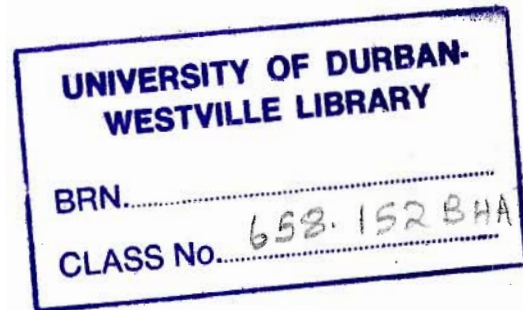


AN INVESTIGATION TO DETERMINE THE POSSIBLE BENEFITS
THAT MAY ACCRUE TO SOUTH AFRICAN INVESTORS
PURSUING INTERNATIONAL INVESTMENT DIVERSIFICATION

by



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CHAPTER 1INTRODUCTION

1.1 The need to study the possibilities offered by international portfolio diversification from a South African investors' standpoint.

International portfolio diversification has received much attention from both investment practitioners and academics in the developed countries. Investors in Western Europe have been investing in foreign securities for the past several decades. In recent years, investors in the United States and other developed countries have also shown great interest in foreign securities. In contrast, the possibilities of investing in foreign securities has received very limited attention (Van den Honert, 1984) in South Africa. The Exchange Control Regulations of 1961, as amended, precludes South African investors from utilizing funds derived in South Africa for investment in foreign securities. As a result, few studies relating to international portfolio diversification from a South African investor's standpoint have been undertaken. The purpose of this investigation is to attempt to fill this void in the literature on the subject.

Most investors are aware of the importance of diversification for reducing the risk of a portfolio. The most important factor when selecting an asset for diversification purposes is the covariance of the asset with all other assets in the portfolio. Using the Capital Asset Pricing Model (CAPM), Sharpe (1964) has shown that the relevant covariance is between the asset and the market portfolio of all risky assets available. The market portfolio used in the CAPM is theoretically assumed to contain all risky assets available. All empirical studies of the CAPM have used the domestic share price index as a proxy for the market portfolio. This is an understatement of the market portfolio because the domestic share price index excludes foreign securities. A true market portfolio should be a total world portfolio which derives the maximum benefits of diversification. We would expect low covariance between the returns for domestic and foreign securities. Therefore, international security diversification would tend to lower the total risk of a portfolio.

The domination of the share market by institutional investors and the existence of exchange control regulations for South African residents has created major distortions in the price of equities traded on the JSE. The unsatisfactory real rates of return in the capital markets during recent periods of high inflation has

further contributed to the tendency for funds to flow into the JSE irrespective of the economic fundamentals. The "weight of institutional funds" argument states that, given the restricted size of the local equity market, and the enormous cash flows of the institutional investors, there is a tendency for share prices on the JSE to rise to artificial levels. The weight of institutional funds argument is not strictly valid in that artificially high prices cannot be maintained in the long-term. There are periods when major downward corrections take place, such as those witnessed in 1969, 1976, and the 1984-85 periods in South Africa. Nevertheless, price distortions caused by exchange control restrictions has contributed to artificial equity prices in the short-term.

During periods when the price of gold and export earnings are high, there is usually excess liquidity in the local economy. The prevention of capital outflows into foreign security investments during such periods results in high rates of inflation. During such periods, it would be more beneficial to investors and the South African economy if there is an outflow of funds into foreign securities. This may enable South African investors to take advantage of the higher returns that may be available from foreign securities (Financial Mail, 1983). Conversely, during periods when the price of gold and export earnings are low, South African investors could liquidate their foreign investments and repatriate the proceeds to take advantage

of the higher yields on domestic capital market securities. A free flow of investment capital is likely to create more efficient equity and capital markets in South Africa. Equity prices on the JSE then will probably reflect the underlying fundamentals of the South African economy. Investment funds can be expected to move between the JSE and the various foreign equity markets and enable South African investors to reap the benefits of international portfolio diversification.

A major obstacle to international portfolio diversification is that exchange control precludes South African residents from acquiring foreign securities from income derived in South Africa. As a rule, exchange control permission is only granted to resident South African companies making "direct" investment in a foreign country where some form of control is obtained over the foreign company concerned. The present exchange control regulations prohibit investment by South African residents in foreign non-direct or portfolio investments. The De Kock Commission (1978) reported that in the past exchange control procedures were not effective in protecting the country's official reserves and were being circumvented, both legally and illegally. Nevertheless, exchange control has denied local investors the opportunity of benefitting from the high rates of growth prevailing in some foreign countries.

The relatively inefficient foreign exchange market in South Africa has also been an obstacle to those seeking foreign security investments. A major shortcoming of the local foreign exchange market is that it is very small by international standards, and the rand is not traded internationally on a large scale. Operators in foreign exchange markets are paying much higher transaction costs than those prevailing in the developed countries. Prior to 1983, the forward exchange rate was artificially high and it bore no relationship to the interest rate differentials between South Africa and the foreign countries, and was also unrelated to the demand and supply factors. The high foreign exchange costs and the poor liquidity represent a major obstacle for South African investors intending acquiring foreign securities.

The De Kock Commission (1978, pp. 43-46) made several recommendations that ultimately led to the removal of exchange control over non-residents in 1983. Furthermore, the Reserve Bank abolished the dual exchange rate as it existed in one form or another since exchange control over non-residents was first introduced in South Africa in 1961. The Reserve Bank also announced that it will no longer quote a spot exchange rate but will influence the exchange rate by intervention in the foreign exchange market, when the rand is under speculative pressure. It is submitted that these developments have

contributed towards a more efficient and market-related exchange rate policy in South Africa. However, the recent politico-economic situation in South Africa has led the authorities to reintroduce certain exchange controls (during September 1985) for non-residents.

The De Kock Commission (1985, p.134) also recommended a progressive relaxation of exchange control over foreign portfolio investments by South African residents. The Commission recommended that initially, registered insurers, pension funds and mutual funds be allowed to invest (say) 10 percent of their annual cash flows in foreign securities approved by the Registrar of Financial Institutions. The De Kock Commission also recommended that in due course such provisions should be extended to financial institutions and corporate bodies and eventually to individuals and non-corporate bodies. Although these recommendations have still to be approved by the Government, they constitute very persuasive arguments for the ultimate approval of foreign portfolio investments by South African residents.

The recommendations of the De Kock Commission received a severe setback with the announcement of a four-month moratorium on foreign loans, reimposition of exchange control over non-residents, and the reintroduction of the financial rand which came into effect on 2 September

1985. These measures were taken as a result of massive capital outflows following the declaration of the State of Emergency. It would seem that the existing exchange control regulations are unlikely to be relaxed until political stability is restored in South Africa. The most opportune moment for phasing out exchange control (residents and non-residents) would include a healthy surplus in the balance of payments and favourable political developments in South Africa. Representations should be made to the relevant authorities regarding appropriate amendments to exchange control when such conditions prevail.

The main objective of this study is to demonstrate that South African investors should be able to improve their portfolio performance by investing in foreign securities. First, a literature survey on overseas studies will be undertaken to demonstrate to what extent investors in other countries have benefitted from investing in foreign securities. Thereafter, a detailed investigation will be undertaken to demonstrate the range of possible gains to South African investors from international security diversification in 18 selected countries during the period 1969 - 83. The results show that a South African investor is able to accomplish significant improvements in portfolio performance when countries such as Japan, Sweden, Switzerland, Finland, and New Zealand are included in their portfolios.

The findings of this investigation are likely to provide much needed information to portfolio managers and other interested parties who are likely to be associated with investing in foreign securities. Firstly, several overseas countries that are likely candidates for security investments have been identified. Secondly, several accepted statistical and technical tests used in portfolio construction and evaluation have been included in this investigation. Thirdly, various problems that are likely to arise from investing in foreign securities are investigated and possible solutions have been suggested. The recommendations arising from this study are likely to have major public policy implications. In particular, the recommendations to abolish exchange control over both residents and non-residents as well as the creation of an efficient and market-related unitary foreign exchange rate policy may well provide the necessary impetus to stimulate the authorities to expedite the desired reform.

The South African Government is committed to deregulate the economy. Consistent with this philosophy, it can be expected that at some stage in the future exchange control for residents will be abolished. In such an eventuality, portfolio managers in South Africa will require guidance on the nature and scope of international security diversification under local conditions. In the

absence of local studies, South African investors can be expected to rely on overseas studies. An undue reliance on overseas studies is likely to produce misleading results. This investigation has shown that foreign securities that are attractive to, say, a United States investor may not necessarily be attractive to a South African investor (who has a different base currency). Therefore, studies similar to the current investigation are necessary for South African investors to derive the optimum benefit from investing in foreign securities. A hypothesis concerning the effectiveness of international portfolio diversification in South Africa is tested. It states that given the independence of the South African economy with the economies of the more advanced countries and the diversifying (risk-reducing) role of goldmining shares, South African investors can be expected to derive substantial benefits from the inclusion of foreign securities in their portfolios.

1.2 Summary of the field of study

In recent years the efficient market hypothesis (EMH) has had a major influence on the investment strategy pursued by portfolio managers. Academic scholars studying the EMH have concluded that stock markets are "sufficiently" efficient and that a naive buy-and-hold

strategy is recommended. This study will show that stock markets constitute a broad spectrum of efficiency, ranging from "hyperefficient" to seemingly inefficient pricing mechanism. Furthermore, besides the NYSE and the LSE, most other stock exchanges do not conform to the requirements of market efficiency. The relative inefficiencies of the other markets could provide favourable investment opportunities for South African investors. Several EMH anomalies such as the January, small firm, neglected firm, and P/E effects have been identified. It will be shown that investors could improve their performance by exploiting the market inefficiencies relating to these EMH anomalies. Based on the relative efficiencies of the various overseas security markets, broad guidelines on appropriate investment strategies will be presented.

Portfolio theory, the capital asset pricing model (CAPM), and the arbitrage pricing theory (APT) will be discussed to determine the applicability of these theories to international portfolio diversification. It will be shown that despite the CAPM's wide acceptance in practice, empirical evidence raises serious doubts regarding its ability to capture precisely the risk-return relationship in security pricing. The APT suggests that more than one factor is responsible for determining security prices. It will be shown that neither the CAPM nor the APT alone are capable of explaining the equilibrium pricing process in

the dynamic investment scene. It will be shown that by combining the CAPM and the APT a more complex and more useful asset pricing relationship may be established. The combined CAPM-APT approach is more likely to explain the pricing mechanism applicable to international securities.

The literature survey makes a study of the empirical evidence relating to the effectiveness of international security investments observed in several overseas countries. It will be shown that there is clear evidence indicating that the inclusion of foreign securities enables a domestic investor to earn higher returns and to lower portfolio risk. Of particular importance is the observation that international securities tends to maximize the long-term rate of return of portfolios, even though many year-by-year returns may be less than those available from domestic investments. It will be shown that the problems related to international security investments may be exaggerated and that the potential benefits far outweigh the problems encountered.

If South African investors are allowed to invest their funds in foreign securities, an examination should be made of the possible obstacles that are likely to arise from such investments. The major obstacles, namely the foreign exchange risk, the availability of investment information, the liquidity of foreign investments, and the

higher transaction costs and complexities of operating in foreign security markets will be discussed. Methods whereby the benefits of international portfolio diversification can be attained and yet minimize the associated problems will be presented. Individuals and financial institutions differ vastly in their approach to investments, foreign portfolio strategies appropriate to their individual needs will also be highlighted.

The three reports of the De Kock Commission of Inquiry into the monetary system and monetary policy in South African will be reviewed. It will be shown that as a result of the interim De Kock Commission (1978) report a market-related foreign exchange policy is gradually emerging in South Africa. When the final report of the De Kock Commission (1985) is implemented by the authorities, it may have far reaching consequences for investors in South Africa. Of particular importance is the De Kock Commission (1985) recommendation of phasing out exchange control for South African residents. It has paved the way for removing a major obstacle to foreign security investments by South African residents. It will be shown that the eventual abolition of exchange control as well as prescribed investments is likely to create a more efficient flow of funds between the capital market and the JSE. The weight of institutional funds argument would probably no longer apply, because prices on the JSE can be expected to

properly reflect the underlying fundamentals of listed companies. Depending on the state of the economy and prospects for listed companies, invested funds can be expected to flow between the JSE and various foreign equity markets.

The research design and methodology of the possible benefits from international portfolio diversification for South African investors is provided. It will be shown that the South African investor could have improved the risk-return characteristics of his portfolio if it was possible to pursue international portfolio diversification during the 1969 - 83 period. It will be shown that the currency factor was important, but not a major element in the performance and risk component of international portfolios representing the 18 selected countries during the 1969 - 83 period. It will be demonstrated that the importance of the currency factor is minimized due to a low and possibly even negative correlations between security prices and exchange rate movements in the different countries. It will also be shown that the results of this investigation support the proposed hypothesis regarding the effectiveness of foreign security investments from the standpoint of a South African investor.

This investigation has shown that the stability of international correlation structures increases consistently and substantially as the assumed investment horizon is lengthened. These results suggest that the appropriate strategy for investing in foreign securities should take into consideration the prevailing stability in the inter-country correlation structures. It will be shown that stable ex post inter-country correlation coefficients can be used to achieve gains from international diversification beyond those available to an investor who pursues a naive strategy. Despite the stability of the long-term correlation structure, the existence of random "noise distortions" has been reported in the historical data. It will also be shown that a major challenge to future researchers lies in developing models which might provide higher correlations between forecasted and actual correlations.

Special attention has been paid to the selection of ex post optimum portfolios available to South African investors. However, it is unlikely that any South African investor will actually attain a point on the efficient frontiers constructed from ex post data. An ex ante strategy, namely the "buy the market" approach is used to avoid the influence of events that actually took place during a given period. The ex ante investment strategy is used to compare the performance of a South African

portfolio with an international portfolio representing equity investments in 18 foreign countries. The risk-adjusted performance of the two portfolios will be compared to determine the benefits foregone by a South African investor as a result of exchange control restrictions.

CHAPTER 2THE EFFICIENT MARKET HYPOTHESIS2.1 Introduction

This chapter reviews several theories that explain the pricing mechanism of securities in capital markets. Particular attention will be devoted to the efficient market hypothesis (EMH) and its implications for investors. Evidence contradicting the EMH will be presented because such information provides investors with opportunities to outperform the market. South African investors are precluded by legislation to invest in overseas countries. The efficiency of the Johannesburg Stock Exchange (JSE) will be investigated as it is of prime importance to local investors. Local investors seeking to diversify internationally will require information on the relative efficiencies of various stock exchanges. Therefore, the efficiencies of several overseas stock exchanges will be reviewed to highlight possible market inefficiencies which could be exploited by local investors. Special attention will be devoted to the various EMH anomalies that has received much attention in the recent literature.

2.2 Fundamental analysis

Several security analysts and prospective investors utilize fundamental analysis for making investment decisions. Adherents of fundamental analysis are primarily interested in calculating the intrinsic value of a particular industry or an individual company. Fundamental analysis is based on the assumption that the intrinsic value of a security is based on factors such as profitability, growth, and risk which will have an influence on future earnings (Reilly, 1982). Fundamental analysis makes a further assumption that the actual market price of a security will tend to move towards the intrinsic value. Investment decisions are made by comparing the prevailing market price with the intrinsic value. A sell signal is triggered when the market price is substantially greater than the intrinsic value. A buy signal is triggered when the market price is substantially below the intrinsic value.

Investors may benefit from fundamental analysis in an inefficient market (where significant differences may exist between intrinsic value and market price). Nevertheless, an efficient market does not preclude the benefit of fundamental analysis providing superior returns to investors. However, the analyst must have exceptional abilities so that he can take advantage of opportunities

when the market prices differs significantly from their intrinsic values. This implies that fundamental analysis will be successful only in those instances when the analyst either possesses superior insight into a company's future prospects or possesses inside information. Therefore, in an efficient market fundamental analysis will lead to superior results when the analyst can project his own data and does not merely rely on publicly available information.

Cohen, Zinbarg, and Zeikel (1982, p.400) have also observed that fundamental analysis does not indicate when actual market price can be expected to converge towards intrinsic value. Market prices may move towards intrinsic values over a period of months, or years, or not at all. Therefore, fundamental analysis cannot guarantee superior investment returns even to astute analysts.

2.3 Technical analysis

Technical analysts or chartists, as they are commonly called, submit that they can discern patterns in price or volume movements. By observing and studying the past behaviour patterns of a given security, they can use this information to predict future price movements in the security.

Technical analysis comprise many different approaches but all have one feature in common - share prices move in trends that persist for a period of time. This is based on the assumption that new information relating to a security does not reach all market participants at the same time because there are several alternative sources of information or because certain investors are able to analyze and interpret the information quicker than others. Technical analysts believe that the price adjustment process is gradual, and is determined by the gradual flow of information from insiders, to sophisticated analysts, and eventually to the vast majority of investors. Prices will continue to move in one direction until the new equilibrium price is reached.

Technical analysts submit that it is futile to evaluate the mass of detailed information which fundamental analysts rely upon. Furthermore, technicians are concerned about the problems and limitations of financial statements and prefer not to use them. Most of the information used by the technicians is derived directly from the share market. Technical analysts rely on the diverse opinions of the various market participants which will be reflected in the price and volume activity of the security in question. The technician acts solely on the basis of this price and volume activity and ignores all other detail which is considered to be superfluous.

In contrast to the wealth of empirical research on the EMH, very little empirical evidence has been conducted in the area of technical analysis. Pinches (1970, p.109) has shown that most of the chartist theories tested were not capable of consistently outperforming the market on a risk-adjusted basis. Point-and-figure charting is a popular technique used by technical analysts. Levy (1971a, p.322) has demonstrated that these charts have limited predictive powers of establishing price trends. The technical analysts have defended their approach by arguing that the tests of the various trading strategies do not adequately simulate the techniques used by the technical analysts in practice. The technicians argue that the tests have been too simple, because they have investigated one trading technique at a time, rather than testing various methods concurrently.

2.4 The efficient market hypothesis

Fundamental analysis has been challenged by a third approach, known initially as the "random walk" theory, which with subsequent refinements, has become better known as the efficient market hypothesis (EMH).



Pioneering work on the random walk model was done by Bachelier in 1900 who observed that commodity prices in France exhibited characteristics of a random walk, although he did not use the term. He stated that the commodity price speculation in France was a "fair game" because neither buyers nor sellers could expect to make profits. The difference between the actual and expected price each day would, if added together for a lengthy period, should aggregate to zero.

Working (1934) observed that the behaviour of share prices is random in nature and that price changes over a period are essentially independent. In 1953 Kendall examined the behaviour of commodity prices in New York and Chicago. After extensive analysis he developed the "chance model". Kendall (1953, p.13) stated that the chance model could explain the pattern in commodity prices which could be generated by a series of random numbers and that the present prices are independent of past results. Osborne (1959), a physicist likened the behaviour of stock market prices to that of molecules suspended in solution. In the United Kingdom, Little (1962) observed randomness in the movements of earnings and growth of companies listed on the London Stock Exchange (LSE).

The empirical evidence in the random walk literature was based on direct observation. None of the researchers attempted to provide an acceptable economic rationale for the hypothesis. The first attempt to integrate the wealth of evidence in support of the random walk model was made by Fama (1970). Fama presented the efficient market theory to explain security pricing mechanism and market behaviour. Fama (1970, p.383) gives the following definition of an "efficient" market:

"..... the ideal is a market in which ... investors can choose among the securities that represent ownership of firms' activities under the assumption that security prices at any time "fully reflect" all available information. A market in which prices always "fully reflect" all available information is "efficient"."

Fama divided the EMH into 3 sub-hypothesis :
weak form, semi-strong form, and strong form.

The weak form EMH assumes that the current share prices fully reflect all existing stock market information (including historical information of securities). Therefore, investors cannot benefit from examining the historical sequence of prices and use this information for forecasting future prices. The weak form EMH is a direct

repudiation of technical analysis. If there is no value in studying past prices and past price changes, there is no value in technical analysis. Similarly, any trading rule which uses historical price changes to predict future prices should be of little value.

Over the years, much research has been undertaken of empirical tests of the random walk. These results generally confirm the validity of the weak form EMH. Several statistical techniques have been recently employed in this research. These techniques generally fall into two categories : those that test for trends in security prices and thus infer whether profitable trading rules can be developed, and those that test such trading rules directly. Fama (1965) has shown that the correlation in share prices over different periods of time is insignificant. This implies that price changes alone cannot be used to predict future price changes. Various trading rules have been simulated using historical information to predict future price movements. Pinches (1970) has shown that these trading rules have not outperformed the market on a risk-adjusted basis.

The semi-strong form of the EMH states that the current prices of shares not only reflects all informational content of historical prices but also reflects all new publicly available information about the

companies being studied (Fama, 1965). Furthermore, the semi-strong EMH implies that the efforts by analysts and investors to acquire and analyze public information will not yield consistently superior returns. Examples of the type of public information that will not be of value to investors are company reports, company announcements, information relating to company dividend policy, forthcoming share splits, and so forth.

The semi-strong form of the EMH maintains that as soon as information becomes publicly available, it is absorbed and reflected in share prices (Fama, 1965). Even if this adjustment is not the correct one immediately, it will in a very short time be properly analyzed by the market. Therefore, the analyst would have great difficulty trying to profit from fundamental analysis. The pricing mechanism is not perfect nor is it predictable. Therefore, an analyst will not be able to develop a trading strategy based on these quick adjustments to new publicly available information.

Several studies /Fettit (1972), Watts (1973)/ have attempted to test the semi-strong form of the EMH to determine the impact of new publicly available information on share prices. Generally, these tests attempt to analyze if the analyst using such data, when they become available, can successfully use this information to obtain superior investment results.

Fama, Fisher, Jensen, and Roll (1972) made a major contribution to the EMH by studying share splits on the NYSE. This study observed that the average share price of a company rose several months preceding the share split. After the share split was completed there was virtually no further increase in the average price of the share. Fama et al. (1972) concluded that the market was efficient with respect to reacting to the informational content of share splits and its impact on expected changes in dividend policy.

Ball and Brown (1968) analyzed the stock market's ability to absorb the informational content of reported annual earnings per share information. This study revealed that for firms whose earnings increased, the share price increased during the year preceding the higher earnings announcement. Similarly, for firms whose earnings decreased, the share price declined during the year preceding the public announcement of lower earnings. Ball and Brown (1968, p.175) conclude that about 85 percent of the informational content of the annual earnings announcement was reflected in the share prices prior to the release of the actual annual earnings figure.

The informational content of dividends has been studied by Pettit (1972) and Watts (1973), who both measured the market's reaction to dividend announcements. Neither study found evidence that a company's dividend announcement affected the company's share price after the announcement. Waud (1970) studied the size and direction of price changes at around the time of changes in the official federal discount rate. This study found no evidence of price adjustments after two days following the announcement. Firth (1977) studied capitalization issues by listed companies on the LSE. This study concluded that capitalization issues had no impact on shares; the market adjusted the ex-capitalization price correctly and rapidly.

The strong form of the EMH maintains that all information publicly available and otherwise is useless to the investor or analyst. Specifically, no information that is available, be it public or "inside" can be used to consistently earn superior investment returns. Therefore, even security analysts and portfolio managers who have access to information earlier than the general investing public are unable to use this information to earn superior returns. The strong form EMH also states that no group has monopolistic access to new information; therefore, insider information is of no value.

