

INVESTMENTS

I. *Measurement of Investment Performance*

- A. Is the Annual Statement net earned interest rate adequate and valid as a measure of investment performance as used:
 - 1. Internally in comparing results from year to year and in trends?
 - 2. Externally as a competitive tool? How widespread is its use?
 - 3. Externally as an item in the valuation of a company's stock from the investor's point of view?
- B. What methods are being used to recognize returns arising from realized and unrealized capital gains and losses on stocks and other investments and gains on call premiums to determine a composite internal interest rate?

MR. FERGUS J. McDIARMID: I strongly feel that, under present conditions, the net earned interest rate as calculated in the Annual Statement is a totally inadequate and misleading measurement of investment performance. This rate is a composite of widely differing elements. It is like adding oranges and apples to potatoes and turnips to try to arrive at a meaningful total. It consists mainly of a composite of interest on taxable bonds, interest on tax-exempt bonds, dividends on preferred stocks, and dividends on common stocks. The relative values of these different elements depend substantially on the federal income tax rate applying to incremental investment income. These values are quite different in the case of a company whose incremental income tax rate is 15 per cent from what they are in the case of a company whose rate is 40 per cent. In the case of the latter, the relative value of tax-exempt interest and dividend income will be much greater than it is in the case of the former. A company in a high tax bracket may find it advantageous to invest substantially in tax-exempt bonds and preferred stocks, even though these substantially depress its net pretax rate of interest.

Also, in this inflationary period, interest income and dividend income on preferred stocks cannot be compared at all with dividend income on common stocks. In the case of the former, the fixed-dollar income is the only thing to be considered. In the case of common stocks, the dividend income is only one source of gain and no doubt in many cases not even the most important one.

Inflation renders quoted interest rates fictitious, and in the last year such rates have been very fictitious indeed. To take satisfaction from increasing the earned rate on your fixed-income investments by, say, 20

basis points in a year during which the real value of those investments was shrinking due to inflation of over 4 per cent is a form of whistling in the wind.

It is worthwhile taking a look at some realities. Consider the real meaning of a $7\frac{1}{2}$ per cent taxable interest rate in the case of a company in a 40 per cent income tax bracket in a year when inflation is progressing at the rate of 4 per cent a year. This was less than the inflation rate in the year just ended. The 40 per cent tax rate reduces the $7\frac{1}{2}$ per cent gross interest rate to $4\frac{1}{2}$ per cent. Then, you should knock off 4 per cent more for the loss in principal due to inflation, and you have $\frac{1}{2}$ of 1 per cent left out of the $7\frac{1}{2}$ per cent gross rate. If the tax rate is 20 per cent instead of 40 per cent, a gross rate of $7\frac{1}{2}$ per cent produces a real net rate of 2 per cent. All of this is just simple third-grade arithmetic. Levying a tax on gross interest income in an inflationary period is like levying a tax on corporate earnings before deducting depreciation.

It is arguable that under such conditions a 3.2 per cent dividend yield on common stocks, which happens to be the present yield on that non-glamorous composite known as the Dow-Jones Industrial Average, is better than a $7\frac{1}{2}$ per cent taxable interest rate. It has been the long-term experience that stock values as a whole have appreciated more than enough to offset the loss in their dollar value through inflation. With the benefit of the 85 per cent intercorporate tax credit, the tax impact on dividend income is relatively light and the dividend return on stock therefore comes fairly close to representing a real net return. Moreover, based on past experience, one can count on a steady stream of dividend increases which, in recent years at least, has tended to increase the return on a common stock account measured at cost at a rate of somewhere around $\frac{1}{4}$ per cent a year.

This year I made a study of the results of our own common stock account over the nineteen years from the end of 1948, when this account was quite small, to the end of 1967. I figured the net dollar input by years, that is, the excess of stock purchases over sales and dividends, and I found that these net input items had to be compounded at an interest rate of slightly over 13 per cent a year to produce the market value at the end of the period. I might add that three-quarters of the net input to our account took place during the last nine years of this period, during which time stocks did not appear cheap in terms of current earnings and dividends. During this period of years, the Dow-Jones Industrial and Utility Averages were on the whole selling at earnings multiples above their historic average levels. If we had the nerve to figure the rate on our bond account in the same way, it would involve writing bonds down to market

during the period, and the results, I am afraid, would be unspeakably dismal.

In spite of such comparisons as these, the purchase of common stocks under present conditions causes a lot of static from our actuaries. Presently, they seem to base all their premium and dividend calculations on this net earned rate. At present, the yield obtainable from buying a quite unglamorous list of common stocks is well under half the yield obtained from buying taxable bonds. Since the purchase of such stocks depresses the net earned rate of the company, this makes the actuaries scream with pain. If the stocks appreciate market-wise so that the yield is further depressed, they scream still louder. Apparently the only stocks they would approve are those that go down in the market, thereby increasing the net earned rate. Because of such reactions, investment people are beginning to suspect that actuaries may be obsolete in some respects.

It is a well-known and established fact that in the case of common stocks a large part of the over-all return, sometimes the greater part of it, is obtained in the form of price appreciation. This is certainly true of low-yielding growth stocks, which under present conditions seem to cause actuaries the greatest anguish. The behavior of such stocks as IBM, Xerox, and Avon Products has no doubt caused them untold suffering.

In my opinion, it is impossible to devise any mathematical formula to take into account in an adequate fashion potential future capital gains on common stocks. For this purpose, old-line, fixed-dollar policies such as have provided the bulk of life insurance reserves in the past appear unsuited. New types of policies will be required, containing possibly fixed minimum mortality guarantees but with reserves invested more or less in equities and the ultimate total benefits depending on the behavior of these equities. That is what I said in a paper delivered to this Society ten years ago, for which I was nearly excommunicated. This same paper would probably be much better received today, when everybody is jumping on the equity band wagon. Only the statistics contained therein need to be brought up to date; the ideas require no revision.

MR. PATRICK L. HUMPHREY: If market values are to be used as the only measure of investment performance, what kind of adjustments can be made for determining a rate to be used in dividend scales, and so forth?

MR. IRWIN T. VANDERHOOF: It seems to me that two things must be considered. One is that market values are going up, and this provides a convenient measure right now for how well we have been doing.

