, Rodney L. White Center for Financial Research, University of Pennsylvania.

[22] The actual regression fitted was SD = .00337 +
$$\underset{(5.34)}{}$$

$$\underset{(.64)}{.00854} \left| R_M - R_F \right| - \underset{(-2.66)}{.00011} \, t \quad \text{with } \overline{R}^2 = .30, \text{ where SD is the}$$

standard deviation of residuals, R_M is the average monthly market rate of return, R_F is a proxy for the risk-free rate measured by the six month commercial paper rate, | | represents absolute value, t is the time trend, the numbers in parentheses represent t values and $\overline{R}^2$ is the coefficient of determination adjusted for degrees of freedom. $\left| R_M - R_F \right|$ was used as an additional explanatory variable to hold constant any residual market effects but is not significant. If $\overline{R}^2$ instead of SD for each of the 21 cross-sectional relationships is regressed on $\left| R_M - R_F \right|$ and t, the coefficient of t is significantly positive.

[23] George Benston (in Henry G. Manne, Ed., _Economic Policy and the Regulation of Corporate Securities_, Washington, 1969, pp.

31-41) concludes that the disclosure provisions applicable to outstanding stock are ineffective largely on the basis of an empirical test of the usefulness of published income statements. However, he seems to draw an incorrect inference from this test since the regression coefficient of the relevant variable, unexpected change in accounting data, is significant for some income variables; he does not allow for the joint effects of unexpected changes in different variables; and, perhaps more important, he makes no adjustment for the substantial understatement of the relevant regression coefficients arising from the very large random measurement errors associated with any measure of unexpected change.

[24]Friend, Blume, and Crockett, op. cit., pp. 91-94. The relationships fitted there were $[(E_{N_i})/(P_{o_i})]' = f[(\frac{\overline{D}}{E})_i, \beta_i, \sigma_i]$

where E is earnings per share, N takes on values from 0 (the current year) to more than 10, i represents the ith stock, P_0 is initial price per share, the prime indicates that the ratio for the ith stock is divided by the corresponding ratio for the market as a whole, (D/E) is the average dividend yield, β the Beta coefficient, and σ the standard deviation of the rate of return. Further tests carried out for this paper, adding the initial (E_o/P_o) ratio as another independent variable to explain (E_n/P_o), increased the correlations of the regressions, particularly for small n, but did not significantly change the earlier conclusions.

[25]Friend, Blume and Crockett, op. cit., pp. 69-73.

[26]The regressions fitted were

$$H'_{oi} = f[\left(\frac{E_{Ni}}{P_{oi}}\right)', \left(\frac{\overline{D}}{E}\right)_i, \beta_i, \sigma_i], \quad H'_{oi} = [\left(\frac{E_{Ni}}{P_{oi}}\right)', \left(\frac{E_{oi}}{P_{oi}}\right)', \left(\frac{\overline{D}}{E}\right)_i, \beta_i, \sigma_i]$$

and

$$H'_{oi} = f[\left(\frac{E_{Ni}}{P_{Ni}}\right)', \left(\frac{E_{oi}}{P_{oi}}\right)', \left(\frac{\overline{D}}{E}\right)_i, \beta_i, \sigma_i] \text{ where } H' \text{ represents year-}$$

end holdings of a specific stock by all funds divided by their holdings of all stocks, and the other symbols have the same meaning as before.

[27] John G. Cragg and Burton G. Malkiel, "The Concensus and Accuracy of Some Predictions of the Growth of Corporate Earnings," Journal of Finance, March 1968.

[28] E.g, a rise in market value of Procter and Gamble common after the introduction of Crest in excess of the gross receipts of all manufacturers of toothpaste; and the price gyrations in Columbia and Southern Ohio Electric stock on the day following the assassination of President John Kennedy, with a drop in price of one-third in the morning, a recovery of half of the loss by the close of the day, and the other half by the opening of the next trading day.

[29] For references, see Friend and Herman, October 1964, op. cit.

[30] Still other tests directed to the efficiency of corporate investment rather than to market efficiency have raised serious questions about the former on the basis of comparisons of differential rates of return on investment financed by external equity, debt, and retained earnings (W.J. Baumol, P. Heim, B.G. Malkiel, and and R.E. Quandt, "Earnings Retention, New Capital and the Growth of the Firm," Review of Economics and Statistics, November 1970). However, a recent analysis suggests that with appropriate adjustments these differentials on the average are not very large (Irwin Friend and Frank Husic, "Efficiency of Corporate Investment," Working Paper No. 4-71, Rodney L. White Center for Financial Research, University of Pennsylvania).

[31] Irwin Friend, "The SEC and the Economic Performance of Securities Markets," in Economic Policy and the Regulation of Corporate Securities, op. cit.

[32] For example, while as indicated earlier the philosopny of full disclosure, which is central to the Securities Act of 1933, has probably paid handsome dividends, this is not necessarily true of all the detailed disclosure requirements nor of the constraints which have been placed on the dissemination of certain types of forecasts. Similarly, margin requirements have probably tended to reduce stock price volatility and increase market efficiency (George W. Douglas, Risk in the Equity Markets: An Empirical Appraisal of Market Efficiency, Yale Economic Essays, Spring 1969, and "The SEC and the Economic

Performance of Securities Markets," op. cit.), but this may not
be true of the restrictions placed on insider trading (H.K. Wu,
Corporate Insider Trading, Profitability, and Stock Price Move-
ment, Ph. D. Dissertation, University of Pennsylvania, 1963). Re-
strictions on insider trading might, of course, be justified
on equity even if not on efficiency grounds.

[33]Such an analysis is currently being carried out by
Marshall Blume and myself.