There is sufficient evidence to confirm the validity of the weak and semi-strong forms of the EMH. By contrast, there is no conclusive evidence to support the strong form of the EMH. It has been suggested that specialists on the NYSE have monopolistic access to information about unfilled limit orders, and therefore are in a position to earn superior returns. Niederhoffer and Osborne (1966) and Reilly and Drzycimski (1975) have studied the role of the specialist on the NYSE. Both studies found that the specialist is able to earn consistently above average rates of return through block trading and reacting to unexpected world events. This evidence rejects the strong form of the EMH.

Several studies have investigated the profitability of insider trading. Wu (1972, p.592) found no evidence that company insiders had performed better than the average for the market. Lorie and Niederhoffer (1968) showed that insiders were able to outperform the market. They were able to predict the direction of share prices six months in advance. Jaffe (1974) summarized the various studies that investigated insider trading. Most of the studies reported support the hypothesis that corporate insiders are able to outperform the market. Superior profits were attained when a large number of insiders were engaged in a particular security.

Several studies have investigated the performance of mutual funds in the United States. Perhaps the best known work to test the performance of professional managers is the study of mutual funds^{*} by Jensen. Jensen (1968) showed that the average returns of all mutual funds was about 15 percent below the average for the market. Friend, Blume and Crockett (1970) showed that on average the mutual funds did as well as the average unmanaged portfolio. Williamson (1972) found that mutual fund managers did not exhibit superior abilities in the selection of securities or in predicting the direction of the market.

The weight of evidence appears to favour the EMH. Evidence in support of the weak form and the semi-strong form of the hypothesis is considerable. However, the evidence clearly indicates that company insiders and stock exchange specialists are able to outperform the market. Therefore, there is no conclusive proof to validate the strong form of the EMH. It can be argued that not even large stock markets are perfectly efficient. Fama (1970) asserts that less stringent conditions can still produce randomness in pricing. It is argued that the market merely needs to be "sufficiently efficient" in the sense that information needs to be available to a sufficiently large number of investors and that transaction costs are reasonable and no group of investors are able to achieve consistently superior or inferior results. The

"sufficiently efficient" market explains randomness and takes into account the observed inefficiencies in the market pricing mechanisms.

2.4.1 Evidence contradicting the EMH

In recent years the EMH has received strong support from academic scholars. The vast pool of evidence supporting the weak and semi-strong forms of the hypothesis has made EMH a settled issue on university campuses. However, there has also been a proliferation of evidence which is contrary to the EMH. The general reaction of the academic scholars has been to downplay the evidence which is contrary to their viewpoints. This section reviews some of the evidence that is inconsistent with the EMH.

A serious challenge to the EMH is the extraordinary performance records of certain investment advisory services which have consistently outperformed the market. The "Value Line Investment Survey" has a large following among investors in the United States. This advisory service has a reputation of accurately ranking shares in terms of their investment merits. Fischer Black, a leading efficient market theorist tested the Value Line share ranking system for the ten years ending 1973. Black (1973) showed that the ranking system was able to consistently predict shares offering superior returns and

shares offering poor returns. Seligman (1983) traced the recent performance record of the Value Line survey and concluded that the risk-adjusted returns are lower than in previous years. Nevertheless, the ability of the Value Line survey to consistently outperform the market is a serious challenge to the validity of the EMH.

Lowry's Reports is a large investment advisory service in the United States which offers clients buying and selling recommendations on the basis of analyzing historical price and volume data. In an efficient market, Lowry's Reports should be of limited usefulness to its followers. Bishop and Rollins have compared the returns attained by the Lowry method of share analysis with the naive buy-and-hold strategy. Bishop and Rollins (1977, p.25) have shown that the Lowry method outperformed the buy-and-hold approach fifteen times during the twenty one years of comparison. Furthermore, it seems highly unlikely that such performance could be due to chance. The proposition that in efficient markets future prices are independent of historical prices is accepted. However, when historical volume and share prices are combined the resulting information may provide insights into future price behaviour. This observation corroborates the findings of Ying (1966).

Over the years several researchers have observed that the share pricing mechanism is influenced by the calendar effect. Although the supporters of the EMH have not recognised the validity of the calendar effects, this is another area where the efficiency of markets is debatable. The "January effect" refers to the observation that the month of January enables investors to earn above-average returns. Furthermore, most of the gains are concentrated in the first five trading days of January. Rozeff and Kinney (1976) compared the distribution of monthly returns on the NYSE during the period 1904 - 1974. They found statistically significant differences in mean monthly returns for different months with the largest returns observed in the month of January. Rozeff and Kinney (1976, p.392) also found that January recorded the highest returns in a sample of Australian shares. However, the strength of the January effect was more clearly evident in the Australian sample.

In an efficient market the distribution of share returns should be identical for all trading days of the week. The empirical evidence casts doubt on the validity of this statement. Fama (1965) reports that Monday's variance is about 20 percent higher than the variance for the other days of the week. This conclusion is supported by the findings of Godfrey, Granger, and Morgenstern (1964). Cross (1973) measured the distribution of share

prices on Fridays and Mondays on the NYSE. There was a persistent tendency for Monday's return to be negative and Friday's return to be positive. These results were subsequently confirmed by studies by French (1980) and Gibbons and Hess (1981). Bhana (1985) investigated the share returns of companies listed on the JSE. The daily returns associated with the JSE Overall Actuaries Index were calculated for the six-year period 1978 - 1983. The return for Monday is the lowest, and Monday is the only day yielding a negative return. Wednesday's returns are the highest for the five trading days, followed by Thursday, Friday, and Tuesday. These research findings suggest the existence of a "weekend effect" phenomenon which yields negative returns on Monday.

No plausible explanation for the weekend effect has yet been offered. French (1980, p. 66) suggests that unfavourable information is more likely to be released over the weekend. It is further suggested that delaying the announcement over the weekend allows more time for the unfavourable information to be digested. This explanation is only valid in inefficient markets. In efficient markets investors would anticipate the release of unfavourable information on weekends and its impact would be fully reflected in Friday's closing prices.

The existence of the weekend effect indicates strong evidence that equilibrium returns vary across the day of the week. The persistent negative returns for Monday suggest that the market pricing mechanism may be inefficient. While there is no justification to reject the EMH, the day of the week effect must be considered as anomalous evidence which remains unanswered. The observed weekend effect on the NYSE and the JSE cannot be reconciled with efficient pricing mechanism. All tests of market efficiency rely on a necessary condition of market equilibrium. Brown and Warner (1980) have demonstrated that market equilibrium rests on the assumption that equilibrium returns are constant and the mean-adjusted return is calculated relative to the announcement dates. The foundations of the market equilibrium model are inconsistent with the various findings that have observed the weekend effect.

In recent years several researchers have studied the "small firm effect" which is based on the observation that companies with small market capitalizations yield higher share returns than companies with larger market capitalizations. Since small company shares are generally riskier than companies with larger market capitalizations, a greater return for the former category is expected. Banz (1981) has shown that even on a risk-adjusted basis, small companies earned significantly higher returns. In an

efficient market such an event is unlikely because the share prices of smaller firms would be adjusted upwards until they provide normal returns on a risk-adjusted basis.

Several researchers conjectured that the existence of the small firm effect suggested that risk measures were incomplete and that the risk-return relationship implied by the capital asset pricing model (CAPM) were misspecified. Roll (1981) has shown that infrequent trading seems to be a major cause of this bias in the risk measurement of small firms. Roll (1981, p. 884) demonstrated that small firm portfolios have higher auto-correlation of returns because their constituent portfolios are less-frequently traded. It was suggested that infrequent trading results in an understatement of risk and a corresponding overestimation of risk-adjusted average returns. This finding is in agreement with Roll's conclusion, but the magnitude of the bias in risk measurement is too small to explain the small firm effect.

An investigation on the small firm effect by Keim (1983) established that the small firm effect is somehow associated with the January effect. This study demonstrated that approximately half the superior returns of small firms were accounted by their superior returns in January. This startling finding suggested that some tax-related factors

may be responsible for the small firm effect. The tax-selling hypothesis proposes that small firms' share values increase in January because they are recovering from large-scale year-end selling associated with reported losses. In an efficient market, the tax-selling hypothesis is of doubtful validity. Rational investors could buy small company shares in December and sell them in January. Roll (1983) tested the tax-selling hypothesis and found that the small firm-cum-January phenomenon did exist. However, this explanation has not been accepted by followers of efficient markets. Stoll and Whaley (1983) also observed a negative correlation between market value and risk-adjusted returns, but they also provided further empirical evidence which suggests that transaction costs partially account for the small firm effect.

Investigations of the small firm effect has largely been confined to the NYSE and the American Stock Exchange (AMEX). Of particular interest to South African investors is whether a similar effect is to be found on the JSE. Affleck-Graves et al. (1985) conducted an investigation into the small firm effect on the JSE covering the period 1976 - 1980. Three measures of size were used, namely market capitalization, asset base, and traded volume. It was observed that the performance of large firm portfolios is superior to small firm portfolios with respect to all three performance measures. These

results are clearly inconsistent with the hypothesis that the small firm effect exists on the JSE. A possible explanation is that the JSE is dominated by institutional investors who have historically favoured investing in large companies enjoying the status of "blue chip" investments.

Chen and Sears (1984) have investigated the magnitude of the total risk for small and large firms, and the behaviour of such measures as the portfolio size is altered. It was shown that the relative magnitudes of total or systematic risk in small firms are approximately four times the respective levels found in large firms. Furthermore, during the period 1967 - 1981, a small firm portfolio of any size had more risk than the typical single large firm. Chen and Sears (1984) conclude that because small firms contain such extreme amounts of unsystematic risk relative to large firms, diversification is essential if investors are going to capture the small firm effect phenomenon that is widely reported in the literature.

In recent years, companies that are neglected by investment analysts and institutional investors have been investigated to determine if neglected securities performed better or worse compared to the more popular securities. Arbel and Strebel (1983) investigated the risk-return characteristics of the United States securities least

followed by investment analysts (neglected securities) for the 10 year period 1970 - 1979. Arbel and Strebel (1983, p. 38) showed that the least researched securities had significantly higher average annual returns than the most highly researched securities (16 percent versus 9 percent). This neglected firm effect was observed for 9 of the 10 years studied. Furthermore, the neglected firms also outperformed the most highly researched firms in terms of annual risk-adjusted returns. It was observed that the total risk increased very slightly with neglect, resulting in a significantly higher return per unit of total risk for the neglected portfolios.

Arbel, Carvell and Strebel (1983) investigated the neglected firm effect when "neglect" is measured in terms of actual investment by financial institutions rather than analyst attention. Arbel et al. (1983, pp. 58-59) showed that the average annual return for institutionally neglected securities was twice that of securities widely held by financial institutions. On a risk-adjusted basis the securities held by institutional investors had an annual excess return of negative 8,58 percent, whereas the neglected portfolio yielded 5,64 percent above the market. The relationship between neglect and company size revealed that on a risk-adjusted basis a strong neglected firm effect persists even when size is controlled. Arbel et al. (1983) also showed that the superior performance of

neglected companies relate to securities held in portfolios. The results do not imply that all neglected shares performed well or that an investment strategy based on degree of neglect alone should be employed for only a few companies. Nevertheless, the existence of both the small firm and the neglected firm effect raises serious questions regarding market efficiency.

Several practitioners believe that shares with low price-earnings (P/E) ratios are undervalued by the market. Therefore, they expect low P/E shares to outperform high P/E shares. This contention contradicts the EMH because no group of securities selected by P/E ratios is supposed to outperform any other group of securities. Basu (1977) showed that, while low P/E portfolios earned a higher return than high P/E portfolios, the higher return is not associated with proportionally higher level of systematic risk. Carter (1975) provided conclusive empirical evidence that low P/E ratio shares provide higher gains than either high P/E ratio shares or the market portfolio, and also demonstrated that low P/E portfolios are relatively risky. Goodman and Peavy (1985) tested the P/E effect for a random sample of 500 companies during the 1970 - 80 period. They observed that the P/E effect is a risk-adjusted anomaly, with low P/E portfolios yielding positive and significant excess returns, whereas high P/E portfolios yielding

significantly negative excess returns. The existence of the P/E effect provides further evidence refuting the efficiency of the EMH.

The findings of the previous studies of the P/E effect employed the CAPM in the analysis. Therefore, the findings of these studies constitute a joint test of the validity of the CAPM and the efficiency of the market. The superiority of the low P/E portfolios found by the previous studies leads to the conclusion that either the CAPM is invalid or the market is inefficient (or both). Levy and Lerman (1985) employed a distribution-free analysis, namely, stochastic dominance, to test the P/E effect for 424 companies covering the period 1960 - 79. They found that low P/E portfolios outperformed high P/E portfolios and randomly-selected portfolios when transaction costs are ignored. Levy and Lerman (1985, p. 38) showed that even after taking transaction costs into consideration, the portfolio of lowest P/E ratio appears in the efficient set and portfolios with high P/E ratios are situated in the inefficient set. It was also shown that sophisticated investors who are able to predict annual earnings in advance are able to identify low P/E shares relatively early and thereby able to outperform the market. However, individual investors who pay higher transaction costs and who are unable to make earnings predictions in advance are advised to adopt a buy-and-hold strategy.

Rosenberg et al. (1985) selected two strategies, namely, the "book price" strategy and "specific-return-reversal" strategy to test the efficiency of the pricing mechanism for 1400 of the largest companies listed on the NYSE and AMEX during the period 1980 - 84. The "book value" strategy buys shares with a high book/equity price ratio (undervalued shares), and sells shares with a low book/equity price ratio (overvalued shares). The "specific-return-reversal" strategy calculates the difference between the investment return for the previous month on the share and a fitted value for that return based upon common factors in the stock market in the previous month. The differential return is the "specific return" that is unique to that share. Rosenberg et al. (1985) showed that both strategies independently achieved highly significant abnormal returns which were consistent with their prior performance in the retrospective period. They conclude that for this sample of shares the actual market prices are inefficient, and that both strategies have shown persuasive evidence of market inefficiency. Furthermore, the success of two such diverse strategies in detecting market inefficiency suggests that still larger potential profits can be made, provided that investors can identify valuation errors related to these strategies.

The existence of the four EMH anomalies relating to: the small firm effect; the neglected firm effect; the January effect; and the P/E anomaly, has resulted in an empirical evaluation of the relationship among the four anomalies. Arbel (1985) has shown that all four anomalies are related to a common variable, called information deficiency that affects the investors' perceived risk. Arbel (1985) makes a distinction between brand-name shares and generic shares. The brand-name shares are "investment grade shares" which are closely followed by financial analysts and institutional investors. Every piece of relevant information is immediately recorded and assessed in the pricing mechanism of brand-name shares. On the other hand, generic shares are not followed by analysts on a regular basis and also do not have the stamp of approval from financial institutions. Here, the information is somewhat unreliable and financial institutions thus have very little interest in these shares.

Arbel (1985) argues that the CAPM ignores the notion of information deficiency and the resulting estimation risk for generic shares. Arbel (1985, p. 6) has shown that the higher returns observed for small companies, for low P/E shares, for neglected shares, and during January are all related to information deficiency. What appears to be an abnormal return is actually an illusory result of misspecification of the risk adjustment model,

which fails to take into consideration information deficiency and the resulting estimation risk. When investing in generic shares (small firms and neglected shares) investors are facing a trade-off between higher return and lower information reliability. If different investors have different preferences regarding the trade-off, then generic shares with their higher returns can exist with the lower return brand-name shares. They are simply not the same, and therefore, their price and return should not be expected to be the same. Therefore, generic shares will continue to provide excess returns as long as large institutions ignore them and thereby perpetuate the information deficiency.

In recent years, there has emerged evidence which suggests that not all information is quickly and efficiently reflected in security prices in terms of the EMH. Fraser and Richards (1985) analyzed the much publicized insolvency of Penn Square Bank (United States) and its impact on the share prices of the four upstream banks which had provided it with large loan financing. Information on the major providers of loans to Penn Square was widely publicized in the financial press several months before the failure of the bank. Therefore, the impact of the Penn Square failure on the share price of the loan providing banks' securities should have been minimal in the period following the announcement of Penn Square's

insolvency. Fraser and Richards (1985) showed that the market required almost four months to fully assimilate the new information (liquidation of Penn Square Bank). Virtually all the adjustment occurred in the first month after the bank failure. Fraser and Richards (1985, p. 36) conclude that these results suggest that opportunities may exist for astute investors to outperform the market:

"While the data suggests that the market reacts to new information, the data also imply that the market is not always perceptive enough to either anticipate the impact of certain events or assess the actual significance of these events. The market for the shares of the upstream banks appears to have been confused for several months after the Penn Square failure."

Research in experimental psychology suggests that most people tend to "overreact" to unexpected and dramatic news events. De Bondt and Thaler (1985) have shown that such behaviour also affects share prices on the NYSE and AMEX, which are generally considered to be efficient markets. The empirical evidence is consistent with the overreaction hypothesis, where substantial weak form market inefficiencies are discovered. Consistent with the predictions of the overreaction hypothesis, portfolios of prior "losers" were found to outperform "winners" for a

period up to 36 months after portfolio formation. The losers earned about 25 percent more than the winners, even though the latter were significantly riskier. De Bondt and Thaler (1985) also observed that large positive excess returns are earned by loser portfolios every January for a period up to 5 years after portfolio formation. These results cast further doubt on the ability of the markets to price securities swiftly and efficiently.

2.4.2 An evaluation of the EMH

Supporters of the EMH can cite very few examples that support the strong form of the hypothesis. Studies that contradict the EMH are relegated to a status of "anomalous evidence" and until recently were rarely mentioned in the literature of the subject. Gupta (1974) studied the performance of the mutual fund industry in relation to the various market indices. The mutual funds were sub-divided into several groups by size and investment objectives during the period 1962 - 71. Gupta (1974) demonstrated that nearly all the subgroups were able to outperform the market irrespective of the index used to measure performance.

In order to resolve the EMH controversy the Securities and Exchange Commission (SEC) approached the Institutional Investor to undertake an in-depth analysis of the performance of the mutual fund industry. The SEC (1971)

concluded that the annual risk-adjusted returns for the mutual fund industry were 1,2 percent per year on an annualized basis. Furthermore, the excess returns were found to be statistically significant at a 5 percent level of significance. The Institutional Investor study contradicts the Jensen study but is rarely mentioned in the EMH literature. However, portfolio managers and other practitioners regularly mention these findings to their clients.

Several studies have observed that the usual methods of evaluating the performance of mutual funds are likely to be biased in favour of the EMH. Arditti (1971) showed that several fund managers undertook greater variability in portfolio selection to increase actual returns. Therefore, the actual returns can be expected to deviate substantially from a normal distribution. By ignoring the skewness in actual returns a bias is introduced in the performance evaluation. Arditti (1971) showed that if this bias is eliminated the performance of mutual funds is not inferior to the performance of the market index. Klemkosky (1973) studied the performance of mutual funds using four different measures of risk. It was reported that the risk-adjusted performance of mutual funds varied considerably from one measure of risk to another. Klemkosky (1973) concluded that inappropriate risk measurement introduced biases in the performance measurement of mutual funds.

The mutual funds performance study by Jensen (1968) provided much support for the EMH. Several investigators have raised considerable doubt on the reliability of Jensen's original findings. The Jensen study assumed that all capital gains would be reinvested at the end of each year. In reality, capital gains would be reinvested throughout the year. During a period of generally rising prices the Jensen assumption would result in a large understatement of the returns of the mutual funds. Mains (1977) made adjustments for the capital gains to be evenly reinvested throughout the year. Mains (1977, p. 384) observed that on average the mutual funds outperformed the market and that nearly 80 percent of the funds earned excess returns.

The Jensen study made risk adjustments using least-squares regression analysis (which is not a very accurate statistical technique). Murphy (1977) demonstrated that errors in risk adjustments has resulted in a large time interval over which the mutual funds had to yield superior results to pass the test of statistical significance. Murphy (1977) showed that the mutual funds in the Jensen study had to outperform the market by 5.82 percent for a period of 14 years for the results to be significant at a 95 percent confidence interval. It was further shown that several funds outperformed the market by

over 2 percent for periods up to 20 years but because of the bias in measurement of risk, the results were not statistically significant. Nevertheless, Jensen concluded that there was no evidence that any mutual fund in his study was able to outperform the market. Murphy (1977) concludes that the results of Jensen's study are strongly influenced by inappropriate statistical techniques used in the analysis. In addition, Hodges and Brearly (1973) confirmed that several statistical methods used in EMH studies to observe consistency of superior performance are inappropriate.

Rohrer (1985) has traced and evaluated the empirical evidence supporting as well as contradicting the EMH. It was observed that the recent challenges to the EMH comes not from investment managers but from within academia itself. Rohrer (1985, p. 142) cites examples to show that not all information is quickly and efficiently reflected in the price of securities. It was shown that security markets constitute a broad spectrum of efficiency, which on one end is "hyperefficient" - instantly adjusting prices to new information - and on the other end is seemingly inefficient, where market prices are a poor relation of true values. Rohrer (1985) also asserts that the rational expectations of investors about such things as dividends and other objective information are often unrelated to security prices. On the contrary, it is the irrational

things such as investment fads (gimmicks) that is often a dominant factor in price determination. Rohrer (1985, p. 144) also argues that in the light of the observed market inefficiencies, investors might do well to analyze the latest fads as closely as they do fundamentals. Nevertheless, the importance of market efficiency should not be understated. The perceived efficiency of the capital market is an important reason investors are willing to invest in that market: they are confident that when buying and selling shares they are not at a disadvantage in relation to other investors.

Supporters of the EMH have presented a strong case to support their view that markets are generally efficient. However, there is sufficient evidence which contradicts the strong form the EMH. This section has presented evidence which casts doubts on the validity of the EMH. Several researchers have observed that the use of inappropriate statistical techniques may have resulted in a bias in favour of the EMH. Bernstein (1977) reviewed the evidence for and against the EMH and concluded that efficiency is in the eye of the beholder. An investor without superior forecasting ability will not be able to beat the market and will regard the market as efficient. However, there are investors with superior forecasting ability who can outperform the market and will consider the markets to be inefficient. Therefore, the efficiency of markets is

largely dependent on the skills and abilities of the investor.

2.5 The efficiency of the JSE

In contrast with the extensive studies on stock market efficiency in the United States, there have been few such studies in South Africa. Until fairly recently there has been a lack of computerized data on share prices of listed companies and this may have prevented earlier studies. Furthermore, the few studies have produced contradictory results. The situation is similar to that in Australia where the different studies have produced conflicting results. However, a common feature of the South African and Australian studies is the use of small samples for analysis. Small samples may not be representative of the market and may therefore produce inconsistent results.

The first major study of the efficiency of the JSE was undertaken by Affleck-Graves and Money. The sample for this study consisted of fifty randomly listed companies whose price movements were monitored for a five-year period ending September 1973. Affleck-Graves and Money (1975, p. 388) conclude that seventy to eighty percent of the shares studied conform to the random walk model, thereby imputing

efficiency to the JSE pricing mechanism. These results are indeed surprising when one considers that during the period of this study the Companies Act of 1926, as amended, was in force and it prescribed less stringent disclosure requirements than the present Act. A subsequent study by Strebel (1977) showed that the JSE is only partially efficient. Because of the small sample size, the Affleck-Graves and Money study may not have been representative of the market.