But market values have been going up for common stocks because there have been increased earnings and increasing dividends. Mr. McDiarmid pointed out that over a period of years the return on the portfolio of common stocks in his company was about $8\frac{1}{2}$ per cent. I do not think, however, that this presents a problem in establishing a dividend scale. All it means is that money being currently invested may earn, say, 3 per cent this year but that the return will go up over a period of years to average out at 5, 6, or 7 per cent. The point is that it is the income from the investments which will work out to a relatively high rate and not just the market value that is involved.

MR. GORDON L. CORNEIL: I am sure Mr. McDiarmid had in mind that a stock investment program, if it is really going to help the company with its dividend scale as the question asked, requires a program of realizing some of the capital gain each year during the period. Otherwise, the 3 per cent return at the start of the investment in any stock is not going to be adequate. Of course, as Mr. Vanderhoof pointed out, as time goes on that 3 per cent is going to grow with increased earnings and increased dividends. But the problem remains that, unless there is some program of realizing capital gains, the part of the increased income resulting from capital appreciation is not available to be paid out in the form of dividends to policyholders.

MR. SIDNEY BENJAMIN: I wish to comment on this subject on the basis of the experience in England. The whole background, however, is so very different. The main difference certainly is the requirement for guaranteed surrender values in America which are very difficult to interpret in terms of equity investments. In England, there have been equity investments for a very long time, but there is no requirement for a guarantee of surrender values. The whole question of relating rates of interest to the valuation basis has received considerable attention over the last fifteen years. As you probably know, we use as a guide Reddington's paper, written about 1952, which goes into the question of the rates of interest used in valuation and relates them to the rate of return on the assets. We in England have reached the stage that we believe there can be no concept of the value of the liabilities without taking into account the value of the assets.

The other comment that I would like to make relates to the last question; it is that, where there is investment in equities, they will have to be written up so that capital appreciation comes through and is recognized in the total assets.

MR. VANDERHOOF: I have frequently heard the comment from English actuaries that the fact of having guaranteed surrender values changes everything. I do not see why that should be so. We have a fairly good idea of the number of policies that are going to lapse at any particular point in time, and we know approximately how much cash we are going to have to pay out on account of them. This seems to me to be just another of Reddington's cash outflows. You would simply add one more item in the formula, and everything else should work out the same. Is there some other reason that makes it different, or is it just the addition of an additional item?

MR. BENJAMIN: It is a serious question of degree; if something changes sufficiently in degree, you get not merely the quantitative difference but a qualitative difference. This is what happens in this case. In Reddington's theory, as you know, it is a question of matching in time. But you will want to look at the relationship between your assets and liabilities from two different points of view. One is from the point of view of solvency, assuming that things do not go very well. Also, if the investment policy is successful there is the problem of equalizing bonuses or dividends to policyholders. You can either take the stand that you are going to invest to obtain maximum maturity values—in which case you cannot have guaranteed surrender values, because at any point in time the values of the investments may be down—or you go to the other extreme and guarantee surrender values—in that case, it seems to me, you must make sure that your investments are relatively liquid at all times.

MR. JAMES L. CLARE: As reported by Mr. Steffen, Mr. McDiarmid noted a historical compounded yield on common stocks, over a recent period, in excess of 13 per cent. During this time price-earnings ratios have increased. I am not suggesting that price-earnings ratios will decrease to their original levels at the start of the period investigated, nor am I suggesting that price-earnings ratios will necessarily remain constant at their present levels. However, it is my feeling that price-earning ratios will *not* increase indefinitely, year after year, at the same pace that they have over the period investigated. If Mr. McDiarmid could isolate from his result of better than 13 per cent the effects of the increase in the price-earnings ratio during this time, this might perhaps provide a fairer comparison to use when discussing the advantages of common stocks, variable annuities, and mutual funds. I would guess that the result, while appreciably below 13 per cent, would still be a substantial and healthy figure.

DR. CHARLES MOELLER, JR.:* In regard to price-earnings ratios, I think you have to be quite careful concerning terminal points. During the time that Fergus McDiarmid was talking about, 1948-68, the price-earnings ratio for the Dow-Jones and also for the Standard and Poor went from about 7 times to as high as 20 times and then down to about 15 or 16 times currently. Quite obviously, this is included in the return that Fergus quotes. If you could go back as far as 1900, you would find that the average price-earnings ratio is not very different from what it is currently. That is, it seems to run generally around 15 or 16 times, so that in all evaluations of stock portfolios you must consider your terminal points; of course, in 1948, stock market prices were down and so were price-earnings ratios.

MR. HUBERT M. STYLES: Don't you also have to consider the fact that the earnings have changed as they have been measured over the past twenty years and that there are different amounts of write-off contained in the earnings figures now than there were twenty years ago?

DR. MOELLER: Yes, but I am not so sure that the quality is any better or any worse now than it was for all stocks, although the question needs to be considered for each stock individually.

MR. CORNEIL: Investment managers over the past few years have been conscious of a new term which must send cold chills down their spines. I am referring to the preoccupation with the term "investment performance." All of us have become aware of how good or bad their investment results have been, either absolutely when compared to goals set by their boards of directors or when compared to the results of other portfolios over the same period of time and operating under what appear to be similar conditions. However, the pressures on two funds are never identical, and, consequently, the comparison of investment results is at best an approximation. Quite frequently, comparisons are made over too short a time interval, and seemingly significant differences in investment performances may not be real.

Many of today's investment managers have only operated during a unique period of time, when wholesale credit defaults have been practically unheard of. It is only when we read the historical record of the 1930's that we gain an insight into the damage to investment results of heavy defaults on principal and interest and the valuing of common stocks at a fraction of their intrinsic value.

* Dr. Moeller is Vice-President—Economics, of the Metropolitan Life Insurance Company.

When we compare our investment results internally over a recent period, we are at a loss to gauge accurately what portion of the improvement should be allocated to a decline in the over-all credit rating of our portfolio. In addition, we do not know what investment reserves should be set aside for possible future losses. The problem is compounded when we attempt to compare the investment results of many portfolios, where it is quite difficult to gauge the relative risk exposure without a very detailed study of the investments involved. Such a study is a matter of judgment and interpretation. Consequently, I am of the opinion that the comparison of investment performance is a very inexact science. I am also concerned that too much importance has been attached to differences in investment results among portfolios when the significance of these differences may not be real; very frequently such comparisons of investment results are over periods which are too short to be meaningful.