The recent studies on the efficiency of the JSE are of special interest. They cover the period during which the Companies Act of 1973, as amended, and the JSE had substantially increased the disclosure requirements. Strebel (1977, p. 15) has suggested that the JSE is not a totally efficient market, and that only half the shares listed on the JSE conform to the EMH. These are companies having high share trading volumes, averaging at least a quarter million shares per annum. Strebel (1977, p.20) also showed that listed companies with high share trading volumes produce share prices that are random in behaviour. By contrast, the low volume shares demonstrated non-random price behaviour. Strebel (1977, p.18) also demonstrated that the risk-return relationship implied by the CAPM applies only to highly traded shares, that for thinly traded shares no such risk-return relationship could be found; and that the beta representing the market risk is

dependent on trading volume, rather than fundamental characteristics of the share. Furthermore, the assumption of a competitive market is not strictly valid for shares having low trading volumes. An inefficient pricing mechanism may cause major distortions in share prices for small issue shares which are not widely held when there is a sudden increase in share trading.

Roux and Gilbertson (1978) carried out a study on the daily price behaviour of twenty-four shares listed on the JSE during the five year period ending February 1976. This study compared the distribution of price changes on the JSE with corresponding price changes on the NYSE. Roux and Gilbertson (1978, p.226) showed that JSE price distribution was characterised by a high concentration of the results around the mode as a result of zero price changes. Thin markets and discontinuity in trading might have contributed to such distribution. The "runs test" to determine the independence of the share prices revealed that the price changes were not completely random. Roux and Gilbertson (1978, p.230) conclude that the JSE shows characteristics of inefficiency. This is not to imply that an investor could consistently achieve superior performance. These findings are supported by Brummer and Jacobs (1981, p.59) who have concluded that the degree of price dependence is marginal and is not sufficient to enable investors to increase their yields.

The performance of mutual funds (unit trusts) is usually used as a basis for testing the validity of the strong form of the EMH. A study at the University of Cape Town tested the efficiency of portfolio selection by the combined portfolio representing the 12 unit trusts in South Africa during the period 1965 - 1980. A portfolio selection algorithm was used to construct efficient frontiers representing efficient portfolios. Carter, Affleck-Graves, and Money (1982, p.175) have shown that the unit trust portfolio's performance was consistently inefficient during the study period. However, this does not imply that the JSE is an efficient market. Carter et al. (1982, p.174) have demonstrated that during the study period it was possible to consistently outperform the JSE market index without incurring additional risk. This suggests that the JSE has the characteristics of an inefficient market.

Seneque and Gourley (1983) conducted a survey addressed to the financial executives of a sample of companies listed on the JSE. The intention of the survey was to determine if there was a consistency between the respondents' efficiency rating of the JSE and the corresponding dividend policy. This survey is based on the Miller and Modigliani (1961) and Black (1971) observation that in an efficient market rational investors would be indifferent to the dividend policy of the firm. Similarly,

rational managers operating in efficient markets will pursue a "passive residual" dividend policy which will declare dividends only when the firm has exhausted all investment opportunities. Therefore, in efficient markets both managers and shareholders are indifferent to the dividend policy of a company. Seneque and Gourley (1983) found that 84 percent of the responding company executives regarded the JSE as an efficient market. However, only 10 percent of the responding executives adopted a passive residual dividend policy. Seneque and Gourley (1983, p.38) conclude that company executives generally regard the JSE as efficient but do not regard it as perfect. The perceived imperfections are reasons for adopting an active dividend policy which aims to satisfy the needs of the majority shareholders.

As a result of the high rates of inflation in the past decade (1975 - 84) several large South African companies (Barlow Rand Ltd., Sasol Ltd., etc.) have switched from a FIFO to a LIFO basis of inventory valuation. A switch to a LIFO method of inventory valuation has substantial economic benefits to a company. In particular, the reduced reported earnings results in a reduced liability for income tax, also the cash flow position of a company is improved. Therefore, in an efficient market the favourable impact of a change to LIFO valuation should be fully impounded in the share price at

the time of the announcement. Knight and Affleck-Graves (1983) studied the efficiency of JSE by monitoring the price movements of 21 listed companies that announced a change to LIFO stock valuation. A surprising finding of this study was that a switch to LIFO valuation had a negative impact on share prices. Furthermore, this negative impact was not instantaneous but was impounded into the share prices over several weeks after the announcement. Knight and Affleck-Graves (1983, p.31) conclude that this suggests double inefficiency on the JSE. The market was incorrect in evaluating the true economic significance of a change to LIFO valuation and the market took too long to reach an equilibrium following an announcement. These results suggest that the JSE has characteristics of an inefficient market.

The empirical evidence presented in this section indicates that in comparison with the NYSE, the JSE cannot be considered to be an efficient market. A major weakness of the JSE is the relatively loose disclosure requirements by companies in South Africa compared with some overseas countries. The detailed disclosure requirements are prescribed by the Companies Act and in most instances the JSE has adopted these without any changes. The compilers of the current Companies Act made it clear that the detailed disclosure requirements for listed companies should be laid down by the JSE. To date, the JSE has not responded to this request.

The Financial Mail (1984, p.108) has highlighted some of the major deficiencies of the JSE: insufficient disclosure requirements, inadequate protection given to minority shareholders in take-over situations, insufficient controls over insider trading, are cited as major weaknesses of the JSE. Despite the severe criticism over the years, the JSE has done little to rectify matters. Finance Week (1984, p.153) reported that the Standing Advisory Committee on Company Law has recommended a take-over panel to control acquisitions in South Africa. The rationale for the proposed take-over panel is that it will safeguard minority shareholders in take-over situations and will assist in increasing the efficiency of the JSE.

The functioning of the JSE concerns several groups either indirectly or directly. The investors are concerned with an efficient market that accurately reflects the value of their investments, and also with disclosure requirements which must provide them with timely information pertaining to their investment. The management of listed companies have to comply with the statutory requirements of the Companies Act as well as the regulations of the JSE. The accountancy and auditing profession has to attest that the financial statements prepared by the directors have satisfied the requirements of the Companies Act and the provisions of the JSE. However, besides the Registrar of

Companies, no outsider is represented on the JSE Committee and its Listing Committee, which lays down the rules and regulations for the listed companies.

The various committees regulating the JSE have consisted entirely of practising stockbrokers. Therefore, it is understandable that the JSE is more concerned with the day-to-day operations of share-dealing which provides its members with a livelihood. There appears to be little concern with wider issues such as creating a more efficient market by generally increasing disclosure requirements and exercising more stringent controls over company matters (such as insider trading). It is submitted that if the JSE is to fully reflect the views of all concerned with the activities of the stock exchange, then its management should be representative of these groups. This will strengthen the standing of the JSE in the business world. Furthermore, the representatives of the various groups will keep the JSE informed on matters concerning an efficient share market. A fully representative management committee could also prevent the creation of a statutory body to regulate the affairs of the JSE. The JSE has recognised the need for outside representation in the management of its affairs. The JSE has agreed in principle to the appointment of a full time professional president who will be free from the vested interests of trading on the stock exchange. A full time executive president will be able to devote his

energies to the JSE as no past unpaid president has managed. Tony Norton has just been appointed as the first Executive President, and such an appointment may well succeed in enabling the JSE to become an efficient organization, vigorously protecting the shareholders' interests, consistently enforcing disclosure requirements, and active in its control over take-overs.

2.6 The efficiency of various overseas stock exchanges

The literature on EMH is dominated by empirical evidence on the efficiency of the NYSE. The evidence presented in section 2.4 offers sufficient proof that the NYSE can be considered to be efficient in the weak form and semi-strong form of the EMH. It was shown in section 2.4.1 that despite the efficiency of the NYSE there are "pockets" of inefficiency that can be exploited by a few investors that have superior forecasting ability. The discussion in the previous section indicated that compared to the NYSE, the JSE shows characteristics of an inefficient market. The intention of this section is to evaluate the efficiencies of certain stockmarkets in Europe, Australia, and the Far East. A knowledge of the efficiency of these markets is of particular importance to South African investors contemplating international diversification.

The general consensus in the EMH literature is that the NYSE and the LSE are the world's major stock exchanges. We would therefore expect the LSE to be an efficient share market. A study by Girmes and Benjamin (1975) confirms the efficiency of the LSE by showing that the prices of only 20 percent of all shares traded deviated from the random walk. Girmes and Benjamin (1975, p.140) observed that there was a strong association between the size of a company and the behaviour of its share price. The larger the company, the greater the likelihood of a random movement in its share price. A major factor contributing to the "randomness" in share price is the amount of dealing in the relevant security. The greater the capitalization and public image enjoyed by the larger companies the greater the dealing of their shares, and the better the chances of a random movement in prices.

Firth (1977) studied 227 capitalization issues made by companies listed on the LSE during the period 1973 - 74. Firth observed that capitalization issues, in themselves, had no impact on share prices. Any superior share price was due entirely to the associated dividend and earnings implications of a capitalization issue. Furthermore, the market adjusted the ex-capitalization price correctly and rapidly - as predicted by the EMH. These results offer additional evidence supporting the "semi-strong" efficiency of the LSE. Firth (1972, p.67)

also showed that the recommendations made by investment analysts produced no evidence against the EMH. It was shown that the information content of newspapers appeared to be fully incorporated in the share prices almost immediately.

Solnik carried out a test to determine the efficiencies of 8 major stock markets operating in the European Economic Community (EEC). Solnik (1973, p.1152) observed that the European Stock Exchanges satisfy the requirements of efficiency but compared to the United States they are less efficient. It was further observed that the LSE is much more efficient than other members of the EEC. It was found that, in terms of shares traded, the LSE and the NYSE have far greater trading activity than the other members of the EEC and this contributed to the relative efficiency of the former group. Solnik (1973, p.1158) offers the following reasons for the lower share market efficiency of the EEC countries:

"Explanations for these departures from the random walk can probably be found in some technical and institutional characteristics of European capital markets: loose requirements for disclosure of information, no control on insiders' trading, thin markets, discontinuity in trading."

Relatively few studies have been performed on the efficiency of German share prices. Conrad and Jüttner (1973) monitored the price movements of 54 of the largest and most actively traded shares on the German stock exchange. Runs analysis and serial correlation tests indicated that the price movements over different periods are not independent. Conrad and Jüttner (1973, p.591) showed that the German stock market was unable to discount properly the positive news during an upswing of economic activity and of negative information during a downswing of economic activity. These results assume added significance when it is considered that the sample studied consisted of the largest and most actively traded companies on the German stock exchange. The empirical evidence supports the view that the German stock market cannot be considered to be efficient in terms of the EMH criteria.

McDonald (1973) studied the efficiency of the Paris Stock Exchange (PSE), commonly known as La Bourse de Paris. The sample of this study was eight of the largest mutual funds in France whose performance during the period 1967 - 69 was evaluated against the market index. Cohn and Pringle (1973) have shown that during the study period there was no organized security analysis industry in France. The French banks, as largest institutional investors, had specialized staff engaged in investment research. The larger French banks enjoyed substantial advantages in financial analysis and access to current

information on French companies. The investment performance of mutual funds managed by the French banks constitutes a strong form test of the efficiency of the PSE. McDonald (1973, p.1177) showed that all eight of the mutual funds produced excess returns on a risk-adjusted basis, with 6 funds yielding excess returns of between 6 to 28 percent per annum. The evidence suggests that mutual fund managers in general possessed superior analytical ability and were able to outperform the market. McDonald (1973, p.1178) concludes that his findings support the widely held view by French investors that the PSE was inefficient with respect to the completeness and speed of dissemination of information relevant to securities.

A more recent study on the efficiency of the PSE was undertaken by Hawawini et al. (1983). This study observed the relationship between average risk and return of a sample of 144 most actively traded shares on the PSE during the period 1969 - 79. Hawawini et al. (1983) established that the relationship between the average returns and the risk of ordinary shares was generally negative: portfolios with lower risk levels earned a return that was much higher than the return of higher risk portfolios. The persistence of a negative risk-return relationship over a period of 10 years is not possible in an efficient market. Stonham (1981) has shown that the inefficiency of the PSE is due to factors peculiar to the

French equity market: the market is dominated by institutional investors who do not have investment flexibility, have poor liquidity, thin markets, and loose disclosure requirements.

Palacios (1975) made a detailed study of the Spanish Stock Market (SSM). The three major stock exchanges in Spain are located in: Madrid, Barcelona, and Bilbao. However, the Madrid Exchange is the most important and accounts for the bulk of the trading volume. This study of the SSM covered the period 1961 - 71. Spanish mutual funds were introduced in 1966 and have now assumed the role of dominant investors on the SSM. The other institutional investors are not actively involved in share investments.

Palacios (1975, p.147) has shown that the efficiency of the SSM has undergone major changes during the study period. Prior to the emergence of mutual funds (1961 to 1966) the market was very inefficient. It was shown that during the study period Spanish firms were not required to have their financial statements audited. Therefore, Spanish firms may have traditionally disclosed inaccurate financial statements to minimize tax exposure. The financial statements were of little value to the investors. The absence of accurate and timely information contributed towards an inefficient market.

The performance of the Spanish mutual funds during the period 1966 to 1971 was used to determine any possible changes in market efficiency. Palacios (1975, p.142) showed that half the mutual funds were able to outperform the market. These results support the conclusion that, on average, the mutual funds were not able to outperform the market. It was also shown that until 1969 the mutual funds consistently outperformed the market. However, in the post-1969 period the mutual fund performance corresponded very closely to that of the market average. The mutual funds in Spain are closely associated with large banks who usually have access to current information on large companies. Palacios (1975, p. 147) concludes that the SSM has become increasingly efficient and that this is probably due to the activity of mutual funds.

The Oslo and Stockholm stock exchanges are the smallest in Europe and are not very well known outside Scandinavia. The Stockholm Stock Exchange (SSE) is the only one in Sweden. There are a number of stock exchanges in Norway but the Oslo Stock Exchange is by far the largest. The relatively small size of the Norwegian and Swedish stock markets suggests that they are likely to be less efficient in the weak form of the EMH than a larger market, implying that share prices in small markets are less likely to follow a random walk.

Jennergren and Korsvold (1975) investigated the share price movements of 15 Norwegian and 30 Swedish shares. These shares were the most actively traded shares on the respective stock exchanges. Nevertheless, the activity of these shares was low in relation to the shares on the larger stock exchanges. Jennergren and Korsvold (1975) conclude that the price changes are not independent random variables in the case of the majority of the Norwegian and Swedish share prices investigated. This implies that the random walk hypothesis is probably not an accurate description of share price behaviour on the Norwegian and Swedish stock markets.

A further study of the efficiency of the SSE investigated the profitability of filter rules in relation to a buy-and-hold strategy. Jennergren (1975) used the same daily prices of the 30 shares on the SSE that was used in testing the random walk hypothesis. Jennergren (1975, p.61) has shown that filter rules do not appear to be profitable for private investors because of the high marginal tax rates. However, institutional investors and investors trading as a corporation enjoy a favourable tax treatment. Jennergren (1975, p.65) has identified several profitable filters on a pre-tax basis, implying that there may exist profitable trading rules for certain institutional investors. The SSE exhibits large deviations from randomness which enables the existence of profitable

trading rules. The existence of profitable trading rules confirms the findings of Jennergren and Korsvold (1975) that the SSE is not an efficient market.

Forsgårdh and Herten (1975) have tested the semi-strong form efficiency of the SSE. This study measured market expectations by making a direct measurement of those expectations that were actually held by influential investors and financial analysts. Earnings expectations were obtained from representatives of the various institutional investors. The impact of these earnings expectations on the market price of shares was measured. The regression analysis indicated that the new earnings information had a significant impact on share prices. Forsgårdh and Herten (1975) conclude that the market expectations on the SSE can be approximated by the expectations of a small group of influential investors and financial analysts acting as opinion leaders. It was also shown that price adjustment to new information is rapid - the bulk of the price adjustment occurs in the announcement week. It is further concluded that these results lend support to the hypothesis that the SSE is efficient in the semi-strong form of the EMH.

Pogue and Solnik (1974) tested various aspects of the market model to determine the efficiencies of seven European countries and the NYSE during the period 1966 -

71. The seven European countries were: Great Britain, France, Germany, Italy, Belgium, Netherlands and Switzerland. The purpose of this study was to measure the stability of various market model parameters representing market efficiency. This study confirmed that the NYSE is by far the most efficient share market in terms of the random walk hypothesis and the various tests of market stability. Pogue and Solnik (1974) have shown that there are substantial differences in the efficiencies of the various European countries. The four major European share markets (Great Britain, France, Germany and Italy) are less efficient than the NYSE. However, the magnitude of inefficiency of these markets is not substantial. The three smaller European markets (Belgium, Netherlands, and Switzerland) have characteristics that reflect major market inefficiencies in comparison with the NYSE.

In recent years, the Hong Kong Stock Market (HKSM) has attained spectacular returns in highly volatile market conditions and has acquired a reputation of being irrational. The HKSM consists of four markets but they can be considered as one exchange because of the considerable overlapping of share listings. The HKSM is a relatively small market with a market capitalization of about 3 percent of the NYSE. Nevertheless, it is an important market and is now the third largest in the Pacific Basin, after Japan and Australia. A knowledge of the efficiency of

the HKSM is of particular importance because of the large sums of international funds that are invested in this market.

Dawson (1982) investigated the efficiency of the HKSM in terms of the strong and semi-strong form of the EMH. This study concerned itself with the investment recommendations by Sun Hung Kai which is the largest brokerage firm in Hong Kong. The firm provides its clients with a regular newsletter giving the following recommendations: buy, buy on weakness, hold, and sell. In an efficient market Sun Hung Kai's investment recommendations would not be of benefit to investors. The risk-adjusted returns for each category of recommendation was analyzed for the period 1974 to 1980. It was shown that during the study period the buy recommendation produced large positive returns and the sell recommendation consistently yielded negative returns. Furthermore, the market did not adjust quickly to the various recommendations. Shares having favourable recommendations rose continuously over the following year. Shares having a sell recommendation continued to decline in value for several months. Dawson (1982, p.20) concludes that the HKSM has characteristics of an inefficient market. However, the market is not irrational as perceived by several market observers. Not all recommended shares rose in value and investors who did not diversify may have suffered losses.

Dawson (1984) extended his investigation to determine if the efficiency of the HKSM had changed during the 1974 - 82 period. Residual returns were calculated to determine the usefulness of the recommendations given in Sun Hung Kai's newsletters. If the market is efficient the expected residual returns should not be statistically different from zero. It was shown that 1974 had only 5 recommendations and 1980 and 1981 were periods of extreme market volatility. Therefore, these years were eliminated from the study and the average residual values during the remaining years (1975 to 1979) were calculated. It was shown that the average residual values declined continuously during this period and approached zero for 1979. Dawson (1984) concludes that there was a pronounced trend towards market efficiency on the HKSM during the period 1975 - 79. However, there is no indication whether this trend toward efficiency will be resumed or whether the inefficient conditions will occur again.

After Japan, Australia has the second largest stock market in the Pacific Basin. The behaviour of the share market in Australia is important to South Africa because of the similarities in size and composition of the markets in these countries. Jüttner and McHugh (1976) analyzed the share price behaviour of companies listed on the Sydney Stock Exchange. It was found that very few

shares behaved randomly and that the share market "is not even efficient in the weak sense". The investigators found that the reasons for share market inefficiency were similar to those cited by Solnik (1973). Furthermore, the higher transaction costs of share dealing in Australia also contributed towards lower market efficiency. These results contradict the earlier study by Praetz (1973) which suggested that there were only small departures from the random walk. However, the Praetz study was based on a small sample and the results may not have been representative of the market as a whole.

A recent study by Brown and Walter (1982) confirms that the Sydney Stock Exchange shows various characteristics of an inefficient market. However, the efficiency of the market has improved substantially when compared with the efficiency reported in the earlier studies. Brown and Walter (1982) observed that not all shares on the Sydney Stock Exchange conform to the EMH criteria. Only the institutional favourites, which have high trading volumes are efficiently priced. It was also observed that the lower transaction costs and increased disclosure requirements have contributed towards the increased efficiency of the market in recent years. Nevertheless, a large percentage of the listed shares have extremely low trading volumes and are not efficiently priced. These securities present opportunities to astute

investors who are able to identify undervalued and overvalued securities.

The Securities Exchange of Thailand (SET) is one of the world's smaller stock exchanges, having only 81 companies listed in 1982. Sareewiwatthana and Malone (1985) have investigated the efficiency of the SET. It was observed that the SET has several characteristics in common with other thin markets, in that a large number of shares are inactive. It was also observed that some individual securities are very inactive and may not react fully to changes in available information. In addition, most companies listed on the SET are not quite public companies. It was shown that even the thirty most actively traded securities are practically family controlled companies. Inactivity coupled with the fact that information is not readily available may enable market participants to manipulate trading on the SET. Consequently, information available only to insiders has in the past been used to generate abnormal returns. Sareewiwatthana and Malone (1985) conclude that the SET appears to be less efficient than most other stock exchanges.

This section has reviewed several studies relating to the efficiency of the various stock exchanges outside the United States. The general consensus is that the world's major stock exchanges, namely, New York and London,

are efficient in the weak form and usually in the semi-strong form of the EMH. The studies relating to the stock exchanges in Europe and countries in the Pacific Basin suggest that these markets have characteristics of an inefficient market. These markets are generally small and therefore the conditions necessary for market efficiency may not exist. Ang and Pohlman (1978) have shown that in small markets departures from randomness arise from: the ability of large investors to manipulate the market through privileged information, market thinness making it difficult for investors to acquire new information, and the pricing mechanism being distorted by infrequent trading.

2.7 Market efficiency and investment strategy

The details of the various investment strategies that are available to investors are discussed in section 3.8, chapter 3. There are basically two investment strategies available to investors, i.e. either active or passive. The passive strategy is based on the assumption that share markets are generally efficient and there is limited scope for success in either selection or timing of investments. It implies the creation of well-diversified portfolios at predetermined risk levels and holding the portfolios relatively unchanged for the long run. Passive portfolios are characterised by very low investment turnover, hence minimum transaction costs, reduced

management expenses and low levels of risk. The active strategy considers the holding period for the portfolio to be temporary. Once the favourable expectation disappears, another portfolio is chosen which is expected to outperform the market.

A South African investor embarking on international diversification should pay particular attention to the efficiencies of the various overseas stock exchanges. An analysis of the risk-return characteristics of different stock markets will provide guidelines regarding the quantity of funds to be invested in the different countries. The next important question is the investment strategy to be followed in the specific overseas stock exchanges. The appropriate investment strategy should be implemented on the basis of evaluating the efficiency of the stock market where the investment is to be made.

The discussion in the previous sections has established that only the NYSE and to a lesser extent the LSE can be regarded as efficient markets in terms of EMH criteria. This being the case, a passive investment strategy is more appropriate for a South African investor seeking to invest in these markets. There are several index funds available in the United States that are designed to replicate the market returns. An index fund is representative of the entire market and therefore, the risk

of the investment is reduced to the systematic risk. Investment in index funds will enable South African investors to earn approximately the average return of the NYSE and at the same time minimize the cost and risk of the investment. The suggested strategy for investments on the LSE is a buy-and-hold policy for a diversified portfolio or to invest in highly diversified unit trusts. However, the LSE is less efficient than the NYSE and opportunities to outperform the former market may exist. For those investors that have superior forecasting abilities, a combination of an active-passive strategy is suggested. An active policy is pursued for those securities that are deemed to be undervalued. The remainder of funds, if any, are invested in a highly diversified portfolio.