The methods used by the ten largest Canadian life insurance companies have been reviewed. Each year the government formula is used to determine the mean interest rate earned on total invested assets for the year on both a gross and a net basis after deducting investment expenses from the revenue income. This formula is also used for the various categories of assets and by geographical areas. The majority of the Canadian life companies are active in the United States and the United Kingdom. They find it essential, because of the different interest rates prevailing in different countries, to calculate the rates earned by geographic area as well as by asset category within the area. Where there are major changes in the size of the asset category near the beginning or end of the year under review, the formula is modified to produce a mean asset corresponding to the revenue income received during the year. It should be noted that in Canada life insurance companies are not subject to income tax until 1969. Consequently, for Canadian investment results there has been no need to determine a net rate after income taxes.

No company has been able to develop what it considered an adequate measure of risk exposure. One company stated it reviewed other portfolios in depth but has not been able to reduce the risk exposure to a usable index. Some companies produced a net earned interest by deducting the net loss or by adding the net gain realized over the year to the revenue income. This is done for the total portfolio and for the various asset categories.

Where the companies maintain segregated equity funds, the unit value of the fund is determined periodically after deducting all investment expenses, using market values for the stocks held. All income is reinvested in the fund. It seemed to be common practice to compare the performance

of the equity fund unit values over a period of time to stock exchange indices, after allowing for the reinvestment of income. They were also compared to the unit values of other life company and trust company equity funds. The most meaningful comparison is to consider the investment of \$100 each month, in the various equity funds being compared, at the published unit values. This theoretical fund is accumulated over a period of time and a compound interest rate determined equivalent to the accumulation. The interest rates at which the equity fund grew over a period of time can be compared.

One life company has followed the practice of unitizing its life branch, common stock portfolio. It made allowance for brokerage and income tax but did not charge an investment management fee.

Many Canadian life companies followed the practice of writing down the book value of securities with the net realized capital gains. In this way a perpetual increment to the net interest rate earned was built into the portfolio.

It is generally recognized that unrealized capital gains are significant only in respect to common stocks. One company has adopted a novel approach to the unrealized capital gains on its life branch, common stock portfolio. They assume a rate of return on their common stocks which will not negatively affect their over-all portfolio interest rate earned. They then periodically write-up and write-down their common stocks to market value, thereby creating a reserve, over a period of time, to which is charged extra income over and above the dividend income necessary to provide an acceptable yield for performance measurement purposes. If their reserve declines too rapidly over a period of time, they know that their common stocks are not performing as expected.

A few years ago a committee of the Canadian Life Insurance Association gave consideration to devising a formula whereby imputed earnings on common stocks could be used in place of dividend income. It was hoped that a way could be found to take into current account some part of the expected future improvement in yield and capital appreciation of common stocks held. This procedure would avoid one of the major drawbacks attributed to investment in low-yielding common stocks, that is, the penalizing of present policyholders to the prospective advantage of future policyholders. It was not possible to arrive at an acceptable formula.

MR. HUMPHREY: We are used to handling book values rather than market values in our annual statements. However, many investment managers feel that the only real basis of earnings is on the basis of market value. What problems does this bring?

MR. CORNEIL: I think it brings forth a lot of problems. One that Mr. McDiarmid mentioned is that, if you use market values for your bond portfolio when bonds are selling at 70 or 80 cents per dollar of original cost, a tremendous amount of unassigned surplus would be used up. There are other areas of investment, such as mortgages, where it is difficult to determine a realistic market value. It is really very difficult to value some of these assets, and I think that most companies look on this question of writing all securities and all mortgages down to market value as pretty difficult.

MR. VANDERHOOF: I think we tend to look at everything from the point of view of the form of our Annual Statement; on one side we have reserves calculated upon mortality tables that do not reflect the true mortality and upon interest rates much less than we expect to earn, and on the other side assets at fictional values. However, the function of the insurance company is to pay claims and expenses as they occur, and the problem should be looked at from the point of view of the dollars that are needed to be paid out for these purposes related to the dollars received in premiums and in the form of income or maturity of investments.

From this point of view, market values are unimportant unless there is a need to sell the investment. They are not likely to be important in regard to mortgages, but they can be important with common stock portfolios because there is a tendency to turn over the stocks fairly often. The usual insurance company is not likely to need to sell fixed mortgages or its bonds so that the market value for these forms of security, even if 20 or 25 points below the cost, is not of concern.

MR. GERALD RICHMOND: The group pension department of my company has a method of getting unrealized appreciation on common stocks into the dividend formula. We have established a minimum and a maximum rate of return that we will credit from our common stock results. In any year in which we go above the maximum, we carry the excess forward to future years to make up for possible deficiencies in years in which we fail to realize the minimum.

As for measurements of investment performance, most of the larger pension-selling insurance companies publish a grid of investment generation results showing the yield by year of investment. The so-called new money rate for the latest investment year is particularly important, since it is a big competitive selling point. Thus, if such companies were to indicate their methods of calculating investment generation rates, a useful comparison of investment results would be available.

MR. JOSEPH B. CRIMMINS: The panel so far seems to be concerned primarily with valuing stocks rather than bonds or other assets that an insurance company may have. Since we have the practical problem of living with our Annual Statement and the figures in it and since there are competitive considerations, I would hope that one of the panel might have a practical suggestion on a better method of developing the interest rates shown in the Annual Statement.

DR. MOELLER: I regret that I do not have an answer to this question, but I do think it is extremely important. I do not wish to differ with one of my fellow panel members, but I do not believe that life insurance companies have only the problem of paying out dollars. Mr. McDiar-mid's remarks in regard to the impact of inflation are very important. In some manner, we are going to have to recognize this as a charge against interest, that is, against current account rather than capital account. We cannot hide behind the fiction that we are simply taking in dollars and paying out dollars, because we are not paying out the same dollars that we have taken in, if for no other reason than inflation.

C. What other methods are being used to measure investment performance? How do they reflect risk exposure in the portfolio?

MR. VANDERHOOF: The NAIC Convention Blank makes provision for only one measure of investment performance—interest rate—yet investment performance has many dimensions and using one measure is like asking the volume of a box and being told that it is 5 inches high.

What are some of these dimensions? First, there is yield. This is each yield as interest or dividends, and capital appreciation realized and unrealized. To evaluate performance properly, using even these basic criteria, adjustments must be made to properly evaluate the effect of the timing of money being made available for investment. Use of geometrically linked value relatives, or a unit accounting technique, can provide fair measures of yield and appreciation which eliminate problems of timing of contributions.

Second, there is the problem of risk. Obviously, a portfolio manager can increase his yield by increasing his risk. Willingness to accept substantial added risk for a slight increase in yield is not the work of a good portfolio manager. In addition, risk is both in terms of loss of income and loss of capital, which can be very different things. On bond investments, these may be measured by default experience. For stock investments, there are several measures possible, based upon the historical variability to total return during successive periods. A good discussion of the com-

bination of yield and risk measures can be found in "Measurement of Investment Performance," by Robert Levy, in the March, 1968, issue of the *Journal of Financial and Quantitative Analysis* and in the papers by Dietz and Jensen in the May, 1968, issue of the *Journal of Finance*. These describe the Sharpe, Treynor, and Jensen indices.

Another measure of performance is liquidity. This is not needed by life insurance companies and is probably undesirable. However, it is meaningful, especially when companies go so far as to have a negative liquidity by committing all funds many months ahead.

Duration of investment is an important characteristic of a portfolio. It refers to the length of the period for which money is invested and to what extent future investment rates are guaranteed. Very considerable work has been done in the study of the immunization, or matching of assets and liabilities, in England even though the concept of duration was invented by MacCauley, an American. The problem of matching is making sure that investments will mature and produce dollars, for payment of benefits, at about the time claims become due. From this point of view, short-term investments are not appropriate for a life company, and low coupon bonds purchased at a discount are especially appropriate, as are common stocks, because our liabilities will mature as cash to be paid out thirty, forty, or more years in the future. In England, keeping track of the duration of the investments is considered quite important.

At least two other dimensions of performance should be considered. One is marketability, or the ability to move large positions. This is probably not very important, unless the company has substantial negative liquidity. The second dimension would be taxability—an important factor to many companies.

Thus the box of performance has many dimensions which must be measured in a variety of ways. I do not have all the answers, but I would like to put out a call for more actuaries to interest themselves in these problems. I think we have a responsibility, because I believe we are better able to develop the necessary superstructure to provide measures that will encourage improved performance in all the directions rather than just one.

MR. HUMPHREY: In justifying the entry of life insurance companies into the field of equities, we have used the euphemism of having a part in the growth of America. The panel has also commented on the need of "protection against inflation." I wonder if I could hear any comments on these two differing points of view.

DR. MOELLER: I think it is a good question, and I have a theory on this business of participating in the growth of the economy that I think is sound. You can participate in the growth of the economy either through stocks or bonds. It is not necessary to go to equities in order to participate in our economic growth. My reasoning is that, in bonds or mortgages or any fixed obligation, you are participating in growth to the extent of your yield on this security or mortgage. In equities, you are participating in economic growth to the extent of yield and also capital appreciation. You must decide how much risk you want to incur in regard to this participation in growth.

So far as inflation is concerned, this is a completely different phenomenon. The market price of equities reflects price increases due to inflation, but up to the present there has not been a true reflection of price increase in bond yields. None of the correlation studies that we have done show any firm relationship between general price levels and interest rates. This, however, is going to change in the future, I think, simply because we have the alternative to go into equities now when we want to. When we feel interest rates are not adequate for the charge on the capital account made by inflation, we can move from bond markets into equity markets.

Another point is that, if we do not take account of inflation in our yields and in our returns, we are not going to get the growth in premium income that we would like to get. In part we are not getting it now; we are going downhill as relative receivers of savings.

CHAIRMAN WILL R. MULLENS: We have been suggesting that as insurance companies we are locked into methods of valuation of assets and that they may not be appropriate. I would be interested in any expressions of opinion on whether we need to get unlocked to some extent and on other methods of valuation.

MR. MANUEL R. CUETO: It is obvious that, if we attempt to reflect all the factors that now enter into an interest rate, it becomes a very complex process which requires a reader to examine very thoroughly all the factors. I am reminded that at one time the gain and loss exhibit in the Annual Statement showed the ratio of actual to expected mortality for the entire company. With the adoption of new mortality tables and different interest rates, the calculation of actual to expected mortality became more complicated and less meaningful, and, ultimately, the ratio was eliminated from the form. Perhaps the best thing that we can do

under the circumstances without going further into complexities in regard to the interest rate is to eliminate it from the Annual Statement in the light of the current investment environment.

MR. NICHOLAS BAUER: The Annual Statement, as prepared either in the United States or in Canada, is primarily a document to permit governmental supervisory authorities to check on the solvency of companies. It is, therefore, a particularly unsuitable instrument for the measurement of investment performance. In valuing pension funds, you can have a solvency valuation and also a going-concern valuation. It seems to me that an insurance company should also have a solvency valuation and a going-concern valuation and that it should be the latter from which you determine interest rate taken into account in calculating dividends.

D. In internal measures of performance, what methods are used to identify the effect of voluntary or governmental restrictions on investment performance; for example, the billion-dollar program and various types of government interest restrictions?

DR. MOELLER: It is probably too early to measure specifically the effect of the billion-dollar program on investment performance, since it was started only about a year ago and investments are still in various stages of consideration, commitment, and disbursement. However, the channeling of life insurance company funds into the core city areas for purposes of housing and other job-creating investments adds a new dimension to the fact that the companies have long had the policy of not only investing in terms of risk involved and yield commensurate with that risk but also investing in terms of social desirability. Cold, hard number measurements of performance consequently now have an added qualitative factor.

These funds that are going into the center cities are, of course, a diversion from the normal investment stream of the life companies. It has been agreed to make investments available in high-risk areas at interest rates no higher than the market for normal lending activities.

In this connection, however, it is vital to bear in mind that business management has a twofold responsibility to its owners, whether they are policyholders, stockholders, depositors, or others. The first is that it must be a successful, competitive, and profitable enterprise today. This is axiomatic. If this fails, all bets are off. So it is understood that every decision must weigh carefully the immediate impact on the company's well-being. The second responsibility requires business to direct its poli-

cies so that the social and economic climate in which it must operate in the future is such that it will be a successful and profitable enterprise tomorrow.

To use the life insurance industry as an example, if business men are to lead the way in helping to solve the very serious urban problems and at the same time in making the view felt that government spending alone is not the answer, efforts must be made to balance the short-run interests of policyholders with their long-run interests.