In the previous section (2.6) it was shown that the majority of the markets in Europe and the Far East show characteristics of inefficient markets. Therefore, an active investment strategy is more likely to succeed in these markets. The investors will have to undertake detailed investigations to identify undervalued and overvalued securities in these markets. A direct investment should be made in these securities considered to be underpriced. Furthermore, an active investment strategy is pursued for these securities. Any securities considered

to be overvalued will be sold and be replaced by securities which are expected to outperform the market. Any surplus funds, if any, will be invested in unit trusts or a diversified portfolio on a buy-and-hold basis.

A combination of an active-passive investment strategy seems appropriate for investments in the different overseas markets. In an efficient market a greater percentage of the funds should be passively invested in highly diversified portfolios that have risk and return characteristics of the entire market. An active investment strategy is followed to the extent that special situations for abnormal gains can be identified. In inefficient markets, a greater percentage of the funds will be actively invested in securities that have the potential to outperform the market. An active investment strategy will be followed so that market inefficiencies are continually exploited. The optimizing principles developed by modern portfolio theory could be used to determine the optimal active-passive investment mix for a specific country.

2.8 Summary and conclusions

Much of the evidence supporting the EMH is based on securities listed on the NYSE. While there is sufficient evidence on the NYSE to support the efficiency of the weak form and semi-strong form of the EMH, no conclusive

evidence supporting the strong form of the hypothesis has been found. Academic scholars have concluded that the stock markets are "sufficiently" efficient. However, in recent years a vast amount of evidence against the EMH has been collected. This anomalous evidence has yet to be reconciled with the EMH. In particular, several investment advisory services have provided their clients with recommendations that were able to consistently outperform the market for lengthy periods.

Recent evidence suggests that not all information is quickly and efficiently reflected in the share price of securities. It would seem that the securities markets constitute a broad spectrum of efficiency ranging from the hyperefficient to the seemingly inefficient. A possible reason for market inefficiency is that investors tend to overreact to unexpected and dramatic news events. There have been cases when irrational factors such as investment fads have played a dominant role in price determination. Several researchers have observed that the use of inappropriate and unreliable statistical techniques may have resulted in a bias in favour of the EMH.

Several EMH anomalies such as the January effect, weekend effect, small firm effect, neglected firm effect, and the P/E effect have been identified. These anomalies have demonstrated price characteristics that are not

consistent with efficient markets. Empirical evidence suggests that the CAPM ignores the notion of information deficiency and the resulting estimation risk associated with these EMH anomalies. The evidence also suggests that the higher returns observed for small companies, for low P/E shares, for neglected shares, and during January are all related to information deficiency. These EMH anomalies can be expected to continue providing excess returns as long as the large institutional investors ignore them and thereby perpetuate the information deficiency.

Knight and Affleck-Graves (1983) have evaluated the efficiency of the JSE. The results show conclusively that the JSE has characteristics of an inefficient market. A major weakness of the JSE is the relatively loose disclosure requirements by companies in South Africa compared with some of the larger industrialized countries. It is recommended that outside representation should be allowed for the various committees regulating company matters on the JSE. Outside representation on the various regulatory committees of the JSE will contribute towards a more efficient market and will probably prevent the creation of a statutory body to regulate company matters.

The literature on market efficiency suggests that the LSE follows the NYSE very closely when evaluated in terms of EMH criteria. Besides the LSE, most other European

stock exchanges are very small and do not conform to the requirements of an efficient market. It was also shown that the Hong Kong and Australian share markets show characteristics that are consistent with inefficient markets. A common feature of these smaller markets is that their efficiency seems to be improving as they become more sophisticated. Nevertheless, their relative inefficiency should provide favourable opportunities for South African investors desiring to invest in these countries. Based on the relative efficiencies of the various overseas markets, broad guidelines on the appropriate investment strategy to be pursued will be suggested.

CHAPTER 3PORTFOLIO THEORY AND CAPITAL MARKET THEORY3.1 Introduction

The purpose of this chapter is to present a historical development of investment portfolio theory. The intention is to trace the evolution of portfolio theory from the shortcomings of investment practices of the early days, to the present, where it has attracted increasing attention by academics and professional portfolio managers. The contribution of Markowitz to the concept of portfolio theory will be discussed as it laid the foundations for the development of the capital asset pricing model (CAPM). It will be shown that the capital market theory contains substantial refinements to the portfolio theory originally developed by Markowitz. It will also be shown that international diversification lowers the systematic risk and thereby reduces the total risk of a portfolio. Based on empirical evidence, several weaknesses of the CAPM will be identified and an alternative approach to security pricing, namely, the arbitrage pricing theory (APT), will be discussed.

3.2 Markowitz's contribution to portfolio theory

The most significant contribution to the development of portfolio theory was the pioneering article on this subject by Markowitz in 1952. Prior to this period the general rule to portfolio selection was to invest in securities that maximized the expected returns from the portfolio. If this rule is observed, most investors would concentrate their funds in a few securities that offered the greatest expected returns. Markowitz (1952, p.77) showed that diversification was necessary to minimize the risk of portfolio investment:

"The hypothesis (or maxim) that the investor does or should maximize discounted return must be rejected. If we ignore market imperfections the foregoing rule never implies that there is a diversified portfolio which is preferable to all non-diversified portfolios. Diversification is both observable and sensible: a rule of behaviour which does not imply the superiority of diversification must be rejected both as a hypothesis and as a maxim."

Prior to Markowitz, performance evaluation of investments did not express quantitatively the relation between risk and return associated with investments (Cohen et al., 1982). This lack of a quantitative measure of risk created much confusion in evaluating portfolios. Investment managers generally compared their results to broad market indices but made no allowances for the level of risk of the portfolio. During this period aggressive investment managers frequently boasted of their ability to outperform

the market. However, the achievement of these portfolio managers did not necessarily reflect superior capabilities, but rather their propensity to take on higher risks. This shortcoming in the measurement of investment performance provided the opportunity for researchers to express risk in quantitative terms.

Markowitz provided a theoretical framework, for the construction of optimum portfolios. Markowitz's theory assumes that the expected returns are normally distributed, and that the investor acts as if money has a diminishing marginal utility. Markowitz (1952) further suggested that rational investors would conduct themselves in a manner which reflects their basic aversion to increasing risk without compensation by a sufficient increase in expected return. It is further stated that the expected utility will be maximized if the investor holds a portfolio which maximizes expected return for a given level of risk represented by variance and minimizes variance for a given expected return. Markowitz (1952, p.80) showed that the variance of portfolio returns is the weighted average of the covariances between the returns of the individual securities. Thus, Markowitz played a pioneering role in the quantification of investment risk of portfolios.

Markowitz (1952) further refined his framework for systematic construction of optimum portfolios by suggesting that investors should try to minimize deviations from

expected portfolio rate of return by holding securities that have a low degree of covariance. Effective diversification is only obtained if the portfolio contains securities that do not fluctuate in a similar fashion, so that the variability of the portfolios' rate of return becomes significantly less than the variability of the constituents of the portfolio. The correlation of returns between securities is measured by the correlation coefficient (r), which may be positive, negative or zero. The important consideration when a security is added to a portfolio is the correlation coefficient between the security and the rest of the portfolio. A low correlation coefficient enables a reduction in the risk of a portfolio. Markowitz made a major contribution to portfolio theory by showing that individual securities are not risk independent, and that this interdependence between securities should be explicitly taken into account in portfolio construction and evaluation.

Markowitz (1952) showed that in constructing portfolios, it is necessary to determine for each security the mean expected return, the expected standard deviation of return, and a covariance of return with each other security in the portfolio. Given this specific information for each security, Markowitz showed how quadratic programming could be used to calculate a set of efficient portfolios available to investors. Only portfolios lying on the efficient frontier can be considered to be optimal.

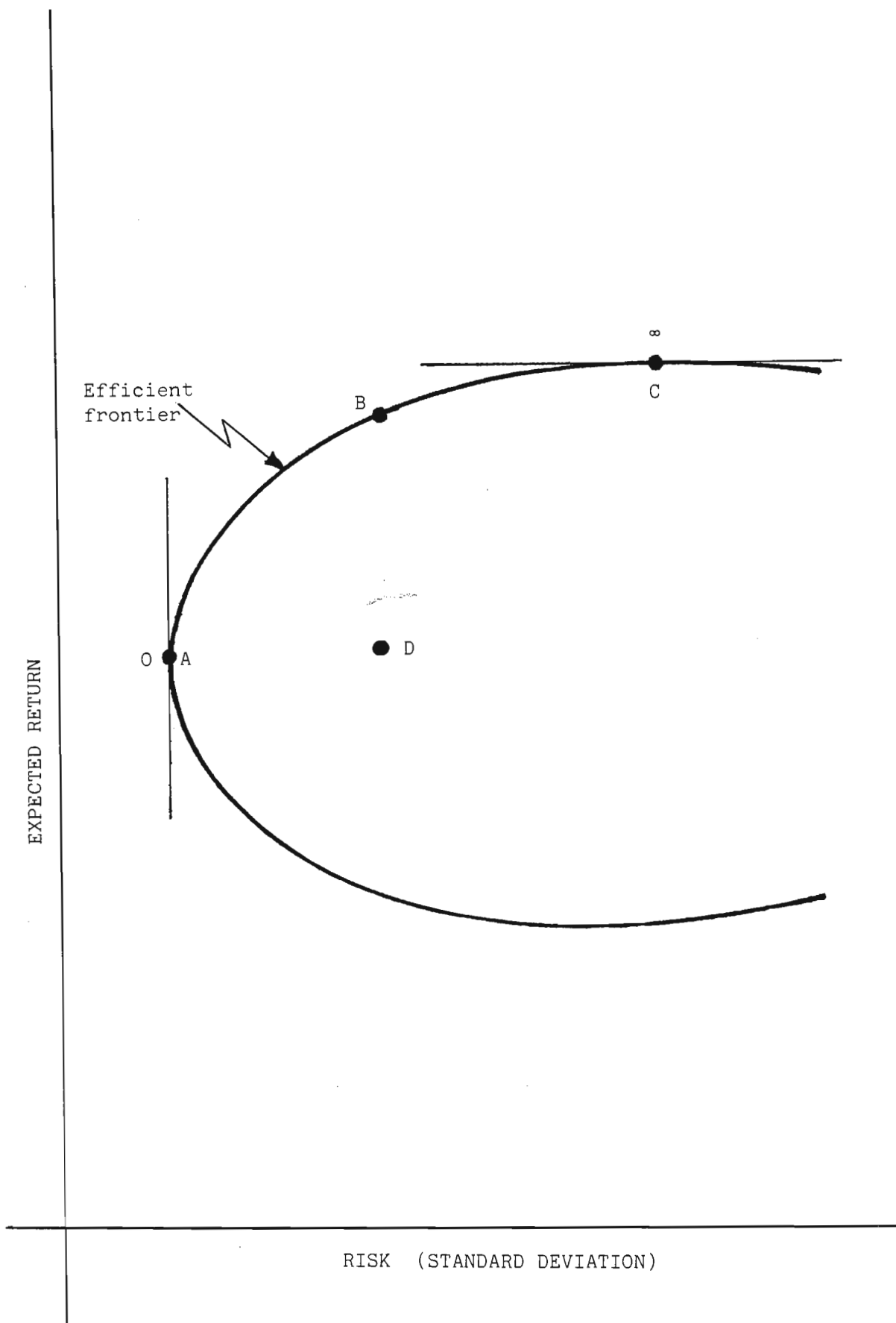


Figure 3.1 The efficient frontier for optimum portfolios
between 0 and ∞

In figure 3.1 curve ABC traces the efficient frontier available to investors. Any portfolio lying below the efficient frontier can be considered to be inefficient or suboptimal. Portfolio D can be considered to be inefficient because portfolio A could produce the same expected return but at a lower risk level, while portfolio B could produce the same degree of risk as D but would yield a higher expected return. It must be remembered that an efficient portfolio will not retain its optimum status over a period of time because of changes in the price of securities. Therefore, optimum portfolios will have to be constructed for each review period.

Markowitz (1952) used the full covariance model to construct an efficient set of portfolios. The model generated the efficient portfolio set between the limits of zero and infinity of the return to risk tradeoff for investors (see figure 3.1). The standard deviation of the portfolio is the square root of the variance formula. The variance equation includes variance and covariance. The equation for a two-security portfolio can be written as:

$$\sigma_p = \sqrt{W_i^2 \sigma_i^2 + W_j^2 \sigma_j^2 + 2W_i W_j \rho_{ij} \sigma_i \sigma_j}$$

..... equation (i)

where: W_i and W_j are the weights of securities i and j,
 σ_p^2 is equal to the variance V of the portfolio,



ρ_{ij} is the coefficient of correlation of security i to security j ,

$\sigma_i \sigma_j$ is the standard deviation of security i , times the standard deviation of security j .

In equation (i) the expression representing covariance is:

$$2W_i W_j \rho_{ij} \sigma_i \sigma_j$$

The first part of equation (i) represents the variance measured by the weight squared (W_i^2) of the security (i), times the standard deviation (σ_i^2) of security plus the weight squared of security j (W_j^2) times the standard deviation squared (σ_j^2).

The basic purpose of the quadratic programme is to find the combination of securities where the standard deviation of the portfolio is a minimum. For a two-security portfolio the quadratic programme develops that combination of two securities where the standard deviation of the portfolio is the lowest. As a general case, the basic purpose of the quadratic programme is to develop all combinations of portfolios that have the lowest risk for each level of expected return between the limits of 0 and ∞ (infinity), as can be seen in figure 3.1. The slope of the efficient frontier of securities in figure 3.1 marked 0 means that the slope of the line at that point is 0, and represents the point of lowest risk. The slope of

the efficient frontier at ∞ is so designated because the slope at that point is infinite. The slope is represented by the symbol λ . For every λ there is a specific return (E_p) and risk σ_p . The purpose of the quadratic programme is to find those values for every point (λ) on the efficient frontier. The value established at each point is referred to as the objective function, ϕ .

The objective function is found by finding the minimum σ_p for every level of E_p . The equation for the objective function is: $\phi = \lambda E_p - \sigma_p$, where ϕ is the function that is to be maximized at every point λ in the efficient frontier for each E_p where σ_p is minimized. It is apparent that when more than two securities are to be put together to form efficient portfolios, the process becomes quite complicated if the investor must calculate the expected returns and standard deviation for each security and for each portfolio, and also estimate how the return on each security correlates to the return on every other security. It takes a substantial amount of time to calculate an optimum combination of securities in a portfolio of more than two securities. Therefore, a computer based quadratic programme is utilized to expedite the computations.

The discussion of optimum portfolios suggests that investors should be guided by three basic principles :

First, securities included in the portfolio should be efficient - that is, possessing the highest expected return with the lowest expected risk. Second, in order to reduce risk, the investor should select securities not merely with the highest return but with returns that are negatively correlated or that have a low positive correlation. This will result in achieving the highest possible return with the lowest possible risk. Third, after the securities are chosen, the portfolio that offers the highest return and lowest risk can be obtained by shifting the weights of the securities in the portfolio. It is important to have not only the correct (efficient) securities in the portfolio, but also the correct amount of each security; the correct weights are determined by the way in which the securities work together to establish the risk and return of the portfolio. The standard deviation and coefficient of correlation will determine the combination with minimum standard deviations. The basic emphasis in portfolio management is to make certain that risk is as low as possible for every possible return for one security or a portfolio of securities.

The concept of the efficient frontier developed by Markowitz (1959) is basic to the understanding of portfolio theory. Assume that in the marketplace, there are a fixed number of securities available to investors. Each of these securities has its own expected return and standard

deviation. Many securities with the same expected return have different standard deviations; others have the same standard deviation but vary in expected return. The investor is expected to select the security that offers the highest return and lowest standard deviation. To facilitate portfolio selection all securities are ranked on the basis of risk and return characteristics. The return and risk are based on the expectation of the analyst or based on predictions of forecasting models.

A starting point in the construction of efficient portfolios is the calculation of return and standard deviation for each security available. Thereafter, a set of efficient portfolios is constructed from which the investor can select a portfolio that offers the level of risk and return that is acceptable. Sharpe (1963) has shown that a portfolio is considered to be efficient if no other portfolio gives a higher expected return with the same standard deviation of return, or a lower standard deviation of return with the same expected return. Furthermore, there is also relationship between expected return, standard deviation, and the number of securities. One portfolio will contain only one security which will offer the highest risk and return. A second portfolio will include a second security, and both the return and risk will be lower for the second portfolio. This illustrates an important principle of portfolio diversification : the

only way to obtain a lower risk is by accepting a lower return, and the only way of reducing risk in a portfolio is by additional securities. The second security need not be added in an amount equal to the first; it is necessary to add only an amount that reduces risk and reward. For example, the first portfolio may consist entirely of security 1, and the second portfolio might consist of 90 percent of security 1 and 10 percent of security 2. Another portfolio, with three securities, will have a lower return and lower risk than the second portfolio. The securities are combined in such a way that as each security is added, it will produce the lowest risk. Securities are added among all those in the market until the efficient set of portfolios is established, as depicted in figure 3.2.

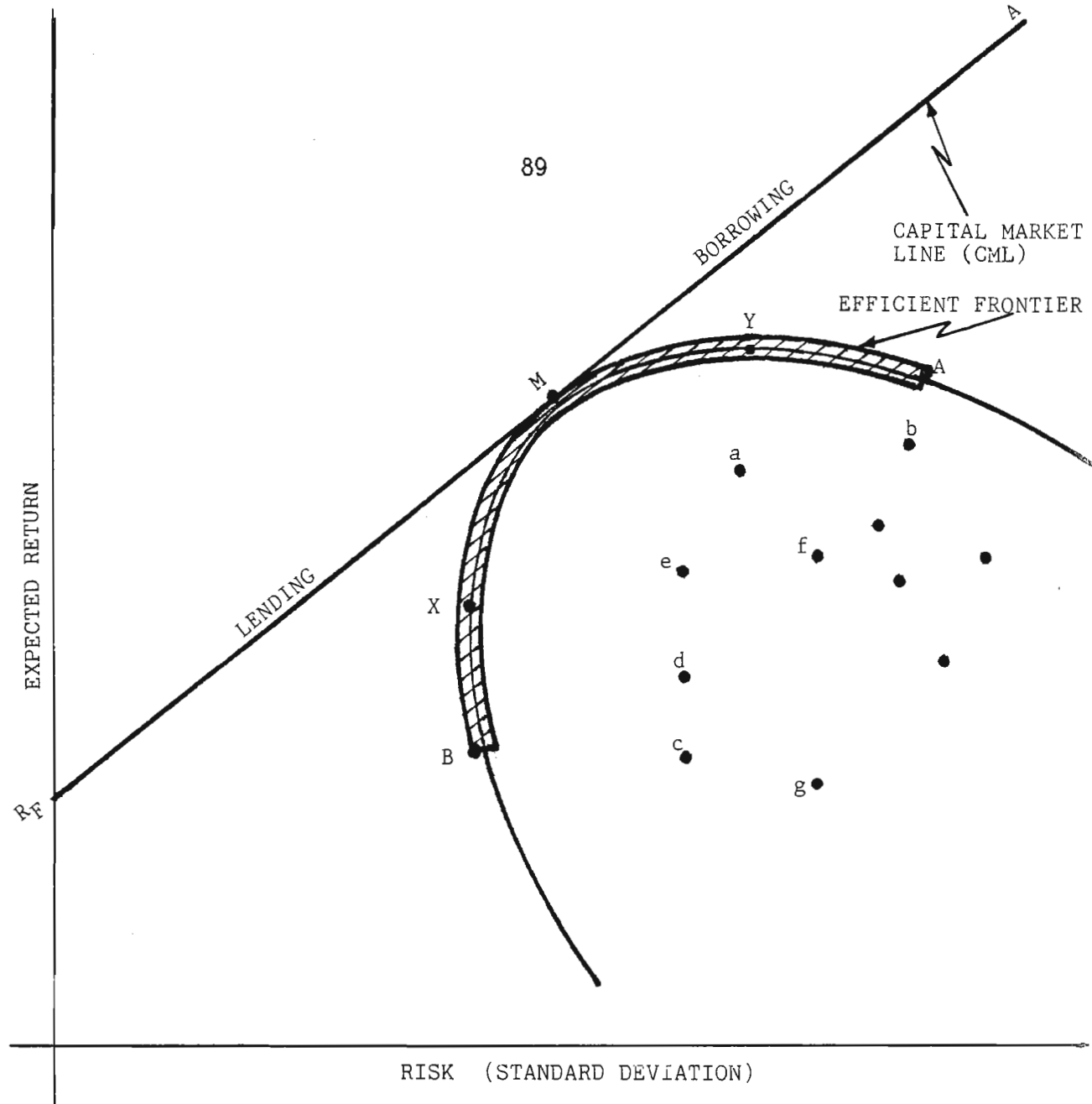


Figure 3.2 The capital market line and Markowitz' efficient frontier

In figure 3.2 the ellipse represents all possible combinations of securities into portfolios that can be put together from all securities available in the market. Each point represents a portfolio with specific risk and return characteristics. Portfolio c, for example, has a specific expected return and standard deviation. However, portfolio c is not efficient, since portfolio B has the same expected return but a lower standard deviation. Portfolio d has a

higher return and the same risk as portfolio c. Although portfolio d is more attractive than portfolio c it is not efficient, since portfolio e has a still higher return with the same degree of risk as c. and d.

Portfolio A is a single-security portfolio that has the highest return and risk, and in no way can we improve on its risk to return ratio. As we move to the right on the curve, return decreases and the risk increases. If we move to the left on the curve, return decreases and risk decreases. Therefore, we are on the efficient frontier, which is shown by the shaded area of the parabola. It represents all possible portfolios that are "efficient" as we move to the left and down.

In the calculation of portfolio return and risk, the coefficient of correlation of one security to another is calculated along with the variance of one security to another. The efficient frontier represented in figure 3.2 includes all possible combinations of portfolios A, M, and B. The other dots on the efficient frontier represents other portfolios with "efficient" risk to return characteristics. The efficient portfolio generated by the quadratic programme provides an investor with the portfolio of minimum risk. The use of the programme eliminates the problem of how to diversify among risky assets. It eliminates the notion that naive diversification (equal amounts invested in each security) is a sound way to select

risky securities. However, it still leaves the decision about the balance between risky and riskless assets up to the investor.

Markowitz's contribution to portfolio theory has been subject to criticism by academics and practitioners. A serious question against Markowitz's portfolio model is whether the standard deviation is an acceptable measure of risk or not. Markowitz uses historical data as a basis to determine the probable variability of a security's rate of return to determine risk. However, for long-term investors with no liquidity problems, price variability is not an appropriate measure of risk. For such an investor the risk of bankruptcy is more important than short-term security price fluctuations.

Another weakness of the Markowitz portfolio model is that it requires an unmanageable volume of data and number of computations. Each time a change to the existing portfolio is to be made, the entire range of possible securities must be re-examined to preserve the desired risk-return relationship. Fisher (1975, p.75) has shown, for example, that selecting a portfolio from a list of 1000 securities, it would be necessary to calculate 1000 expected returns, 1000 standard deviations, and 499 500 covariances. The large volume of input and the amount of computer time to compute an efficient portfolio would appear to be not economically feasible.



Despite the limitations of his portfolio model, Markowitz has made a significant contribution to the development of modern portfolio theory. Several researchers have refined and adjusted the Markowitz portfolio model so that a more workable model is available for those involved in portfolio selection. Markowitz's major contribution to portfolio theory is to draw attention to the total portfolio risk and not the risk of a security in isolation when securities are selected.