MR. BENJAMIN: In England we pay a considerable amount of attention to attempting to match maturity dates of assets and liabilities. If I have a liability due in twenty years' time and it is exactly matched by an asset which happens to come due at the same date, I am not at all concerned with the rate of interest used in valuation, provided it is applied both to the asset and to the liability. Indeed, when the actuary signs his valuation certificate, he is supposed to have looked at the matching position. If the company is not reasonably matched according to maturity dates, he would penalize the company in his valuation. The new board of trade regulations require the actuary to sign a statement to the effect that he has looked carefully at the assets. In fact, the board of trade has adopted the attitude that, unless the actuary considers the assets, there is no meaning to his valuation at all.

MR. KEATH P. GIBSON: A continual problem in running pension trusts is to get the trustees to invest on the basis of long-term investment results. They are only interested in improving the current investment return and not at all in the return that their successors may show ten or fifteen years later.

II. *Computer Management of Investment Portfolio*

- A. How effectively has the Markowitz model of portfolio selection been used in the life insurance industry? What insights have been derived from this model? How effective has it been in producing specific action rules? What other models have been tried?
- B. Have computer models designed to project cash flow been effective in improving investment performance?

DR. CHARLES MOELLER, JR.: In computer utilization, the Markowitz model of portfolio selection is probably one of the more widely discussed techniques; yet, from what I have been able to determine from other machine users, the model is seldom applied in the day-to-day operations of life companies or any other type of financial institution. This is not any reflection upon the basic concepts; rather, it is simply that those investors of any size who have tried it find that too much trading is involved. Moreover, there is also the question of allocating computer time, which is expensive.

For those not familiar with the Markowitz technique, it essentially attempts to list alternative minimum risk portfolios for each stated level of return desired. This then permits an evaluation of the efficiency of a portfolio in terms of minimizing risk for a given return.

Let me give an excerpt from the IBM manual on the Markowitz model:

Program input consists of estimates in the form of probability beliefs on the expected return and possible risk associated with individual securities, along with data on the correlation of their price movements in the market. . . . Within the computer, data is subjected to a rigorous optimization by a mathematical model. The output of the program is a series of diversified portfolios which provide minimum risk at stated levels of total expected return, and which meet all imposed restrictions on the allocations of funds to individual securities or groups of securities. The portfolio manager then applies his experience and judgment to this quantitative information, and establishes an investment strategy.

One of the strong points of this approach is the recognition of risk as one facet of performance measurement—a factor whose importance is all too frequently minimized by many individuals who base performance primarily upon capital appreciation or over-all rate of return. Hopefully, someday the Markowitz model or a modified version of it will find greater application in the measurement of performance, since portfolio management is a complex process that involves the application of numerous probability expectations and the simultaneous consideration of many variables.

While I have been asked to concentrate my remarks more in the area of computer management of investment portfolios, the question of risk exposure is also extremely pertinent to the other part of this program, namely, measurement of investment performance. In fact, purely mathematical measurements and comparisons of investment performance are valueless, unless they are considered against the backdrop of risk exposure.

As an illustration, the Bank Administration Institute is in the process of publishing a detailed study to facilitate comparisons of performance between funds, giving recognition to time-weighted rates of return and to risk. However, many investors cannot agree on what is the best measure of risk. Perhaps in this day and age of high-speed computers the ultimate means of measuring portfolio performance, either internally or by outsiders, would be to draw repeated random samples from an agreed-upon population and then to compare the values of these random portfolios with the parameter values achieved by the portfolio under scrutiny.

The greatest concentration of computer time used for securities analysis at the present time seems to be in individual stock selection rather than over-all portfolio selection or balance. A surprisingly large amount of machine time is in turn devoted to the tasks of data retrieval and report generation. Such utilization does relieve the analyst of much of the drudgery of his job and permits him to spend a growing proportion of his time doing true analytical work. This in turn enables institutions to cover a wider range of industries and companies with a given staff size and may perhaps explain, in part, the growing institutional activity on the American Stock Exchange and in the over-the-counter market.

Many individual stock-selection programs center about some sort of filter mechanism or screening process. These range from very simple to rather complex multiple screenings. Here, again, the objective is to cover as many companies as possible and to sort out potential buy or sell situations in the market on the basis of certain preconceived or pretested constraints. It is then generally left to the analysts and portfolio managers to evaluate the companies thus culled out and to take specific courses of action. I personally do not know of any life companies using a completely mechanistic approach to the screening process, but there are other groups in the stock market currently following the recommendations of their filter religiously, with little regard to other considerations.

One very simple and yet commonly used screen is based upon momentum theory, using price as the measure of momentum and assuming that those stock issues showing the greatest momentum in period (t) will more than likely show the greatest momentum in period ($t + 1$). This approach

has yielded some excellent results and is fine so long as there are relatively few groups using the same technique. But as more and more investors adopt a price-momentum filter, there is always the danger of pulling yourself up by your bootstraps.

Somewhere along the upward trajectory of stock issues uncovered by these price-momentum theories the players of the game can expect a rather abrupt reversal of trend as investors readjust to the fundamental forces behind each issue. Some of the recent shift in emphasis back to quality issues and away from the highflyers is a reflection of this phenomenon. So far, the recent shift has been fairly orderly, but there is no guarantee that this will always be the case.

Several other similar momentum filters use earnings as their screening device. One widely quoted screen used three different time-period measures of earnings growth. Another uses three separate filters—(1) an earnings growth greater than (x) per cent over the last (y) years; (2) a test for stability of earnings; and (3) a requirement that the more recent earnings rates exceed the (y)-year average.

Such earnings-filter techniques at least have some relationship to basic fundamentals and point out stocks with above-average earnings performance. But it still remains for the analyst to judge whether the current market price of the stock is reasonable or not—perhaps with the aid of relative price-earnings ratios.

Even if we assume that historical tests show validity, once an operation technique becomes widely operative in the market there is a good possibility that the results achieved in the market will be altered and the historical pattern shifted. There are two other criticisms of filter techniques: (1) they generally stress buy rather than sell situations and (2) there is a tendency to vary the gauge of the filter depending upon the over-all conditions of the market and the economy without any pretesting of the new standards.

In regard to other computer techniques, unless investors are just not talking about it, they do not seem to be using correlation and regression analysis as extensively as they might. Much of the work currently being done in this area revolves around relatively simple tasks, such as calculations of trend lines, deviations from trend, and least-squares growth rates.

From a theoretical point of view, trend analysis is attractive for setting buy and sell decisions, since this lends itself neatly to probability analysis. Unfortunately though, as many of us have discovered, there are very significant differences for trend values, depending upon the time spans covered. This is particularly true in the case of five- or ten-year

trend calculations, where the use of "pre- or post-performance era" data results in substantial differences. Thus selection of a representative trend line evolves into subjective evaluation, and the neat application of probability theory evaporates.