3.3 Capital Asset Pricing Model (CAPM)

The CAPM model was developed by Sharpe (1964) and was further refined by Lintner (1965). This model is based on several assumptions of the behaviour of risk averse investors. The key assumptions of the CAPM are: - the capital markets are efficient and investors are fully informed, there are no transaction costs; - no single investor is able to influence the price of securities; - the individual is able to borrow and lend at the risk-free rate of return; - investors hold homogeneous views on the risk-return characteristics of securities and therefore have the same efficient frontiers. It is obvious that many of these assumptions do not accord with reality. However, Sharpe (1964) has stated that the practical reality of the assumptions are not important, but rather the acceptability of its implications. The capital market line representing the CAPM is illustrated in figure 3.2.

$R_F M A$ is the capital market line which describes the trade-off between the expected return and the risk of holding a combination of risk-free securities and the risky market portfolio. The risk-free rate of return (R_F) is the intercept on the vertical axis and represents the reward per unit of time which the investors earn for deferring consumption. The slope of the capital market line represents the market price of risk, and can be viewed as the reward per unit of risk undertaken. Since most investors are averse to risk, each additional unit of risk in an efficient portfolio must be rewarded in the securities market if equilibrium is to be attained. All efficient portfolios are expected to earn a risk premium in proportion to the additional risk undertaken. Investors are expected to have portfolios which combine the risk-free asset with risky assets.

The CAPM can be contrasted with the Markowitz model of portfolio selection. The Markowitz model adjusts risk by moving up or down the efficient frontier of alternative portfolios. By contrast, the CAPM adjusts for risk by borrowing and lending against a single optimal risky portfolio M in figure 3.2. Portfolio M represents the market as a whole and consists of all risky investments available to investors with each investment weighted in proportion to its share of the total market value of all risky investments. However, because of the wide variety and complexity of investments, it is virtually impossible to

calculate a market portfolio that represents all risky investments available to investors during a specific period. Therefore, researchers prefer to use a surrogate index such as the Standard and Poor's 500 stock index (in the U.S.A.) to represent the market portfolio. In South Africa, the JSE Overall Actuaries Index can be used as a surrogate for the market universe.

According to the CAPM, the market portfolio or its surrogate share price index is the optimal risky portfolio for all investors. The utility preferences of the individual investors do not alter the optimum portfolio of risky assets. When a risk-free security is available, and when borrowing and lending are possible at this rate, the market portfolio will dominate all other portfolios. Therefore, the individual's utility preferences are independent or separate from the optimum portfolio of risky assets. This observation was made by Tobin (1958) and is known as the separation theorem. This theorem implies that the portfolio chosen by an individual depends on the expected returns and the risk represented by the standard deviation for the various possible portfolios of risky assets.

In figure 3.2, the line segment $R_F M$ represents the various returns that are available through a combination of risk-free and risky assets which are represented by the market index. There are several possible combinations

available to investors, ranging from a total investment in risk-free assets to a full commitment to risky assets which exactly matches the market returns. If the investor is to achieve an expected return greater than the market, it is assumed that he will borrow at the risk-free rate and invest further in risky assets. The investor is thereby able to leverage the portfolio by reinvesting the borrowed funds in the market portfolio. This is represented by segment MA of the capital market line. It can be seen from figure 3.2 that by leveraging the portfolio the investor earns a greater return than can be achieved by moving upward on the Markowitz efficient frontier.

The ability to leverage a portfolio has been severely criticized by opponents of the CAPM. It is stated that the ability to leverage a portfolio is practically unattainable for most investors. Firstly, most individual investors are reluctant to borrow and in any event they will have to pay more for borrowed funds than the prevailing risk-free rate. Secondly, most institutional investors have legal restrictions on their borrowing capacity. Therefore, the line segment MA appears to be an overestimation of the ability of investors to increase portfolio returns by utilizing financial leverage. Despite these criticisms, the CAPM represents a substantial advance in the development of modern portfolio theory.

It must be stressed that the CML represents the

risk-return relationship for efficient portfolios only. The CML states that the return of an efficient portfolio is equal to the risk-free return plus the risk premium. The risk premium is equal to the "market price of risk" multiplied by the standard deviation of the portfolio. This market price of risk is the normalized risk premium. The market price of risk reflects the risk attitudes of all individual investors in the aggregate. The CML equation is:

$$R_P = R_F + \left(\frac{R_M - R_F}{\sigma_M} \right) \sigma_P \quad \dots\dots\dots \text{equation (1)}$$

- where: R_P = expected return of the portfolio
 R_F = risk-free rate of return
 R_M = expected return for the market
 σ_M = standard deviation of the market
 σ_P = standard deviation of the portfolio

3.4 The Security Market Line (SML)

Sharpe (1964) and Lintner (1965) have shown that, if the capital market is in equilibrium, the expected return of any individual security will be a linear function of the covariance of its return with that of the market portfolio. This can be expressed as:

$$R_j = R_F + \left(\frac{R_M - R_F}{\sigma_M^2} \right) \text{COV.}(R_j, R_M) \quad \dots\dots\dots \text{Equation (2)}$$

where: R_j = expected return of individual security
 $\text{COV.}(R_j, R_M)$ = covariance of the security return with
the market portfolio

all other terms are as defined in equation (1)

The SML is the most important relationship of the CAPM because it defines the risk of any individual security in terms of its contribution to the risk of the market portfolio. The SML is shown graphically in figure 3.3.

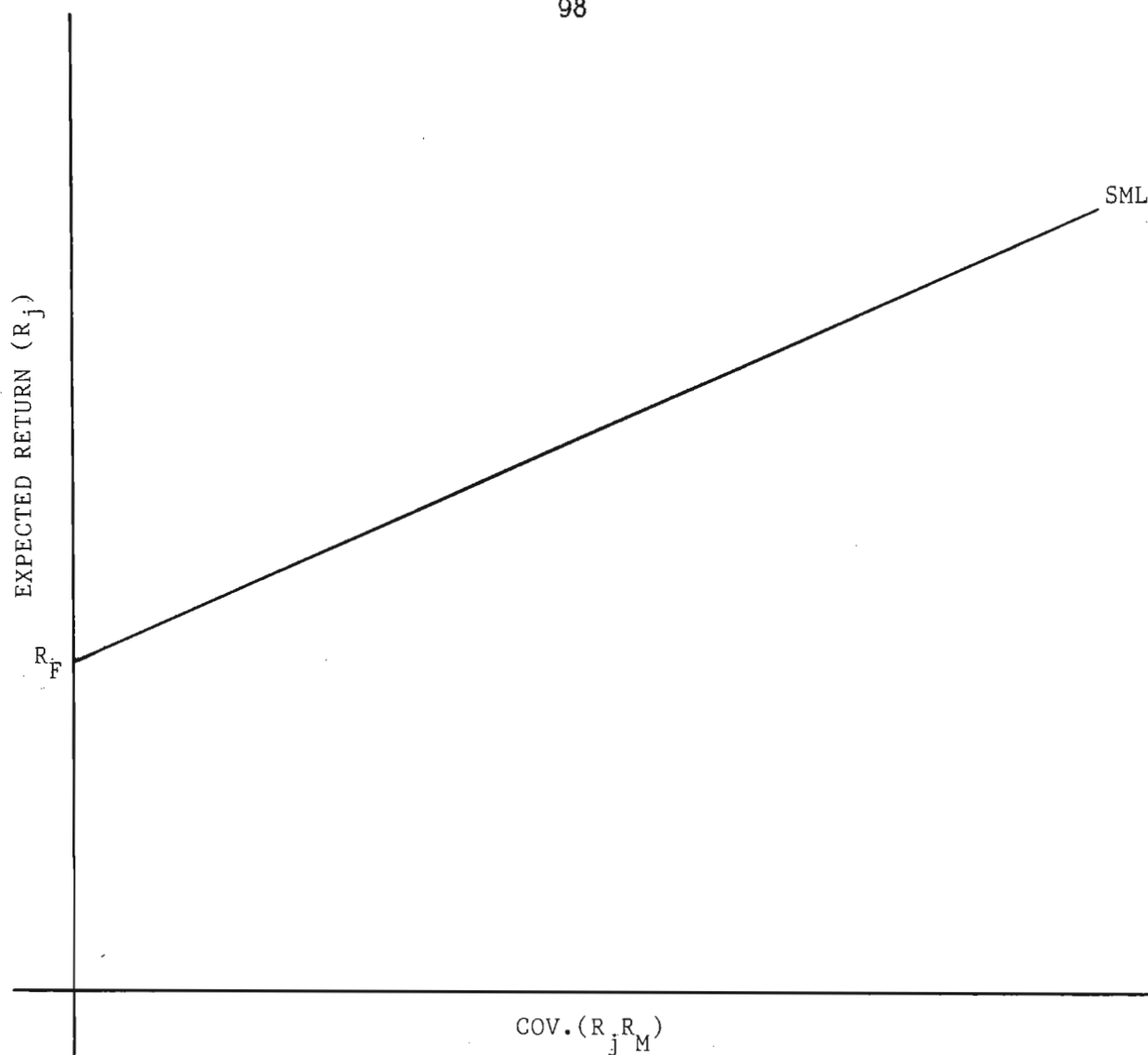


Figure 3.3 The Security Market Line (SML)

Given that $\text{COV.}(R_j, R_M) = r_{jM} \sigma_j \sigma_M$, the SML may be expressed in terms of the correlation coefficient and the individual standard deviations σ_j and σ_M . The SML can therefore be expressed as:

$$R_j = R_F + \left(\frac{R_M - R_F}{\sigma_M^2} \right) r_{jM} \sigma_j \sigma_M \quad \dots\dots\dots \text{Equation (3)}$$

Equation (3) establishes the relationship between the CML and the SML. The CML is a relationship which holds for efficient portfolios only, while the SML holds for any individual security or portfolio. If the portfolio is efficient, then $r_{jM} = 1$, and the SML for such a portfolio reduces to the CML:

$$R_P = R_F + \left(\frac{R_M - R_F}{\sigma_M} \right) \sigma_P \quad \dots\dots\dots \text{Equation (4)}$$

where the subscript p denotes any efficient portfolio.

The most important development of the CAPM is the expression of the risk of any individual security in terms of its beta coefficient. Equation (3) can be rewritten as follows:

$$R_j = R_F + \beta_j (R_M - R_F) \quad \dots\dots\dots \text{Equation (5)}$$

$$\text{where } \beta_j = \frac{r_{jM} \sigma_j \sigma_M}{\sigma_M^2}$$

β_j represents the beta coefficient for security j

In equation (5) the risk of any security j is measured by its beta coefficient, which is the measure of the risk of this security relative to the risk of the market portfolio. Therefore, the risk of any particular security or portfolio is a linear function of its beta coefficient β_j .

The CAPM measures the risk of a security or a portfolio in terms of the beta coefficient. The beta coefficient is a measure of the volatility of the individual security's returns relative to the market. Therefore, the beta coefficient of the market portfolio is equal to 1. The several possible values of the beta coefficient is illustrated in figure 3.4.

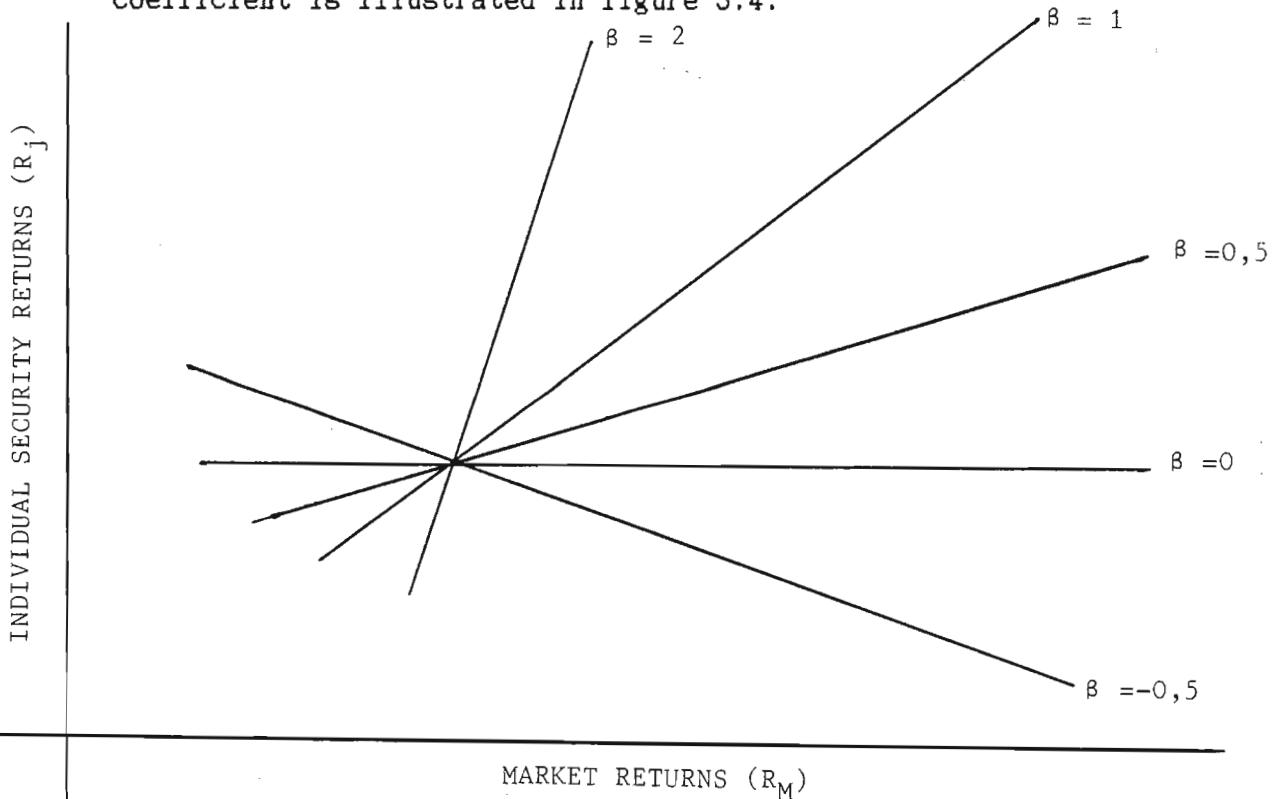


Figure 3.4 Range of beta coefficients adapted from Sharpe

(1970, p.93)

A $\beta = 1$ implies that the security's return fluctuates proportionately with the market average return. If the market rate rises by, say, 2 percent then the return on the security rises by the same percentage. A security having a $\beta < 1$ is said to be defensive. A β of 0,5 for instance indicates that if the market return rises or falls by n percent, the security's return will rise or fall by 0,5 n percent. The investor is, therefore, to some extent "defended" against major declines in market returns. Securities with $\beta > 1$ are riskier and, therefore, must yield returns greater than that expected for the market and are called "aggressive" securities. A negative beta implies that the price of the security moves inversely with the movement of the market returns. Such securities are called "super-defensive", since they provide a greater protection to investors than simple defensive securities. Negative betas are of particular importance for portfolio diversification. However, a study by Blume (1971) showed that few investors are able to achieve portfolios having negative betas because nearly all shares appear to move with the market.

Sharpe (1970) further refined the CAPM by showing that the total risk can be separated into two distinct elements. That portion of a security's price movement fluctuating with the market as a whole is referred to as the "market risk" (also called systematic or nondiversifiable risk). The second risk component is that

portion of the price movement that is unique to the specific security and is referred to as the unsystematic or diversifiable risk. Furthermore, the unsystematic risk may be further subdivided into industry characteristics and the balance into characteristics related to the company itself. Several writers, including Evans and Archer (1968), Wagner and Lau (1971), Klemkosky and Martin (1975) have shown that the unsystematic risk is reduced at a decreasing rate towards zero as more randomly selected securities are added to a portfolio. These studies suggest that most of the unsystematic risk of a portfolio is eliminated by selecting fifteen to twenty securities randomly. This is illustrated in figure 3.5.

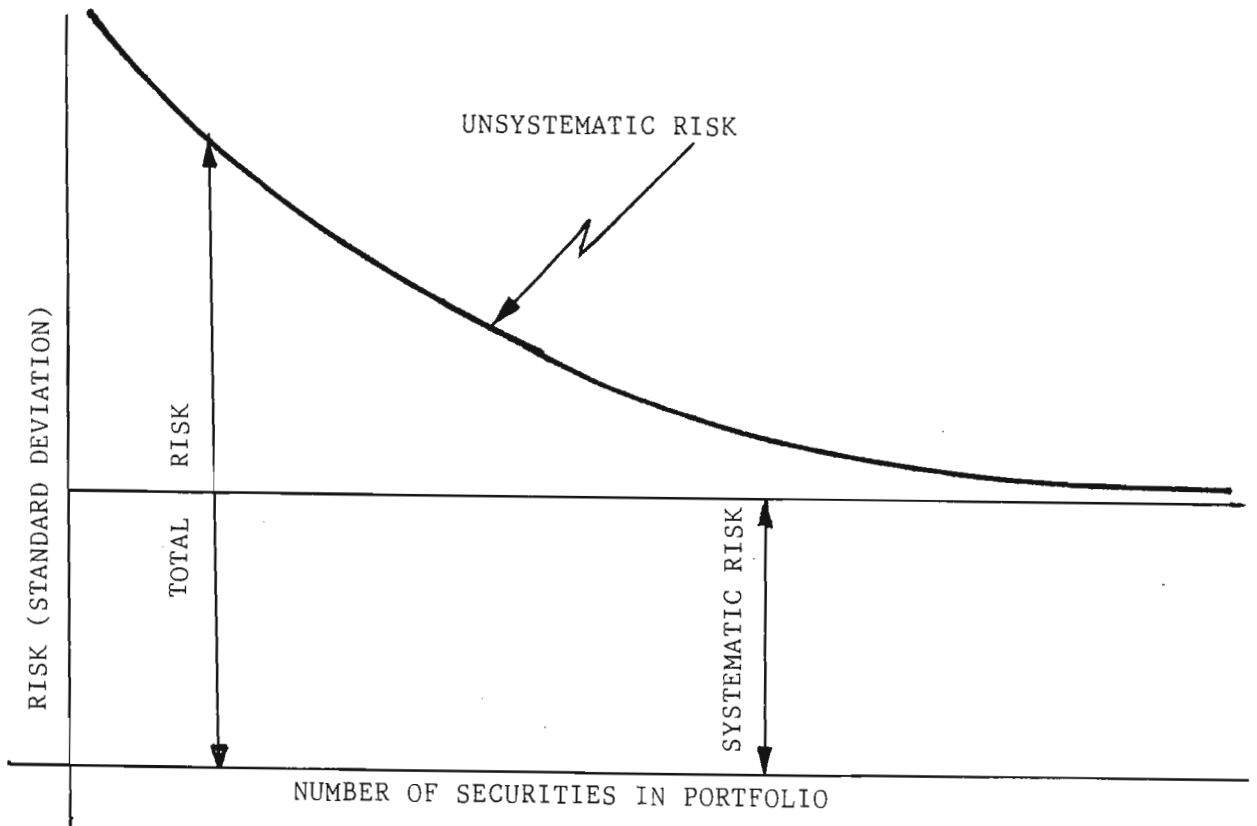


Figure 3.5 Different risk components of a security

Diversification can be discussed in terms of the relationships in figure 3.5. As the number of randomly selected securities held in a portfolio increases, the total risk of a portfolio decreases, due to the reduction in unsystematic (unique) risk. However, this reduction occurs at a decreasing rate. Diversification can be regarded as efficient when it reduces the total risk of a portfolio to a point where it is equal to the systematic risk which cannot be diversified away. Therefore, within the CAPM context, each security should be judged on the basis of its nondiversifiable risk and not its total risk, since part of it can be diversified away.

An interesting question is: what does international diversification do to the riskiness of the portfolio and to its rate of return? Since the correlation coefficients between the indexes of the different stock markets are expected to be less than perfect, risk is expected to decline through international diversification. Lessard (1976) has shown that only a fraction of the national systematic risk is systematic in a world context. Further, it was shown that international diversification lowers the systematic risk and hence the total risk of a portfolio as the domestic market portfolio is broadened to include more securities having low correlation coefficients.

Cone and Weaver (1982, p.43) have shown that in

the world capital market there exists three levels of risk: unsystematic security risk, unsystematic domestic market-related risk, and systematic market risk. The systematic world market risk is less than the unsystematic domestic market-related risk and the two levels of unsystematic risk may be reduced through international diversification. Cone and Weaver (1982, p.55) conclude that internationally diversified portfolios produce superior results because what was previously an undiversifiable systematic risk (at a domestic level) is in fact partially diversifiable at the international level.

Prior to the development and acceptance of modern portfolio theory, portfolio performance was evaluated on the basis of the actual return attained compared with the market index or any other yardstick. The risk composition of a portfolio was generally ignored, and portfolio managers could have outperformed the market index by simply adopting a high risk profile. The CAPM, which uses betas as a measure of risk, provides a more meaningful technique to evaluate the investment performance of different portfolios. A portfolio is judged on the basis of whether it has outperformed or underperformed the expected returns reflecting the risk characteristics of a portfolio. This approach is illustrated in figure 3.6.

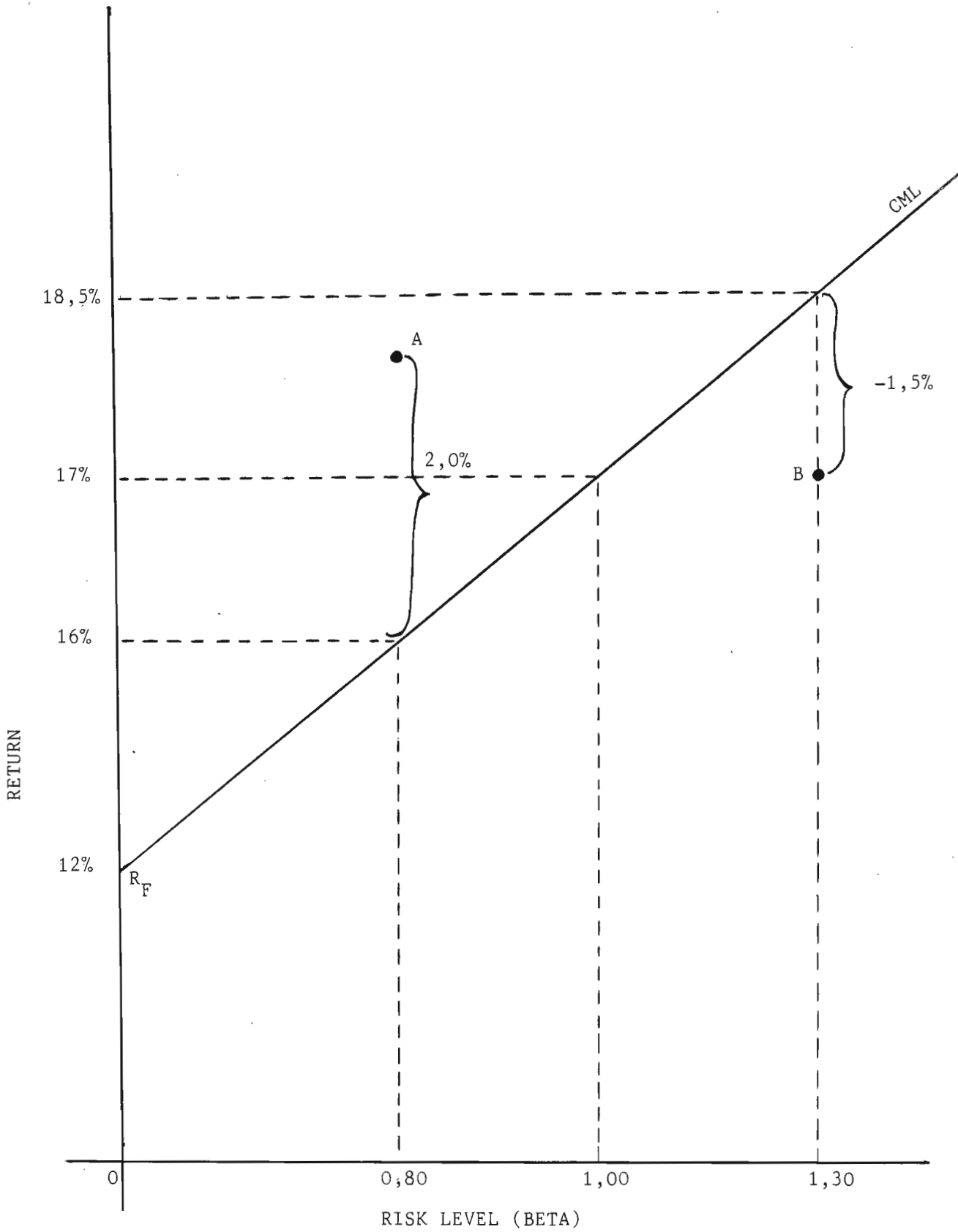


Figure 3.6 Using CAPM to determine risk-adjusted returns

Figure 3.6 illustrates the capital market theory which asserts that there is a linear relationship between the required rate of return and the risk of a security or portfolio. The intercept of the capital market line (CML) will be the risk-free rate of return (R_F), the required rate of return for the market i.e. $\beta = 1,0$ will provide another point on the CML. Joining the risk-free rate and the point with market return having a β of 1,0 will provide the CML. Given the β of a portfolio, the expected return will be provided by equation 5, i.e.

$R_P = R_F + \beta(R_M - R_F)$. This equation can be used to determine the required rates of return for portfolios having different risk levels. Assume that in a given period, the risk-free rate is 12 percent, and the market return is 17 percent. This information can be used to determine the required rate of return for hypothetical portfolios A and B having β values 0,80 and 1,30 respectively. The expected returns of portfolios A and B will be 16 percent and 18,5 percent respectively.

The risk-adjusted returns of Portfolios A and B can be measured from the CML. Portfolio A should have returned 16 percent, but actually returned 18 percent. Its risk-adjusted performance is +2,0 percent, the difference between the actual return and the required rate of return. Similarly, portfolio B provided a risk-adjusted return of -1,5 percent. On a risk-adjusted basis we can consider all portfolios producing returns above the CML as outperforming

the market, while those portfolios below the CML as underperforming the market. Therefore, risk-adjusted returns can be used to evaluate portfolio performance and to compare portfolios with different risk levels and varying investment strategies.

3.5 An evaluation of the CAPM

The CAPM, as a development of modern portfolio theory, received widespread attention from academics and practitioners. The key implication of the CAPM is that a security's beta determines its equilibrium price. However, if the CAPM is to be used for valuing securities, empirical evidence to test its validity must be forthcoming. Another important implication of the CAPM is that the market portfolio is the most efficient portfolio available to investors. Furthermore, all investors will seek to hold the market portfolio to be in equilibrium as described by the SML. Empirical researchers have attempted to test this pricing relationship. Roll (1977) has suggested that the CAPM is inherently untestable, and that despite the numerous tests over the years, the validity of the CAPM cannot be proven one way or the other.

Roll (1977) has shown that the assumption of the market portfolio to be efficient cannot be tested, because it is not possible to actually observe and measure what is contained in it. The market portfolio is supposed to

contain every marketable real or financial asset in the world i.e. all forms of share capital, all forms of debentures and loan capital, all government securities, all real estate, all forms of hard assets, etc. Roll argues that, in reality, this portfolio cannot be observed or measured. Most tests of the CAPM use some market index as a surrogate for the true market portfolio. The various market indices used in the CAPM grossly understate the true market portfolio. Therefore, Ross argues that since all implications of the CAPM follow from the efficiency of the market portfolio, meaningful tests of these implications cannot be performed. Roll (1977) further argues that an estimation of beta depends on the ability to measure the contents of the market portfolio, since it requires an assessment of each security's covariance with the true market portfolio. Ross argues that the beta estimation is incorrect because the market index and not the true market return is used to derive it. The inability to measure the true market return and beta coefficients makes empirical tests of the CAPM highly unreliable.

Fielitz and Greene (1980) have also raised doubts about the reliability of risk-adjustments derived from the CAPM. They have shown that portfolio risk measures are sensitive to the length of the holding period under review. It was shown that portfolio rankings are significantly influenced by the duration of the measurement interval. Further, Fielitz and Greene (1980, p.13) have shown that

even small differences in the beginning and terminal dates can lead to significant differences in performance results. The reliability of the CAPM can be questioned because the risk based on beta appear to be highly influenced by the holding period involved in the risk-return calculations.

Several researchers have tested an important assumption of the CAPM which states that portfolios with zero beta would earn the risk-free rate over the study period. Friend and Westerfield (1980) have shown that portfolios with zero beta are not totally insensitive to general market conditions as implied by the CAPM. This study revealed that zero beta portfolios sometimes exceed the risk-free returns and at other times produce returns below the risk-free returns. This finding suggests that the risk premium in the CAPM context may be misleading, and this leads to corresponding doubts on the reliability of the capital market line to establish risk-return relationships.

Another key assumption of the CAPM is that beta coefficients are stable and are expected to prevail in the future. Various studies have consistently shown that beta coefficients are not stable over time. Sunder (1980) showed that using a security's current beta as an indication of the future market risk cannot be relied upon because of the high level of instability. Levy (1971b) examined the

weekly rate of return for 500 shares on the NYSE and concluded that for fairly short periods (52 weeks) risk represented by beta was not reliable for individual securities. Blume (1971) determined that the correlation of beta for individual securities during adjoining periods was fairly low, and that the beta stability increased substantially for portfolios of 20 or more securities. Tole (1981) also demonstrated the ability of large portfolios to generate stable beta estimates. These results indicate that the beta of individual securities may not be stable, but stability can be attained by increasing the number of securities in a portfolio. These results are an endorsement of the portfolio approach to investment.

The CAPM assumes that there is a positive long-term linear relationship between risk and return. The empirical evidence suggests that the linear relationship between expected return and beta risk is valid, but that it may have a different slope from that suggested by the theoretical assumptions. Figure 3.7 illustrates what might be the relationship between the "theoretical" and "empirical" SMLs. The discrepancy between the two lines may explain the extent to which the strict theoretical assumptions of the CAPM may not hold.

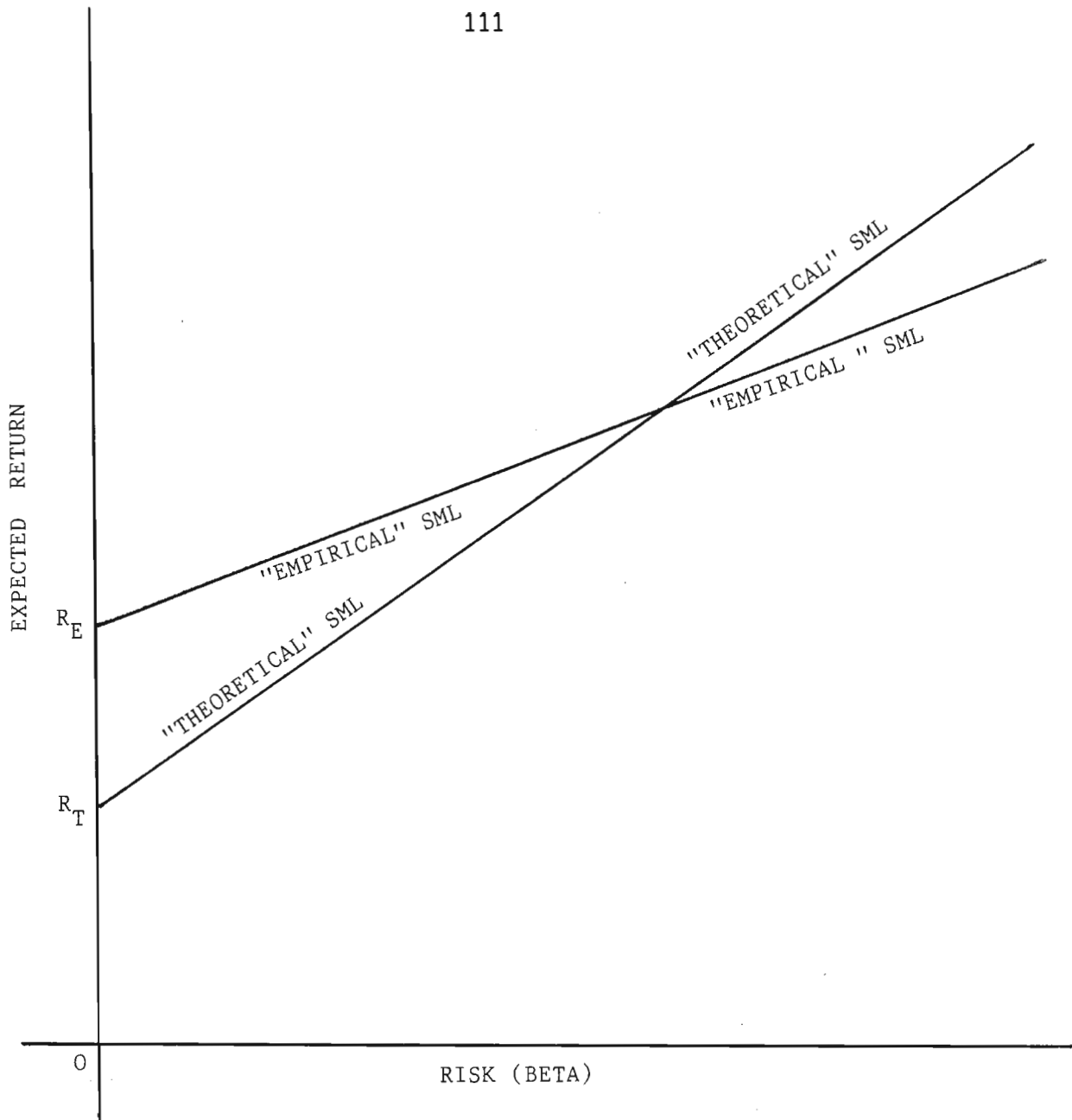


Figure 3.7 Possible relationship between theoretical and empirical SML

Friend, Westerfield and Granito (1978) have shown that the observed SML has a tendency to be tilted clockwise from the theoretical SML, as shown in figure 3.7. Low beta securities earn more than the CAPM would predict, and high beta securities earn less than the CAPM would predict. A

possible explanation is that high risk investors tend to exaggerate the opportunities offered by very risky securities and may overpay to acquire them. This could result in actual returns being below what is expected in line with the risk involved.

Another possible explanation of the divergence between the theoretical SML and the empirical SML is the impact of inflation on security pricing. In recent years inflation has been a major element in risk and uncertainty and it affects all securities, including the risk-free rate and the market portfolio. All normal risk-free rates are risky in real, purchasing power terms, even though the money rate may be risk-free. The changes in the rate of inflation may cause the risk-free rate and the return for risky securities to adjust at different rates. Furthermore, investors in risk-free investments may require a greater adjustment factor because they are more vulnerable to the effects of inflation. Therefore, on the vertical axis of figure 3.7 the distance between the points R_T (theoretical return) and R_E (expected return) may be partly explained by the differential beta response to inflation risk.

The exclusive use of beta to represent risk in the CAPM has been subject to criticism. Vandell (1981) showed that there are securities having the same beta coefficients, but may have significantly different alpha values and therefore cannot be said to have the same risk.

Vandell (1981) concludes that the riskiness of securities may comprise several risk factors instead of just beta, as advanced by the CAPM. Klemkosky and Martin (1975) have shown that a significantly higher level of market risk is present in high beta securities in comparison with low beta securities. Therefore, a larger number of securities are required in a high risk portfolio to attain the same level of risk reduction as in a low risk portfolio. Martin and Keown (1977) have shown that the domination of a portfolio by either high or low betas will result in a misleading measure of the true risk of a portfolio. It was shown that securities having extreme beta values often have related covariances that are not attributable to the market as a whole.

Arnott (1980) analyzed a large group of securities to determine whether the price volatility conforms to groups or clusters such as: quality growth, utilities, oil and related, basic industries, consumer cyclicals. It was observed that the price movement of the utility cluster is largely influenced by variations in the interest rates, while the consumer cyclical cluster is more influenced by the state of the business cycle. Arnott (1980) showed that his clusters provided a 30 percent improvement over the use of beta alone to explain the correlation between the security's return with the market. It is suggested that the various other factors besides the five identified clusters will account for the total market

risk. Arnott (1980) concludes that only after all the market related factors have been fully removed can we identify the unique risk attributes of specific securities.

Banz (1981) observed that the risk-return relationship suggested by the CAPM did not hold for small firms. It was found that the smaller firms had to offer a significantly higher return than predicted by the CAPM to persuade investors to acquire such securities. Reinganum (1981a) revealed that the security returns for small firms were related to beta as well as the firm's earnings per share to its share price. This finding contradicts the CAPM which claims that only the beta value is a determinant of risk. Reinganum (1981) observed that portfolios with equal beta but different earnings/price ratios offered different returns. These results highlight the problems of estimating the risk of small firms which tend to have both low market values and higher earnings/price ratios. Roll (1981) has observed that lack of continuous trading in the securities of small firms may create a problem of obtaining comparable prices at the close of the trading period. Therefore, risk estimates for small firms may be substantially downward biased, and by including earnings/price variable a better risk estimate is obtained.

This section has presented some of the empirical evidence that raises doubts about the ability of the CAPM to accurately predict the true risk-return relationship in

the market for securities. The evidence suggests that beta is not an ideal measure of risk, and therefore, returns predicted on the basis of beta coefficients are not as accurate as suggested by the CAPM. However, the imperfections of the CAPM does not negate the underlying importance of this model. The various deficiencies of the CAPM serve to point the dangers of blind adherence to this model. The model does not permit a precise measurement of the required rate of return for particular securities. However, it does provide users of this model with a workable risk-return relationship which when used in conjunction with other investment criteria will enable practitioners to make more accurate investment decisions.

3.6 The Arbitrage Pricing Theory

The discussion in the previous section has shown that many of the tenets of the CAPM are not supported by empirical evidence. The Arbitrage Pricing Theory (APT) was developed by Ross (1976) to identify the equilibrium returns that would be offered by securities in a more complex world where there is more than one return-generating factor. The APT is based on the law of one price as it relates to security pricing. The shares of a specific company should have the same price on a stock exchange at a given time. If this is not so, the simultaneous action of selling the higher priced and buying the lower priced shares of the same company will enable an

astute investor to earn a profit with no risk and no investment outlay. Profits generated by such a transaction are called arbitrage profits, and the investor exploiting the situation is called an arbitrageur. Ross (1976) has utilized the law of one price to develop a different approach to pricing securities. The APT is based on the assumption that security prices will adjust so that no portfolio will be able to earn any arbitrage profits.

The CAPM assumes that security returns are a function of market returns and factors unique to the individual security. Ross (1976) proposed an equilibrium relationship for more complex situations where the security returns are explained by a number of macro factors:

$$R_{it} = E(R_i) + \beta_{i1}F_{1t} + \beta_{i2}F_{2t} + \dots + \beta_{ih}F_{ht} + \epsilon_{it} \quad \dots \text{Equation (6)}$$

where: R_{it} = annual return on security i in period t

$E(R_i)$ = expected return of security i in period t

F_1, F_2, \dots, F_h = common return-generating factors

$\beta_{i1}, \beta_{i2}, \dots, \beta_{ih}$ = sensitivity of security i to factors 1 through h

ϵ_{it} = unique influence of security i for period t

Equation (6) states that the actual return on a security i for period t is composed of its expected return $E(R_i)$ and the positive or negative influences associated with factors F_1, F_2, \dots, F_h which are common to many securities, and ϵ_{it} which is unique to security i . Each of the return-generating factors (F) are expected to influence different securities in different ways. For instance, factor one, F_1 may be related to the money supply in the economy, F_2 to changes in the inflation rate, F_3 to industrial productivity. β_{ih} is a measure of sensitivity of security i to the corresponding factor F_h .

Ross (1976) has stated that equation (6) is more representative of the complexities of the market equilibrium process. The APT proposed by Ross assumes that there are a limited number of factors (F) that influence security returns. The APT can be used to construct a portfolio of N securities whose returns are influenced by the various factors represented by:

$$R_{pt} = \sum_{i=1}^N X_i E(R_i) + F_{1t} \sum_{i=1}^N X_i \beta_{i1} + F_{2t} \sum_{i=1}^N X_i \beta_{i2} + \dots$$

$$\dots + F_{ht} \sum_{i=1}^N X_i \beta_{ih} + \sum_{i=1}^N X_i \epsilon_{it}$$

..... Equation (7)

where: R_{pt} = return for portfolio p during period t

X_i = percentage of total investment in security i

all other terms as before

By selecting the portfolio weights in a particular way, the portfolio can emphasize one or more of the return-generating factors. For instance, a portfolio can be constructed so that it has a high sensitivity to factors one and two, and a low sensitivity to factor three. Therefore, if a portfolio is well diversified, the influence of the unique factors ϵ_{it} would be small, because they tend to be independent from one security to another.

The basic assumption of the APT is that the arbitrage portfolio will have no funds invested, and that it has no risk. Therefore, if any security has no risk, then its return should correspond to the risk-free rate of return. Ross (1976) argues that if this is not so, and the return on a zero beta portfolio were greater than the risk-free rate of return, then arbitrage opportunities will be available. Investors will earn a positive risk-adjusted return by investing in such a portfolio having a zero beta. Investors will respond to this arbitrage opportunity by investing in the zero risk portfolio that offers excess returns. The action of the arbitragers will result in the price of the excess return portfolio to increase in relation to other portfolios, and there will be a corresponding decline in returns. This process will continue until the value of the risk-free portfolio will decline to the point that it will yield a risk-free rate of return.

The arbitrage portfolio can be constructed by making the following assumptions:

1. No systematic risk due to factor h on the portfolio.

$$\beta_{ph} = \sum_{i=1}^N X_i \beta_{ih} = 0 \text{ for all } h \dots\dots\dots \text{equation (8)}$$

where β_{ph} = beta of the arbitrage portfolio

This assumption implies that the total beta of the arbitrage portfolio is zero.

2. It is assumed that the portfolio involves no new investment i.e.

$$\sum_{i=1}^N X_i = 0 \dots\dots\dots \text{Equation (9)}$$

3. The portfolio contains a large number of securities so that

$$\sum_{i=1}^N X_i e_i = 0 \dots\dots\dots \text{Equation (10)}$$

Therefore, the beta for each return-generating factor in the portfolio is zero, and the portfolio weights are so constructed that the proceeds from short sales are just sufficient to make possible positive investments for the remaining securities in the portfolio. Furthermore, a large portfolio is constructed so that the effects of any unique factors are minimal.

4. The arbitrage portfolio will have an expected return of zero.

$$\sum_{i=1}^N X_i E(R_i) = 0$$

..... Equation (11)

This follows from the assumptions that the arbitrage portfolio (1) has no systematic risk, (2) has no new investment, (3) has no unsystematic or unique factors. Such a portfolio in equilibrium must yield zero return. If any positive returns are earned, the action of arbitragers will result in all profits disappearing.

Ross (1976) further developed the APT by showing that the individual security's expected return is equal to the summed products of its beta coefficients with the market prices for the different factor risks. This can be represented by the following equation:

$$E(R_i) = \lambda_0 + \beta_{i1} \lambda_1 + \beta_{i2} \lambda_2 + \dots + \beta_{ih} \lambda_h \dots \text{Equation (12)}$$

where: λ_h = market price for h th type of risk

β_{ih} = beta value of h th type of risk contained in security i

λ_0 = risk-free rate

A specific λ could be positive or negative and should be added to or subtracted from the security's equilibrium return. Any return greater than the risk-free rate is caused by the market's aversion to accept risk associated with a certain return-generating factor. Therefore, if λ_h is positive, it indicates that the aversion by the market for that factor will cause the equilibrium return for the security to rise. Similarly, if any λ_h is negative, it will lower equilibrium return for the security in which it is contained.

The assumption of the arbitrage portfolio having a multifactor return-generating process can be utilized to develop a multifactor SML which includes several complex factors in the equilibrium pricing process. Equation 12 can be regarded as a general form of the SML. When there is only one factor F_1 , the APT represented in equation 12 can be expressed as:

$$E(R_i) = \lambda_0 + \beta_i \lambda_1 \quad \dots\dots\dots \text{Equation (13)}$$

where: the variable λ_0 corresponds to R_F and λ_1 corresponds to $(R_M - R_F)$

Therefore, the APT can be regarded as more general and less restrictive than the CAPM. The APT does not require that all investors hold the market portfolio because it does not make use of the market portfolio concept for equilibrium pricing. The APT is based on the assumption that portfolio selection is based on choosing factors to eliminate arbitrage profits. Equilibrium pricing in the APT is attained by the law of one price applicable to the different portfolio combinations. Any group of securities containing the same composition of betas would be required to offer the same expected returns. Furthermore, the APT implies that every equilibrium will be characterized by a linear relationship between each asset's expected return and its risk loadings on the common return-generating

factors. The APT's major strength is that it explicitly accounts for several factors that may influence risky returns. Therefore, it is more realistic than the single factor approach of the CAPM.

A major weakness of the APT is that although it suggests that several factors are involved in the return-generating process, these factors are not explicitly specified. The APT does not define what factor 1 is, factor 2 is, and so on. The factors are identified by analyzing actual market returns by a statistical technique called factor analysis. Therefore, the practical use of the APT is minimized by the cumbersome computations to identify factors to be used in the return-generating process. The advantage of the CAPM is that only one "factor", the return on the market portfolio, is required for the return-generating process. Furthermore, the market portfolio or its surrogate index are well defined and readily available. This advantage of the CAPM over the APT probably accounts for the more widespread use of the CAPM by portfolio managers and other practitioners.

If the APT is to serve as a workable model, procedures for determining the return-generating factors must be established. Historical observation may enable us to identify and quantify the impact of the various factors that have influenced security returns in the past. Furthermore, financial and investment literature can assist

in determining to what extent security prices have been influenced by key factors such as changes in interest rates, rates of inflation, money supply, productivity of labour, national output, etc. Furthermore, factors that are most likely to influence investor expectations and market sentiments are important inputs that should be incorporated in the multifactor pricing model. A further complication is that not all variables that influence the specific factors are measurable. For instance, the influence of social and political trends are not easily measurable but nevertheless play an important role in the return-generating process.

3.6.1 Empirical tests of the APT

The first major empirical test of APT was undertaken by Roll and Ross (1980) using methodology previously used by Gehr (1975). The sample for this study was 1260 securities listed on the New York and American Stock Exchanges during the period July 1962 to December 1972. The data was split into 42 groups each having 30 securities. Roll and Ross (1980) showed that although there were several factors that influenced the returns earned by the various securities, between 3 and 5 factors played a predominant role. It was further shown that the most important factor influenced security returns by about 30 percent. Furthermore, all the other factors combined accounted for about 21 percent of the variability of security returns. These findings confirm the basic

assumption of the APT that there may be more than one factor (the market portfolio) to explain security returns. However, these results do not strongly contradict the CAPM which uses only the marketwide portfolio to explain the risk-return relationship. Roll and Ross (1980, p.1100) admit the weakness of the tests used, but conclude that the empirical evidence nevertheless supports the APT.