Some regression analysis has been attempted in the area of valuation models, with the simplest approach being that of relating earnings growth to price-earnings ratios. Other more complex valuation models have been attempted. One bank, for example, developed a valuation model using, as the independent variables, earnings, a measure of price volatility, the dividend payout ratio, and a market constant based upon the exchange or market in which the stock is traded. Some other models include, as another variable, a subjective evaluation or rating of management. Nevertheless, it is my distinct impression that work on more complex valuation models is still in its infancy.

As more and more institutional stock investors adopt the various filter techniques, the importance of the multiple regression approach should be enhanced—particularly when combined with economic data and forecasts. With this thought in mind, we have done considerable work in seeking to find historical lead-lag relationships between various macromeasures at the economic and industry levels and key micro-measures at the company level. So far, most of our research has been held to the industry area. Although results have been mixed, a significant number of high correlation coefficients have been obtained. Nevertheless, relatively high standard errors of forecast are still frequent, and the predicting equations have missed turning points because of present difficulties in isolating all the exogenous forces affecting prices. This is not discouraging, however, since the problem is not insurmountable. The use of input-output tables also presents an opportunity to tie economic forecasts and the investment function closely together.

For some industries a fruitful approach has been present-value analysis. Not only does this method provide a means of screening potential buy-sell situations, but, depending upon the techniques formulated, it is possible to provide the analyst with another means of checking his own earnings and capital appreciation projections against evaluations of the rest of the market. Two big problems to overcome in the present value technique are determining the appropriate market discount rate to be used and determining the time period over which it should be applied.

In regard to the utilization of computers in still another area of life company investment, there is no doubt that techniques can and have resulted in the structuring of cash-flow models for short- and even longer-term purposes. So far, our own scientific applications in this area have

been aimed at special aspects of the cash-flow problem. We have spent considerable time, for example, in developing a multiple regression model for forecasting policy loans—an area that I am sure wreaked havoc upon many cash-flow models, especially during the period of the 1966 crunch. We also have done fairly extensive regression analysis, and even solutions of simultaneous equations, in the area of interest rates. Regular postings are set up with a computer forecast of conventional mortgage rates in order to provide an additional tool to fine-tune the commitment process. It also might be mentioned, in passing, that the growing availability of machine-readable data on a geographic basis has proved quite adaptable to detailed analyses of local mortgage market conditions.

Last, we have used computers in our annual five-year forecast of the sources and uses of funds in the United States, structured after the Federal Reserve Board's flow-of-funds accounts. Such a forecast is essential in making long-range investment policy and setting commitment budgets.

For many life insurance companies the barriers to scientific computer investment analysis have long since disappeared. Although expensive in absolute terms, the cost of an in-house investment-analysis system should be weighed against the possible results that the computer program may have upon portfolio performance.

One formidable barrier that has been removed is the problem of a data base. This can now be purchased commercially. After a period of digestion, most analysts now seem reasonably satisfied with the Standard and Poor's Compustat tapes and generally speak in terms of desiring more companies—an optimistic outlook for the trend of investment computer applications. Although in research on bonds there is undoubtedly a need for more detailed information for each company, particularly balance sheet data, it would seem that this area of utilization is still well below its potential.

Our feeling with regard to the data base is that five years' worth of quarterly data is inadequate for either stock or bond analysis, and we have made provisions in our own data supply to overcome this problem.

In closing, I would like to say that, while I am most optimistic for the future role of scientific computer analysis in life company investment operations, this in no way means that the role of the investment analyst and portfolio manager will be diminished. They are merely using a new tool, admittedly a very powerful one, but, as in all other cases, the quality of the investment decisions produced will largely be a function of the skills of those guiding the tool. Although the main objective of any computer operations is to find a systematic method of objectively evaluating the economic and investment universe on a regular basis, this will

never be a replacement for, but only an adjunct to, sound human investment experience and judgment.

MR. JOSEPH B. CRIMMINS: In your build-up of the Markowitz model, Dr. Moeller, I think you intimated that much of the input is already colored by your own subjective beliefs. Don't you, therefore, arrive at the stage where a security turns out to be good merely because you made the a priori decision that it is good and many other people made the same decision at the same time or under comparable circumstances?

DR. MOELLER: This is a very pertinent observation. What Markowitz tries to do in developing his model is to look ahead, not being locked into a rationale which is based only on the past but also taking into consideration future developments that might be expected. Perhaps this is best illustrated by this excerpt from Mr. Markowitz' book *Portfolio Selection*:

A portfolio analysis starts with information concerning individual securities. It ends with conclusions concerning portfolios as a whole. The purpose of the analysis is to find portfolios which best meet the objectives of the investor.

Various types of information concerning securities can be used as the raw material of a portfolio analysis. One source of information is the past performance of individual securities. A second source of information is the beliefs of one or more security analysts concerning future performances. When past performances of securities are used as inputs, the outputs of the analysis are portfolios which performed particularly well in the past. When beliefs of security analysts are used as inputs, the outputs of the analysis are the implications of these beliefs for better and worse portfolios [p. 3].

Investment decisions depend upon the ability of individuals to formulate sound probability beliefs concerning the expected return and possible risk among securities. Portfolio selection begins where security analysis leaves off.

- C. To what extent have statistical and/or computer methods, such as multiple regression, been used in investment selection? Are data inputs adequate for satisfactory results on computer utilization, in regard to both data retrieval and analysis?
- D. What are the problems on company size and expense of computers, as these relate to time-sharing versus the use of your own system?

MR. IRWIN T. VANDERHOOF: In the area of general economic data several hundred economic indicators, of which seventy-two are accepted as having business-cycle significance, are available from the Census Bureau on punched cards for periods of up to twenty years. In addition,

a reducing number of economic series are available back to 1860, also on punched cards.

In the area of general economic indicators the data seem to be available in a suitable form. However, economic series, especially those which have political implications, have been subject to so many types of errors and so many revisions and changes of series, that it is not possible to assign ratings as to the reliability of these figures. The United States has the best statistics in the world, and, since they are improving all the time, the most recent are the most reliable. But, in preparing this talk, I pulled out the first two copies of *Business Cycle Developments* that I came across and came up with the following example. Let us consider the gross national product as an annual rate for the first quarter of 1966. In May, 1967, it was \$721.2 billion; the most recent figure is \$728.4 billion. That is a change of only 1 per cent, but it is still an error of \$7 billion. These series should be treated with great respect and greater skepticism.

As we go from aggregate government statistics to individual company statistics, almost the same situation prevails—extensive data are available on punched cards. The Hickman statistics of the National Bureau of Economic Research relate a variety of balance sheet and earnings data to bond yields and default experience. These punched cards were used in studies that lead to the most recent revisions of the Mandatory Securities Valuation Reserve. These data have been so thoroughly worked over that it can be argued that, to the extent that the past is a good guide to the future, the problem of the quality of bond investments is properly a branch of actuarial science.

Even more up-to-date material is available for about 2,500 companies on the Compustat tapes provided by Standard Statistics. Data go back from seven to twenty years, with quarterly data available for the most recent twenty quarters for 1,800 United States companies. There are sixty data items, which include balance sheet and income items and annual range of stock prices. All Compustat master tapes are updated weekly. Insofar as possible, Standard Statistics has standardized the data and made them comparable from one company to another. They provide a manual of accounts along with the tapes. Within one year the tapes should also include data on 1,400 over-the-counter companies with data since 1960.

Data on stock prices on a monthly basis for all New York Stock Exchange companies from 1926 and volume and daily price data since 1960 have also been put on tape. Bunker-Ramo is apparently making these data commercially available, starting with 1967.

There seems to be plenty of data available. The question is, what does it mean? With depletion and tax-credit flow-through, depreciation, inventory, pooling, and capitalization of research and development, I do not see how anyone can be sure what is represented by earnings. I understand that there are twenty-eight different generally accepted methods of calculating earnings for an electric utility.

In regard to market-price data, these are the most reliable data in the realm of economics; everyone knows that the tape is occasionally in error but no one knows when.

The mathematical techniques used to analyze these data have been varied, sophisticated, and powerful. Formulas have been developed, using multiple regression for the following:

1. Commercial paper and long-term government bond yields in terms of previous yield, change in free reserves, and residual sources of funds.
2. Aaa corporate bond yields in terms of ten monetary supply and demand factors.
3. Risk premium on bond yields in terms of earnings variability, period without default, ratio of market value of equity to debt, and bonds outstanding.

If we examine the work already done in the analysis of stock prices and yields, we are almost overwhelmed by the number of Ph.D. dissertations being published and snapped up by the investment community. Some conclusions so far are the following:

1. That random investments in N.Y.S.E. common stocks have yielded almost 10 per cent average return since 1926.
2. That today's price change is not related to yesterday's price change. Price changes are then a random walk.
3. Growth and profitability of firms in England are related weekly to past growth and profitability but not to size. This study used index regression analysis.
4. Comparative results of investment in common stocks of companies with high returns in assets vs. companies with low returns; the high-return companies were somewhat better investments.
5. That much better investment results are achieved by investing in stock with low price-earnings ratios than in stocks with high price-earnings ratios.
6. Despite the random-walk hypothesis, there apparently is some persistence in performance of stocks relative to the rest of the market.
7. Spectral analysis indicates that there is no periodicity in stock prices and no relation between prices and volume.

While there are many people using computers for research and for general analysis, there are only a few mutual funds that transfer the computer output almost directly into market decisions. The best publi-

cized may be Compufund, which uses computer selections based on fundamental analysis. The computer is not second-guessed according to the managers. Dr. Robert A. Levy's Computer Direction Advisors is a technical service and represents that the only postcomputer check is for marketability. Jessup & Lamont sponsor a fund where there is no check whatsoever after the computer run. American Investors Fund is run primarily off the results of a computer run and has a long enough history for the results of this approach to be evaluated.

The first problem we face on using computers to make and execute investment decisions is that we may require information that our analysts are simply not equipped to give.

It seems that, even when that problem has been overcome, computers may still not be making decisions for life insurance companies for a very long time. I believe that there will be two reasons for this. First, computers will do what they are programmed to do. With a Markowitz-type portfolio program, for example, a small change in expected return on one security could cause the computer to recommend extensive portfolio revisions, even to selling on Tuesday a stock the company bought on Monday. The first time an insurance department examiner mentioned the word "speculation" in connection with such a transaction, the program might be subject to extensive overhaul. A second reason is that, if we program five items as being important, the computer will ignore the things which we did not program but really believe—things such as that tobacco stocks are immoral or that railroads are on the way out. We will not program our prejudices and will not feel comfortable in having the computer ignore them. As time goes by, we will be more and more frequently faced with this problem, because security selection is a contest. If a stock is especially attractively priced according to our computer, there must be a reason, and that reason will always be something we did not program. The best buys from the computer will then almost always be stocks that we instinctively do not like and cannot defend to the chairman of our finance committee who will not like them either.

Since time is running out, I would like to describe briefly the White and Weld Analytics. This system seems to be an ultimate in time-sharing systems for financial analysts. From a remote terminal the subscriber (there are thirty-one, and forty waiting) can get access to the central computer and system using Fortran, First Financial Language, or five other machine languages. Programs written over the remote access terminal have access to most of the Compustat Tape Data in addition to technical stock data and earnings estimates for companies where sub-

scribers have entered them into the system. Additional data for economic series will be added over a period of time until there will be access to everything that any subscriber believes will be of value. This service costs from \$30,000 to \$60,000 per year, which seems a bargain. There is an essential presumption that a principal value is the possibility of continuous interaction between the analyst and the computer. If that is a value, then the cost is modest indeed.

If we are looking into our own computers, what are the arguments between time-sharing with other departments and a separate machine? Time-sharing surely allows inexpensive access to equipment and gives a chance for people to learn without there being a tremendous commitment on time and equipment. There is the eventual danger that one of the sharees will get bumped because of increased volume of work in another department. There are also annoying conflicts on scheduling and personality problems among departments competing for time.

The cost of a separate system can be relatively small. There is developing a market in second-hand second-generation computers. The price seems to be around 40 per cent of the new price. A \$250,000 machine would then go for about \$100,000. This would be written off over ten years, or \$10,000 per year, with an additional \$5,000 for power and maintenance. This seems a reasonable cost, since you would pay that much for a couple of statistical clerks to grind out ratios. The Compustat Tapes would run around \$10,000 per year, and technical data might cost as much. This implies a total cost of \$35,000, of which \$15,000 would be for the computer. It would seem that this should develop almost immediate savings if any kind of extensive analysis is now being done and also in preparation of schedules and reports for management. There should be no continuing programming costs, because the analysts should be taught to do their own programming as a required skill for their jobs.