Reinganum (1981b) used factor analysis to test the validity of the APT. The sample consisted of 1457 securities that were listed on the New York and American Stock Exchanges during the period 1963 to 1978. Based on the evidence, Reinganum (1981) observed that the APT was not able to explain the several empirical anomalies of the CAPM. It was found that portfolios of small firms earned on average 20 percent more than portfolios of large firms, even after measuring risk with a three, four, or five factor model. Reinganum observes that while the empirical evidence is inconsistent with the APT, the results do not pinpoint the exact source of error of the multifactor model. Therefore, one cannot conclude from the evidence that the APT is an inadequate model for asset pricing.

Shanken (1982) has challenged the view that the APT is inherently more susceptible to empirical verification than the CAPM. The investigation by Shanken (1982) revealed that the results of the APT can be manipulated by an arbitrary grouping of a given set of

securities. A new set of returns associated with different securities will produce a new set of random variables as return-generating factors. Shanken (1982, p.1137) concludes that factor analysis is not a reliable technique to identify the factors that are relevant in pricing securities. Factor analysis determines statistical correlations and ignores the aggregate economic considerations. Shanken (1982) concludes that the APT is inadequate in that it precludes the expected return differentials between securities which it attempts to explain.

The pioneering empirical research relating to the APT by Roll and Ross (1980) has been critically re-examined by Dhrymes et al. (1984). The re-examination of the original Roll-Ross data resulted in several important conclusions emerging from the analysis. Firstly, the basic methodology of analyzing the sample population into small groups of securities is criticized by Dhrymes et al. The researchers observed that analyzing small groups of securities produces ambiguous results. Secondly, the indeterminate nature of factor analysis precludes the possibility to test directly whether a given "factor" is priced. Thirdly, the basic conclusion that there are three to five factors is questionable; the researchers showed that the number of factors observed depends on the size of the group of securities analyzed. Dhrymes et al. (1984) also showed that, when analyzing a 15 security group one

factor is detected; when analyzing a group of 30 securities, three factors are observed; with a group of 45 securities, four factors are detected; with a group of 60 securities, six factors are revealed; and a group of 90 securities, nine factors are detected. Dhrymes et al. have therefore questioned the finding of the APT which suggests that there are only three to five factors that measure common market risk.

In a reply to Dhrymes et al. Roll and Ross (1984) concede that their original evidence has shortcomings and therefore is not to be regarded as a definitive test of the APT. Roll and Ross (1984, p.350) have further conceded that their empirical evidence is to be regarded as first step which others could extend by constructive suggestions for improving the testing procedure. Jobson (1982) and Lee et al. (1983) have used multivariate linear regression models as an alternative method to test the APT. Jobson (1982) has shown that multivariate linear regression enables us to determine in advance the (k) factors to be used in testing the APT, and therefore the premium returns associated with each factor can be determined.

The empirical evidence of most of the earlier investigations have been against the claim that the APT is superior to the CAPM. However, refinements to the original APT model produced very interesting results. Cho (1984) employed inter-battery factor analysis which enables the

identification of factors that are common between two groups of securities. Cho (1984, p.1499) demonstrates that inter-battery factor analysis is able to detect five or six inter-group common factors that generate daily returns for two groups, and that these inter-group common factors do not depend on group size. Cho (1984) argues that marketwide common factors across all groups could be obtained by extending the methodology to include more than two groups. Cho (1984, p.1499) concludes that the APT should not be rejected, and that refinements to the existing model may yield practically useful results. Positive support for the APT is also provided by Chen (1983) who used cross-sectional risk-return relationship for drawing returns from days not used in developing factor sensitivities. They study explicitly tests for the residual size effect observed by Reinganum. Chen (1983) found no evidence of the size effect, and concludes that if size is an important determinant of returns it is captured by the APT factors.

The CAPM has been proposed as the principal measure of risk for the regulated electric utilities in the United States. Bower et al. (1984) have compared the use of CAPM and APT to estimate the cost of capital for two groups of utilities: electric and natural gas distribution companies. The sample consisted of a portfolio of all companies in these groups that traded on the New York and American Stock Exchanges from 1971 to 1979. Four factors

and associated factor sensitivity coefficients were used to measure risk and returns using the APT. Bower et al. (1984) found that the APT explained more of the variance in portfolio returns as a function of risk sensitivity than the CAPM. Furthermore, the sensitivity coefficients for portfolios for subperiods during 1971 to 1979 were closely correlated. The consistency in the estimate of factor scores and factor sensitivities for different sets of returns convinced Bower et al. (1984) that the APT is superior to the CAPM in explaining and forecasting return variations through time and across assets. Bower et al. (1984, p.1053) conclude that policymakers should not adopt CAPM as the sole standard for risk measurement and tariff determination. The APT should be given greater consideration in setting tariffs because the multiple factors of the APT provide a better indication of asset risk and a better estimate of expected return.

Although a considerable amount of empirical research has been carried out into the APT in the United States, this field appears to be neglected in South Africa. Page (1985) has attempted to establish the number of "priced" factors influencing security returns of 200 companies listed on the JSE during the period February 1973 to January 1982. The findings suggest that at least two factors determine security returns, rather than just the return on the market as predicted by the CAPM. Furthermore, the two factor APT model produced significantly better

explanatory powers than the CAPM in the ex post sense. Page (1985) employed factor rotation to identify the two factors influencing security returns on the JSE. It was observed that one of the rotated factors was composed exclusively of mining related shares while the other factor consisted mainly of industrial shares. These results are similar to the two factor "market model" identified by Gilbertson and Goldberg (1981). Page (1985) concludes that his findings suggest that the "macro-economic variables determining the return-generating process can be divided into those variables that influence the mining sector to a greater extent and those that affect the industrial sector to a greater extent." These results are exploratory and further research is necessary before these variables can be finally identified.

Sareewiwatthana and Malone (1985) investigated the risk-return relationship in the thin market of the Securities Exchange of Thailand (SET). The thirty most active securities whose prices were listed continuously on the SET during December 1978 through November 1982 were selected for analysis. The APT is used to test the risk-return relationship in the securities investigated. The results indicate that four common factors may be the determinants of returns in the SET. The cross-sectional regression analysis indicate that three of the four common factors appear to be relevant determinants in the variation in return on the securities in the SET during the time

period studied. If the APT is to be a useful model, the three common factors must be identifiable. Sareewiwatthana and Malone (1985, p.450) suggest that the three common factors might be a risk measure, a skewness measure, and some domestic or world-wide economic variables that affect security returns in the SET. The investigators compared the APT and the CAPM, and the APT was found to be substantially better with regard to the explanation of variability in share returns on the SET.

Solnik (1983) investigated the effectiveness of international diversification in the context of the APT by developing International Arbitrage Pricing Theory (IAPT). It was shown that the IAPT is a better alternative to the CAPM in explaining asset pricing in the international context. The CAPM is based on investor utility and this creates difficulties because utility can vary across national boundaries. The APT is not utility based and therefore, the IAPT only requires the existence of efficient markets, and that investors have homogeneous expectations on the returns generated by the different factors. The CAPM also has to contend with currency fluctuations and its impact on security returns. The problems arising from currency fluctuations do not arise in the IAPT. As long as investors hold homogeneous expectations, the same h -factors and pricing relationship will apply to all investors irrespective of their specific currency holding. If the IAPT is to be a viable and useful

technique, the number of common factors must be small in relation to the number of securities. Solnik (1983) suggests that the usefulness of the IAPT will be enhanced by identifying a combination of international factors common to specific types of securities and national factors affecting only domestic securities.

3.7 An evaluation of the CAPM and APT

The discussion in section 3.4.1 has shown that there is a controversy in financial management and investment analysis on whether the CAPM or the APT is the appropriate return-generating technique for asset pricing. The CAPM has been traditionally used in investment analysis and enjoys widespread acceptance. Nevertheless, several weaknesses in the assumptions of the CAPM have been highlighted by empirical investigators. The deficiencies of the CAPM has led to the development of the APT as an alternative return-generating model. The previous section has shown that to date there is no conclusive evidence to support the multifactor return-generating process advocated by the APT. Nevertheless, the usefulness of APT in both financial management and investment analysis is growing rapidly. On the basis of the available evidence it is difficult to make a judgement on the superiority of either the CAPM or the APT. Fogler (1982) compared the relative advantages and disadvantages of the CAPM and the APT and concluded that both models can be used to improve

investment analysis and portfolio management.

The CAPM assumes that the returns are generated by a single factor which consists of a marketwide portfolio and not several factors as suggested by the APT. Nevertheless, the CAPM assumption is not inconsistent with the returns generated by the factor model. The CAPM implies that the securities' expected returns are related to their beta coefficients:

$$R_j = R_F + \beta_j (R_M - R_F) \quad \dots\dots\dots \text{Equation (5)}$$

The APT assumes that security returns are generated by an h-factor model, where the beta value of security j will be related to its sensitivities to the h factors and the corresponding beta values of the h factors, which was previously shown in equation (12)

$$R_j = \lambda_0 + \beta_{i1} \lambda_1 + \beta_{i2} \lambda_2 + \dots\dots\dots + \beta_{ih} \lambda_h \quad \dots\dots\dots \text{Equation (12)}$$

Combining equations (5) and (12) gives the following:

$$R_j = R_F + \beta_{i1} (R_M - R_F) + \beta_{i2} (R_M - R_F) + \dots\dots\dots \\ \dots\dots\dots + \beta_{ih} (R_M - R_F) \quad \dots\dots\dots \text{Equation (14)}$$

where: λ_0 corresponds with R_F (risk-free rate)
 $\lambda_1, \lambda_2, \dots, \lambda_h$ corresponds with $(R_M - R_F)$

Therefore, if the assumptions of equilibrium pricing of both the APT and the CAPM are combined, equation (14) will represent the new equilibrium condition which incorporates the risk-free rate of return (R_F), the factors with corresponding beta values (β_{ih}), and the risk premium ($R_M - R_F$).

The combined CAPM-APT model will provide pricing relationships which the individual models do not provide on their own. The APT does not provide any information regarding the magnitude of the market price of risk (λ_h) for the different factors. However, the investor utility preference assumption of the CAPM will provide guidance on possible risk premiums. The CAPM suggests that there will be positive premiums for the sensitivity of those factors that move with the market and negative premiums for those factors whose sensitivity moves opposite to the market returns. Furthermore, the CAPM also predicts that the more (less) a factor moves with the market, the greater (lesser) will be the expected return.

The combined CAPM-APT model also suggests that the expected returns of a security may be related to several specific characteristics such as labour productivity, growth of the economy, interest rates, money supply etc. These characteristics may be related to one or more of the return-generating factors F_h . Therefore β_{ih} would reflect the risk propensity of such characteristics for

average investors and $\lambda_h = R_M - R_F$, would reflect the expected risk premium. Therefore, the return-generating factors will reflect the different characteristics that have an impact on security prices. It is suggested that the combined CAPM-APT is better able to explain the security pricing mechanism in the dynamic investment world. The two models combined will provide significantly more useful predictive abilities than the APT and the CAPM alone. Therefore, it is recommended that future research should be directed towards synthesizing the two theories of asset pricing. Such an approach is more likely to provide insight into equilibrium pricing than an exclusive reliance on either CAPM or the APT.

3.8 Portfolio theory and investment strategy

The aim of portfolio selection is to allocate investment funds among several securities in order to maximize investors' expected utility. Modern portfolio theory has provided several guidelines regarding the appropriate investment strategy to be pursued. In practice, there are many approaches to investment management. However, the actual investment tactics are variants of the active or passive approach. In recent years, investors have increasingly adopted an investment strategy that combines the active and passive approaches. The actual strategy used should be consistent with the objectives and constraints of investors.

The passive approach is based on the CAPM developed by Sharpe (1964), Lintner (1965) and Mossin (1966). An important concept of the CAPM is that the market portfolio should offer the highest level of return per unit of risk in an efficient market. Furthermore, the market portfolio represents a capitalization-weighted investment in all available risky assets. The passive approach assumes that trading actively in securities is not likely to consistently cover the higher management fees and transaction costs associated with active management. In the absence of share selection skills, market timing, or other active management skills, passive management should be preferred by rational investors. If these skills are not available, active management will simply incur high costs without producing compensating returns.

The rationale for a passive investment strategy is a belief that financial markets are efficient, and that at a given time security prices fully reflect all publicly available information relevant to security pricing. In such a market there would be little justification for actively searching for undervalued/overvalued securities. The proper risky portfolio to be held should be a well-diversified portfolio with borrowing or lending. Passive portfolios are characterised by a very low turnover, minimum transaction costs, minimal management expenses, and low levels of specific risk.

Investors in the United States of America who subscribe to the passive management strategy have increasingly turned to the use of index funds to reduce portfolio risk and to replicate the market return. The objective of an index fund is to match the performance of a particular stock market index by holding securities in the same proportions as those that comprise the index itself. For example, if Barlow Rand Limited accounts for 5 percent of the JSE Actuaries Overall Index and the intention is to have a portfolio which matches this index, then the portfolio would invest 5 percent of its assets in Barlow Rand, and so on. Once an index fund is established, there is no need to vary its composition except to make adjustments for reinvestment of dividend income and to adjust for changes in company capitalization arising from rights issues, share dividends, etc. Vertin (1983) has shown that few actively managed portfolios are expected to outperform the market. Therefore, index funds will be increasingly good performers over time.

Index funds have become a major force in the investment industry in the United States. Ehrbar (1976) has shown that a major impetus to the growth of index funds was provided by a severe decline in share prices during the 1973 - 74 bear market in the United States. Poorly-diversified portfolios in particular suffered substantial losses, and this led to a reevaluation of the investment worthiness of large institutional investors.

Further disappointing performances of institutional investors during the 1975 - 76 period resulted in several investment advisors recommending index funds. Langbein and Posner (1976) developed legal arguments to support investment in index funds. They suggested that index funds maximize diversification at a given risk-return level and minimize investment costs; therefore, it is imprudent for institutional investors not to make use of these funds. The widespread use of index funds by institutional investors in the United States reflects dissatisfaction over the performance of conventionally managed portfolios.

Active portfolio management is based on the notion that financial markets may offer risk-adjusted returns exceeding those provided by a passive approach by actively seeking securities that are not fully priced. The active investment strategy seeks to secure higher returns than those offered by a combination of a market index with borrowing or lending. The active strategy attempts to benefit from share selection and market timing or both. Selection refers to the process whereby securities are bought or sold. Timing refers to a strategy enabling one to decide when to buy or sell securities identified by the selection process. Generally, both selection and timing must be considered when pursuing an active strategy. Forecasting plays a crucial role in active portfolio management. The major task of an active portfolio manager is to forecast more accurately than the market. Active

portfolio managers consider the holding period of securities to be temporary. If the original expectations do not materialize, the portfolio holdings are replaced by another set of securities that are expected to outperform the market. Active portfolio management concentrates on investment in a small number of securities continuously traded in contrast to a large number of securities held on long-term consideration in a passive strategy.

Treynor (1976) demonstrated that it is rare for any investor to pursue a purely passive or purely active portfolio management strategy. In recent years, large institutional investors have realized the importance of combining active and passive strategies. These institutional investors recognize that it is not possible to consistently outperform the market. Therefore, they have developed strategies that combine both active and passive approaches to investment management. If the market is efficient, a large percentage of their holdings are held in a highly diversified portfolio that is designed to mirror the performance of the market. A smaller percentage of the total assets are placed at the disposal of aggressive investment managers who are seeking opportunities to outperform the market. Generally, the active portion of a portfolio has beta levels that are greater than that for the market, and returns that are less correlated with the market movement but on average are expected to outperform the market.

The actual investment mix between active and passive investment depends on the efficiency of the market, on the differential management fees, transaction costs, and how aggressively portfolios are managed. If an investor has acquired a unique evaluation technique that predicts overvalued/undervalued securities, then it is possible to consistently outperform the market. However, as soon as other investors become aware of this technique, the investor's ability to outperform the market will disappear. In developed markets, such as the NYSE, there are few opportunities to outperform the market. In such markets, the cost of aggressive investment is likely to exceed the benefits, thereby making a buy-and-hold strategy in broadly based portfolios a better alternative. The popularity of index funds in the United States of America is confirmation of the superiority of passive investment management in efficient markets. In smaller and less efficient markets, such as the JSE, there are more opportunities to exploit market inefficiencies, thereby increasing the scope of active investment management. In inefficient markets the large investors can be expected to have a large percentage of portfolio assets directed towards actively seeking underpriced securities. However, individual investors not having the resources or analytical ability will be better served by investing in diversified portfolios such as mutual funds.

3.9 Summary and conclusions

This chapter has traced the most significant developments in modern portfolio theory. The major contribution of Markowitz to portfolio theory is that individual securities are not risk independent, and that this interdependence between securities should be taken into consideration in portfolio construction and evaluation. The Markowitz concept of an efficient frontier revolutionized portfolio theory by demonstrating that both risk and return should be considered in portfolio evaluation. Despite the limitations of the original Markowitz model, it has laid the foundations upon which modern portfolio theory has developed.

The CAPM is the most widely used technique for security pricing and investment evaluation. The popularity of the CAPM is probably due to the simple risk-return relationship it provides. Furthermore, there is only one "factor", the return on the marketwide portfolio which is required for the return-generating process. Empirical research testing the CAPM raises serious doubts regarding its ability to measure precisely the required rates of return of particular securities. The deficiencies of the CAPM serve to highlight the dangers of an exclusive adherence to this model. It is submitted that despite its limitations, the CAPM nevertheless provides a workable asset pricing relationship.

The shortcomings of the CAPM has led to the development of the APT as an alternative asset pricing model. The APT is based on the assumption that security prices will adjust so that no portfolio should be able to earn any arbitrage profits. The APT suggests that more than one factor is responsible for determining security returns. By selecting portfolio weights in a particular way, the portfolio can emphasize one or more of the return-generating factors. A major weakness of the APT is that the various factors involved in equilibrium pricing are not specified and this limits the practical use of this model. Despite the popularity it enjoys in current research, there is insufficient empirical evidence to support the APT. Earlier research did not provide strong evidence to establish the validity of the APT. However, recent tests of the APT have incorporated several refinements to the original model and the empirical evidence suggests that the multifactor APT may provide useful practical applications for investment analysis.

Neither the CAPM nor the APT alone adequately explain the equilibrium pricing process in a complex world. Therefore, an exclusive reliance on either of these theories may lead to suboptimal investment decisions. The current controversy relating to these theories has highlighted the relative strengths and weaknesses of the individual models. It has been shown that by combining the CAPM and the APT, a more complex and more useful asset

pricing relationship can be established. Therefore, research attention should be directed towards synthesizing these theories so that a more reliable model may be available for investment management.

The different investment strategies that may be adopted by investors have been identified. The appropriate strategy is largely dependent on the degree of efficiency of the market concerned. The more efficient the market, the fewer the possibilities of consistently outperforming the market, and it may be advisable to acquire a well diversified portfolio and adopt a buy-and-hold strategy. In less efficient markets, more opportunities to outperform the market are present, and this suggests that an active policy of buying and selling securities that are not fully priced may yield superior investment returns.

CHAPTER 4BENEFITS FROM INTERNATIONAL PORTFOLIO DIVERSIFICATION4.1 Introduction

The purpose of this chapter is to provide the rationale for international portfolio diversification. It will be shown that the covariances between international securities and domestic securities of a specific country are expected to be very low. Therefore, an international portfolio should present substantial risk reduction possibilities. This chapter will review several empirical studies that have investigated the possible benefits from international diversification. It will be shown that empirical evidence strongly supports the view that international portfolio diversification is superior to both domestic diversification and diversification attained by multinational companies.

It will be shown that there are several obstacles to international diversification that have precluded a more active investment programme in foreign securities. First, it will be shown that despite the greater volatility in the value of foreign currencies, major developments in the foreign exchange markets has minimized foreign exchange losses. The existence of exchange control regulations in

South Africa precludes foreign portfolio investments by South African residents and companies. The recommendations of the De Kock Commission of Inquiry and its implications for foreign security investments will be investigated. It will be shown that the removal of exchange control is likely to have major consequences for the capital and equity markets in South Africa - investment funds can be expected to flow between the JSE and various foreign equity markets depending on the economic prospects in the different countries.

A major problem associated with investing in foreign securities is the dearth of financial information relating to foreign securities. The differences in accounting theory and practice in the United States, United Kingdom, and the other major countries will be discussed. It will be shown that variations in accounting standards prevailing in the different countries creates difficulties in the analysis and interpretation of published financial statements. However, it will be shown that various international organizations are addressing this problem and that international accounting standards are being compiled and could serve as a basis for financial reporting in the different countries.



An additional obstacle to international portfolio investment is that few stock markets possess the level of liquidity required by the large institutional investors. Nevertheless, it will be shown that the greater volatility of foreign stock markets creates favourable opportunities for investment. It will also be shown that the administrative problems and higher costs of owning foreign securities can be avoided by the use of American Depository Receipts. Finally, it will be shown that a method whereby the benefits of international portfolio diversification can be attained and yet minimize the associated problems is to invest in mutual funds and investment companies that specialize in international securities.

4.2 The advantages of international portfolio diversification

The different countries of the world differ substantially with regard to the natural resources they possess, their technological expertise, the quality of their labour force, and their social, political, and economic systems. As a result of these differences, we would expect the economies of the different countries, to a large extent, to be independent of one another. In particular, the economic cycles in different countries do not coincide. Therefore,

the corporate profits and share prices are to a large extent independent in the different countries. Such independence among foreign economies creates opportunities for investors to benefit by having internationally diversified portfolios. The low covariances of returns on equity investments between the different countries present an opportunity for investors to attain reduction in portfolio risk by including foreign securities in their domestic portfolios.

Solnik (1975) investigated the risk reduction possibilities of domestic and international portfolios by analyzing the risk-return relationships of eight countries : United Kingdom, Germany, France, Switzerland, Italy, Belgium, Netherlands, and the United States of America. Random portfolios were constructed for each country by increasing the number of domestic securities. It was observed that as diversification increased, the risk of a portfolio decreased in all countries but not proportionately. Beyond a certain level of risk reduction, the marginal reduction in risk becomes negligible as additional securities are added to the portfolio. This is confirmation of a well-known fact that the rate of return of a domestic portfolio will be highly correlated with the market as a whole. Solnik (1975, p.171) showed that the systematic (non-diversifiable) risk for a United States investor was 27 percent. It was also shown that European

security markets had a higher level of systemic risk. For instance, in the German market 44 percent of the portfolio risk could not be diversified away by enlarging the size of a domestic portfolio. Solnik (1975) showed that investors in the United States have a large securities market and therefore have more opportunities for diversification. Therefore, international investment diversification would be relatively more attractive for European investors than to investors in the United States.