At what point should a company consider a separate computer? As soon as it is committed to computer analysis and is going to get the Compustat Tapes and comparable other data. There is no long-term economic sense in time-sharing unless the facility is sure to be there over a long period of time.

CHAIRMAN WILL R. MULLENS: Do any of you know whether anything has been done in the field of computer management of investments outside the common stock field?

DR. MOELLER: I have mentioned the studies that we have been doing in the mortgage market. These run on relatively simple principles. If you think interest rates in the future are going down, you commit

heavily now, whereas, if you think interest rates are going up, you ease off on your present commitment policy. We find that mortgages are especially adaptable to lead-lag relationships and other types of analysis on the computer because you can get some interesting relationships between what is happening now in commitment rates on mortgages and what has happened in past months in Aaa and Baa. These can produce chains of monthly expectations on mortgage rates for, say, a period of the next six months, which can be re-evaluated biweekly and can indicate whether your commitment policy should be strong or weak.

Another computer use on which we have barely scratched the surface is in bond-pricing and yield expectations. Further, if we start putting into the computer questions like "What is the outlook for the general economy?" "What do you expect monetary policy to be?" "What are expectations for fiscal policy?" "How does this affect demands for capital?" "How does this affect mortgages vs. bonds vs. stocks?" we will come up with some very interesting combinations that could be illuminating in determining future investment policy.

MR. HARRY D. GARBER: Before you can get into portfolio management by computer, you must convince the investment people that you can be of value in dealing with individual securities. One of the things that we have been trying to do with bond investments is to arrive at a set of risks or ratings which will fit in with standard ratings but could be expressed numerically. This means that, if you have Aaa bonds or Aa or Ba, there are very wide classes and a bond at the low end of the class can be very different from one at the high end. We have been able, using balance sheet and income data over the past several years, to fit fairly well with a standard rating formula and to develop a continuous rating formula and a continuous rating index for bonds. The next step, of course, is to try to relate this to risk in some fashion, but we have not taken this step yet.

There are a good many assumptions that go into making a rating, such as assumptions as to future earnings and future developments of one sort or another in the company. The assumptions that have been reflected or are reflected automatically in a process of this sort are what has happened in the past. To the extent that the future will not follow the trend of the past, analysts should be making adjustments in these assumptions to see what effect this has on the rating. This is the sort of thing which we have built into our model. The ability to move the assumptions around and then to see what effect this has on the rating gives investment managers the kind of tool which they can use in making

decisions. Particularly if some of the assumptions are varied and they produce very little effect upon the rating, the investment people can feel reasonably confident in decisions that they are making based on the rating. If some changes have a very significant effect, then they may feel less confident in their decisions.

We are working in the stock area along much the same lines, trying to value the stock and comparing it with the current prices to develop a means of identifying the stocks which appear to be undervalued and those that appear to be overvalued. Again, the stock analyst has the ability to vary some of the assumptions which have been used in the formula and to see what effect this has on the results. We have designed certain programs and models which can be used, and we are planning to put a terminal in the investment area. The investment analyst can then sit at the terminal, vary the assumptions, and see what effects these have on the results and on the ratings.

In effect, we have started by looking at the individual investment rather than by trying to deal with the portfolio as a whole, and we have tried to give the investment analysts tools which they can use in making decisions on individual investments.

MR. SIDNEY BENJAMIN: I would like to ask a prejudiced question, since I do not believe in portfolio management or analysis. Dr. Moeller, how do you propose to set up a test to show that investment management by computer is not the same as horse-racing?

DR. MOELLER: Mr. Vanderhoof pointed out the type of data base available to us. There are many variations, but the one that is popularly used is 900 industrial issues from Compustat, 50 or so variables for each issue. If everyone uses these data and juggles them in terms of every combination possible, I would agree that this is a kind of horse-race. But if the variables are changed, using intelligence as to what industries we think are going to grow in the future and what monetary policy—easy money, tight money, or a combination—is likely, and the possibilities for government expenditures and how they might be financed by debt or taxation are superimposed, as well as some other items that people often forget (such as state and local government financing), I maintain that the situation is quite different. We will never know exactly where we ought to be going, but we will know much better than we would if we did not use the computer, simply because of the tremendous mass of data available to us.

MR. CRIMMINS: With all this interest in equity investment from insurance companies, pension funds, mutual funds, and so on, do you think we are getting to the stage where we are liable to start pushing the price-earnings ratios through the roof and, if so, do we have a corrective in the market somewhere?

DR. MOELLER: I think this goes back to the question of price-earnings ratios per se and the quality of earnings. You might also ask whether there can ever be enough stocks to supply the demand if all institutions and individuals go heavily into the market. In my opinion, if we all get into the act, there are a variety of financial and economic factors that must be considered.

For example, it should be recognized that the supply of available equities will continue to grow at a strong pace—due in part to new corporate stock issues but primarily to the large volume of earnings retained directly by the corporations. In the last ten years, for example, these retained earnings have been roughly twenty times as great as the funds obtained from new issues of stock. These earnings have added to the earnings base of corporations and, when capitalized by investors, have added substantially to the market value of all equities outstanding.

The concept of growing stock values due to a rise in the earnings base, which in turn is due to retained earnings, is best illustrated by the concept of the stock dividend. In such instances, earned surplus is debited and capital stock is credited for the stock dividend. The result on the balance sheet would be the same as if the corporation paid out earnings in the form of cash dividends and then sold new stock equal in amount to the cash dividends paid out.

Moreover, a successful selling effort in equities may not affect the general economy too greatly because counteracting, equilibrating forces in the market place will tend to keep the shift to equities from out-running itself. For example, bonds still supply the bulk of the external longer-term financing requirements of corporations. Any unusually rapid shift to common stock investing by institutional suppliers of funds would result in a compensating rise in interest rates offered by borrowers to reattract the institutional dollars previously invested in corporate debt. Similarly, from the issuers' point of view, if institutions bid up prices too rapidly and stocks become overvalued, corporations may raise more funds externally, diluting equity and thereby changing the relative attractiveness of common stocks to investors. Hence, the alternative rates of return available from these two types of investment, that is, equities and bonds, will tend to equilibrate a reasonable flow of funds between them and the institutions investing in them.