Solnik (1975) also compared the risk-reduction possibilities of domestic portfolios with that of a combination of domestic and international securities. The gains from international diversification were substantial for all eight countries. In the case of the United States, it was shown that an internationally diversified portfolio would only be half as risky as a well-diversified portfolio of domestic securities. It was shown that the benefits of international diversification for European investors would be even larger in relation to their domestically diversified position. Solnik (1975, p.173) showed that while a relatively small incremental reduction in risk seems to be attained by increasing the size of a domestic portfolio to over twenty securities, substantial reduction in total risk can still be achieved for an international portfolio of up to fifty securities. Solnik (1975) also showed that an international portfolio that selected across

different industries attains a lower reduction in risk compared to an international portfolio that concentrated its holdings in a specific industry.

Lessard (1976) investigated the impact of international diversification on the riskiness and rate of return of portfolio investment. It was shown that the low positive correlation between national markets resulted in international diversification lowering the systematic risk and hence a reduction in total risk of the portfolio. Lessard (1976, p.37) further demonstrated that investors in all countries except the United States would suffer a substantial reduction in rate of return if they held only domestic portfolios. The reason for the United States investor suffering only a minor reduction in returns is that their domestic portfolio is very highly correlated with the world portfolio, mainly because the United States represents a large proportion of the world portfolio. Cohn and Pringle (1973) have presented a forceful argument for the removal of all barriers to international financial capital movements. They showed that international diversification lowers the slope of the capital market line thereby reducing the required rate of return, and consequently raising the market price of individual securities.

Several researchers have enquired as to the possible increase in the welfare of investors as a result of international diversification. There are two theories that have attempted to explain the pricing of securities in capital markets. The segmented market theory argues that the security markets are not integrated, therefore, security prices in each national market are not related to those in other countries. Lessard (1975, p.207) has shown that in a fully segmented market, the securities are priced in terms of their national, systematic risk, and this should enable a significant risk reduction through international diversification because previously undiversifiable risk at a national level would be diversifiable at an international level. Therefore, international diversification should produce superior results relative to domestic diversification.

The integrated market theory states that securities are not determined in the national context but are priced in terms of their global systematic risk. Therefore, the riskiness of a security is no longer solely determined in the domestic capital market. The influence of the national market must be seen in the context of its role in an international portfolio. Lessard (1975) has constructed a world portfolio which is a weighted portfolio of leading industrial countries of the world represented by

their respective market indexes. The weights used in constructing a world portfolio is the relative market capitalization of securities in each country. A major implication of the integrated market theory is that domestic diversification alone is not efficient. A domestic portfolio would be carrying an unnecessary risk and yet would not be compensated for it because the securities would be priced at lower international systematic risk and not in terms of the higher domestic systematic risk. Therefore, international diversification is clearly superior, there will be a reduction in the unsystematic risk of individual securities and thereby reducing the total portfolio risk.

Agmon (1972) studied the share price behaviour in the equity markets of United States, United Kingdom, Germany, and Japan. This study investigated to what extent equity prices in the non-United States countries respond to price changes in the United States. Agmon (1972, p.849) observed that there was no lagging in prices, and that price responses were almost immediate. This study concluded that the behaviour of share prices in the four countries is consistent with the integrated market hypothesis. Stehle (1977) compared the movement in security prices of the NYSE market index with the corresponding market indexes representing a group of

European countries and Japan. The regression analysis results did not support either the segmented market theory or the integrated market theory in respect to the pricing of shares on the NYSE. Lessard (1980) also studied the influence of world factors in the returns generated by a group of international securities. It was observed that both national and international factors influence security prices. Solnik (1977, p.510) has shown that differences in definitions of foreign exchange risks preclude the possibility of empirical evidence providing reliable answers regarding whether national or international factors apply in security pricing. To date, no conclusive evidence supporting the integrated market theory or the segmented market theory has been presented. Therefore, both national and international factors should be considered in portfolio construction.

4.3 Empirical evidence of possible benefits from international portfolio diversification

A pioneering study on international investments was undertaken by Grubel (1968). This study demonstrated the range of possible gains to United States investors from international investment diversification in 10 major countries during the period 1959 to 1966. The results were adjusted for risk arising from fluctuations in foreign

exchange variances between the United States dollar and currencies of 10 other countries. The rates of return, standard deviation, and correlation coefficient with the United States market index (NYSE) are shown in table 4.1.

Table 4.1 Rates of return and standard deviation from investing in foreign securities during 1959 - 66.

Country	annual return (percent)	Standard deviation	Correlation (R) with USA returns
United States	7,54	47,26	1,0000
Canada	5,95	42,19	0,7025
United Kingdom	9,59	65,28	0,2414
West Germany	7,32	94,69	0,3008
France	4,27	49,60	0,1938
Italy	8,12	103,33	0,1465
Belgium	1,09	37,56	0,1080
Netherlands	5,14	86,34	0,2107
Japan	16,54	92,52	0,1149
Australia	9,44	34,87	0,0585
South Africa (goldmining shares)	8,47	61,92	-0,1620

Source: Grubel (1968, p. 1304)

Grubel (1968) observed that Japan had the highest annual return and also the largest standard deviation during the study period. Of particular importance is the fact that Japan had a relatively low correlation with the United States market index, thereby making it an excellent candidate for international investment diversification for investors in the United States. Australia had the lowest positive correlation and also offered higher returns and lower standard deviation compared to the United States. Therefore, Australia would also be very suitable to United States investors seeking to diversify internationally. The index representing South African goldmining shares was unique in that it had a negative correlation with the United States market index. Therefore, an inclusion of goldmining shares in a portfolio of United States securities should produce a counter-cyclical effect on investment returns. This probably accounts for the popularity of South African goldmining shares to the large institutional investors in the United States. Grubel (1968, p. 1307) derived hypothetical portfolios by combining the securities of all 11 countries. It was observed that diversification among securities from all 11 countries enabled United States investors to earn higher rates of return and attain lower investment risk than could be obtained with a portfolio of domestic securities only.

Levy and Sarnat (1970) investigated the possible gains accruing from international diversification by analyzing the risk-return relationship for 28 major countries during the period 1951 to 1967. This study also revealed that Japan offered both higher returns and higher investment risk than the United States. An efficient frontier of the different countries revealed that the United States and Japan dominated the optimal portfolios, and the developed countries of Western Europe are virtually excluded. It was also revealed that a relatively high proportion of the investment in the optimum portfolio comprised developing countries such as Venezuela, New Zealand, Australia and Mexico. Levy and Sarnat (1970, p. 674) showed that despite the relatively low returns in the developing countries they are still useful additions to international portfolios because of their low covariances with the developed countries. Levy and Sarnat (1970, p. 673) showed that only when the United States investor diversifies his portfolio to include such countries as Japan, South Africa, and the developing countries of South America, and Asia that significant improvement in portfolio returns are realized.

Grubel and Fadner (1971) compared the degree of correlation between the returns of securities in the United States, United Kingdom, and West Germany during the period

1965 to 1967. This was done by comparing the correlation of profits among identical industries in the three countries. The results revealed that investment diversification between countries was more effective than investment diversification within the country. The correlation of returns was strongly influenced by the volume of importing and exporting between the countries. It was observed that the greater an industry's involvement in foreign trade, the more sensitive is its profitability to conditions throughout the world. By contrast, the profitability of an industry not involved in foreign trade is more influenced by domestic monetary and fiscal policies. Grubel and Fadner (1971, p.92) showed that the correlation of returns is an increasing function of holding periods and therefore, reduced gains from internationally diversified portfolios are likely for longer holding periods. Grubel and Fadner (1971, p.94) found that foreign exchange rates were relatively stable during the study period and had little influence on international investment returns.

Lessard (1973) investigated international diversification potential among a group of Latin American countries that were in a similar stage of economic development. Hypothetical investment portfolios for Colombia, Chile, Argentina, and Brazil covering the period

1958 to 1968 were constructed. In order to determine the magnitude of gains from diversification, historical performances of national and international portfolios were compared. Lessard (1973, p. 626) demonstrated that securities for each country were highly correlated with the domestic market index. However, the market component for each country was significantly independent of the market component for the other countries. These results show that contrary to the common assumption of portfolio managers, a great deal of diversification can still take place among developing countries in a single geographical area. Lessard (1973) concludes that a United States investor diversifying into these countries would derive even greater benefits, because movements in the economies of the two regions are largely independent.

McDonald (1973) investigated the potential benefits of international diversification for a group of French mutual funds during the period 1964 - 69. French mutual funds were selected for investigation because several funds have large exposure to international securities, especially securities listed on the NYSE. The investment performance of eight mutual funds was analyzed during the study period. It was shown that the exclusively domestic mutual fund Sliva France ranked last, and the most internationally diversified fund Soginter ranked first, in terms of performance evaluation.

McDonald (1973) showed that the domestic mutual funds were unable to consistently select undervalued French securities despite the considerable advantages enjoyed by fund managers in forecasting returns on these securities. However, the internationally diversified mutual funds derived additional benefits from international diversification, and were therefore able to outperform the domestic mutual funds. McDonald (1973, p.1179) concludes that as the French securities market becomes more efficient, the French Mutual funds' ability to profit from superior information on domestic securities will diminish, and this may induce French mutual funds to invest a greater percentage of their funds in international securities.

Bergstrom (1975) investigated the total long-term historical rates of return for 20 major stock markets including the NYSE, during the six-and half years ending June 30, 1975. All the returns were converted to United States dollars to reflect international diversification from the standpoint of United States' investors. During the study period the United States market ranked number 17 out of 20 securities markets. Only Italy, Australia, and the United Kingdom were not able to outperform the NYSE market index. During the study period the NYSE showed a compound rise of 5 percent per annum, while most other markets achieved significantly larger gains. Brazil, Hong Kong, South African goldmining shares, and Japan were the

best performers yielding compound annual returns in excess of 20 percent. Bergstrom (1975, p.32) investigated the returns for the same 20 stock markets for a sixteen-and-half year period ending June 30, 1975. It was shown that during this period the performance of NYSE lagged 16 of the 20 foreign security markets. Bergstrom (1975, p.36) demonstrated that the superior growth of securities markets in Japan, Brazil, Hong Kong, and Spain was due to the higher rate of real GNP experienced in these countries during the study period. It was also shown that the foreign earnings of United States multinationals grew significantly faster than their domestic earnings during the study period, confirming that these companies benefitted from having undertaken international diversification. Bergstrom (1975) concluded that no significant increase in economic growth in the United States was expected in the post-study period, therefore, investors may find international diversification more attractive than domestic diversification.

In analyzing the possible benefits of international investment diversification, previous empirical researchers have not investigated the effects of various institutional restrictions on the cost of foreign investment. This is a serious omission in that most countries have some form of control over the flow of investment funds into foreign countries. Guy (1978) has

examined the cost of exchange controls and their effect on the potential benefits of international diversification. This study examined how a sample of internationally diversified British investment trusts performed within the institutional environment of the sixties when British investors were subjected to very restrictive exchange controls. Firstly, the cost of overseas investment included a payment of the dollar premium; furthermore, all dividend or interest payments had to be converted into sterling at the official spot rate. Secondly, the value of the dollar premium fluctuated with the demand and supply of investment dollars and this created additional uncertainty for British investors. Thirdly, the "quarter surrender" rule applied to capital gains which acted as a tax on switching foreign investments, and which made an active investment policy unprofitable.

Guy (1978b) investigated the performance of a sample of 47 internationally diversified British investment trusts during the period 1960 to 1970 when the exchange controls cited above were in operation. The investment trusts were subject to the same restrictions on foreign investments as individual British investors. However, they could, to a certain extent, avoid these restrictions by making dollar loans with special permission from the Bank of England. The returns of the internationally diversified investment trusts were compared with random portfolios of

British and United States securities. Guy (1978b, p.432) demonstrated that the internationally diversified investment trusts compared unfavourably with the performance of hypothetical investment portfolios. However, the international investment trusts could still have outperformed portfolios consisting entirely of British securities.

In an earlier study, Guy (1978a), demonstrated that no British investment trust was able to significantly outperform the average returns obtained on the LSE during the period 1960 - 69. This finding suggests that during the decade of the sixties, the British investment trusts could have performed just as well by confining their investments to the LSE and that foreign investments did not provide any significant benefits. Guy (1978b, p.1433) concludes that the disappointing performance of the British international trusts was probably due to their following a suboptimal investment policy in which, rather than adopting a buy-and-hold strategy, they actively traded their foreign securities and paid the penalty of a high turnover tax. This finding is of particular importance to investors in countries such as South Africa where exchange control and other institutional restrictions apply to the outflow of foreign investment funds. The findings of Guy (1978b) suggests that the benefits of international diversification can still be attained despite the onerous costs of

institutional restrictions. In such situations, there are clear advantages of constructing an "international index fund" which adopts a buy-and-hold strategy.

Most of the earlier studies on international portfolio investment have revealed that there was little difference between the unadjusted and adjusted returns to reflect fluctuations of the currency in which foreign investments are held. This is probably due to the fact that during these earlier periods the exchange rates of the major currencies were relatively stable. In recent years, the currencies of the different countries have been allowed to "float" and therefore, have become very volatile. Therefore, a study by Bergstrom, Koeneman, and Siegal (1983) is of particular importance. This study investigated the historical annual returns that could have been attained through investments in international equity markets by United States investors during the 21 years covering 1959 - 79. Furthermore, this study made adjustments for the variation in exchange rates that occurred during the investment period. The distribution of the actual returns attained by investing in the 21 major countries are shown in table 4.2.

Table 4.2 : Adjusted and unadjusted returns from investing in foreign securities during 1959 - 79.

Stock market	Annual percentage returns to United States investor	Annual percentage returns in Domestic country	gains or (losses) from foreign exchange
	(1)	(2)	(3)
Hong Kong	22,2	19,3	2,9
Singapore	17,3	14,2	3,1
South Africa (gold shares)	17,0	21,8	(4,8)
Japan	15,4	13,2	2,2
Norway	13,3	11,3	2,0
Switzerland	12,4	7,2	5,2
Austria	11,5	7,7	3,8
Germany	10,7	6,2	4,5
Brazil	10,1	4,1	6,0
United King.	9,8	11,0	(2,0)
Australia	9,7	13,5	(3,8)
Sweden	9,0	7,9	1,1
Netherlands	9,0	5,5	3,5
Belgium	8,5	5,6	2,9
Canada	8,2	9,2	(1,0)
Denmark	7,8	6,5	1,3
Spain	7,6	17,1	(9,5)
United States	6,9	6,9	-
France	6,7	5,7	1,0
Italy	0,7	1,9	(1,2)

Source : Bergstrom et al. (1983, pp. 222 - 223)

The results in table 4.2 show that there is a substantial variation in the average returns earned on different equity markets. However, the variation in the rate of return for most European countries during the study period was not large. Of particular interest is the high rates of return in Hong Kong, Singapore, Japan, and South African gold shares. The inclusion of securities from these countries in a portfolio of United States securities would result in a significant increase in investor wealth. The results also show that the United States market (as measured by the NYSE index) was in an unenviable position of being 18th out of 20 world markets in terms of performance. Bergstrom et al. (1983, p.221) identified that the low rate of growth in real GNP in the United States accounted for the poor investment performance of this country in comparison with the majority of foreign countries. By way of contrast, Hong Kong, Singapore, Japan, and South African goldmining shares attained very high rates of growth during the study period.

The results presented in table 4.2 are calculated from the standpoint of a United States investor. They reflect the fluctuations in the relative rate of exchange between the United States dollar and the local currency. Column (2) reflects the average annual return accruing to a domestic investor in each country listed in the table. Seen from the standpoint of a United States investor

(column (1)), the gains or losses from foreign exchange are quite large, with gains outnumbering losses almost three to one. The results in table 4.2 also indicate that while the magnitude and, therefore, the importance to investors of exchange rate fluctuations has increased considerably in recent years, they are still much smaller than share price fluctuations. These results also indicate that the impact of foreign exchange fluctuations must be specifically accounted for if the true potential benefits from international portfolio diversification are to be determined.

The CAPM suggests that in efficient capital markets a portfolio that consists of the entire market represents optimal investment opportunities. However, the market portfolio is difficult to observe and construct because it is supposed to represent all assets in the world. The use of a domestic market index as a surrogate for the entire market may therefore understate the true risk-return possibilities available from a truly diversified portfolio. Ibbotson and Siegel (1983) have attempted to simulate the true market portfolio by constructing a World Market Wealth Portfolio (WMWP). The WMWP consists of a value-weighted combination of five major categories of assets : (1) equity share capital, (2) bonds (debentures), (3) cash, (4) real estate, and (5) investment in precious metals. The countries whose assets are

included in the WMWP are the United States, Northern and Western Europe, Japan, Hong Kong, Singapore, Canada, and Australia. The WMWP theoretically reflects the entire wealth of the world. The sum of all assets included in the WMWP does not represent the "market" in that several categories of assets are excluded from the portfolio, while at the same time certain assets are not real wealth but have been included in the portfolio. According to the CAPM the WMWP should have a beta of 1,0 and should represent each asset class in proportion to its prevalence in the world market - the ultimate index fund.

Bernstein (1983) investigated the potential benefits from international portfolio diversification available to United States investors by comparing the risk-return characteristics representing investments in domestic securities with that of the WMWP developed by Ibbotson and Siegel (1983). For comparative purposes the return on cash or risk-free securities in the United States were included in the analysis. The various categories of investment were studied for the period covering 1960 - 1980 and the results are shown in table 4.3.

Table 4.3 : Risk-return characteristics of World Market Wealth Portfolio (WMWP) and United States' marketable securities

	WMWP (Passive strategy)	United States market port= folio (Passive strategy)	United States Market Port= folio (Active strategy)	Risk-free returns
mean annual return	9,30%	8,04%	6,56%	5,84%
standard deviation	5,75%	10,20%	11,47%	2,39%
compound annual return	9,15%	7,69%	5,27%	5,82%
Alpha	0	- 3,44	- 6,99	4,30
Beta	1,0	1,75	1,45	0,17
correlation coefficient	1,0	0,75	0,53	0,16

Source : Bernstein (1983, p.241)

It can be seen from the above table that the WMWP outperformed the investments in United States marketable securities. The compound annual return of the WMWP is substantially higher than the corresponding return on domestic portfolios irrespective of the investment strategy used. Of particular interest is the observation that investors in the United States domestic portfolios could have attained superior results by adopting a buy-and-hold strategy instead of a policy of active trading.

Bernstein (1983, p.242) showed that both categories of United States marketable securities performed favourably with the WMWP during the 1960's. However, the United States securities performed poorly in several years during 1970's, and the subsequent recoveries were insufficient to make up the previous big losses. The results suggest that investing in United States securities provided insufficient diversification to sustain a stable level of returns. By contrast, the WMWP would have provided investors with stable earnings during the entire study period, and a collection of moderate but consistent returns are better than large but widely fluctuating returns.

Bernstein (1983) provided several possible reasons why the WMWP was able to outperform United States domestic portfolios. Firstly, foreign securities markets were growing much faster than those in the United States during the study period. Secondly, foreign real estate represented in the WMWP increased substantially in value during the study period. By contrast, United States portfolio managers concentrated on equity capital and fixed income securities, and therefore, failed to take advantage of the higher returns offered by real estate investments. Thirdly, gold denominated investments constituted a large percentage of the WMWP, and therefore, this portfolio obtained substantial benefits from the increasing price of gold during the study period. Furthermore, gold investments showed a very low correlation with the rest of the assets in the WMWP, and thereby helped to stabilize the return of this portfolio. Fourthly, international diversification protects the portfolio from downturns in the domestic economy, which in turn results in declining domestic security returns. International securities tend to maximize the portfolio's long-term rate of return, even though many year-by-year returns may be less than those available from domestic investments.

Solnik and Noetzlin (1982) investigated the different categories of risk confronted by a United States investor diversifying internationally during the period

1971 - 1980. The standard deviations were calculated to determine three types of risk : domestic risk, exchange risk, and total risk. It was shown that the exchange risk is always significantly smaller than the domestic risk of the respective stock markets. Furthermore, the total risk of investing in foreign securities is smaller than the sum total of the domestic and exchange risk. This is due usually to a weak or even a negative correlation between exchange risk and domestic risk. Solnik and Noetzlin (1982, p.14) reported that the exchange risk amounted to only 15 percent of the total risk involved in international equity portfolios. Solnik and Nemeth (1982) have demonstrated that the correlation between return on foreign exchange and return on foreign investments is usually low (close to zero), and therefore the difference between total risk and domestic risk should be small. This suggests that the importance of foreign exchange risk can easily be exaggerated in studies on international portfolio diversification.

Van den Honert (1984) has investigated the possible benefits from international investment diversification from the standpoint of a South African investor. This study covered the period February 1965 to January 1980, and consisted of 24 different securities. The securities comprised : seven different sectors of the JSE, the NYSE and the LSE, ten commonly quoted metals, and

five commonly quoted soft commodities. Van den Honert (1984) has demonstrated that in terms of returns only, the South African investor would have been well served by the JSE, with only silver, gold, sugar, and platinum being able to outperform the different sectors of the JSE during the study period. Van den Honert (1984) also showed that the two foreign stock exchanges and the soft commodities markets would have provided the best diversification opportunities for South African investors. The main attraction of investing in the commodities is that exchange rate fluctuations between the South African currency and the dollar/pound tend to counter the major movements in the commodities markets. Van den Honert (1984) further showed that the metal exchanges had limited diversification opportunities for a South African investor because the Metals and Minerals Sector of the JSE would offer similar returns. These results clearly indicate that a South African investor would have derived substantial risk and return benefits from international investment diversification over the 1965 - 1980 period if exchange control regulations had not been in operation.

4.4 Diversification benefits of multinational companies (MNCs) compared to international portfolio diversification

Ragazzi (1973) suggests that foreign operations are more profitable than comparable domestic operations and that this differential provides an inducement for MNCs to expand beyond national boundaries. Shapiro (1982) hypothesizes that for many companies becoming multinational is more a matter of survival than of choice, i.e. huge research and development expenditures, antitrust laws, domestic market saturation, and other factors may force a company to become a MNC in order to stay in business. However, this line of reasoning does not rule out the possibility of foreign operations being more profitable than domestic activities. Jensen and Meckling (1976, p.348) have shown that MNCs are larger than pure domestic companies, and the larger the company the larger the management (agency) costs. Therefore, foreign operations must be marginally more profitable in order to compensate the company for the higher agency costs of foreign operations.

Jacquillat and Solnik (1978) investigated whether the shares of MNCs have the same characteristics as internationally diversified portfolios. The total variability of returns of three portfolios were compared : 1) a portfolio of United States companies not involved in foreign operations, 2) a portfolio of large United States MNCs that had substantial foreign operations, 3) an internationally diversified portfolio of securities invested on major national markets. It was observed that the variability of returns measured by standard deviation of the United States MNCs is about 90 percent of the risk of a purely domestic United States portfolio. However, the risk of the internationally diversified portfolio is only 30 to 50 percent of the risk of the domestic United States portfolio. Although MNCs do perform some international diversification for the investor, the results suggest that MNCs are poor substitutes for international portfolio diversification.

Jacquillat and Solnik (1978) also investigated the share price behaviour of MNCs in the United States and eight Western European countries. They regressed the share returns of the MNCs on the various national stock market indices to evaluate whether the foreign factors had a significant influence on MNCs share price behaviour. The results clearly showed that only the domestic betas are significant, and on average they were close to one. The

foreign betas were found to be small and insignificant. Jacquillat and Solnik (1978, p.10) observed that the compound influence of the eight foreign countries explained less than two percent of the share price behaviour of United States MNCs. They conclude that international share price behaviour of the United States MNCs is negligible and there is not much difference between their share prices and typical domestic United States shares. Therefore, investing in the United States MNCs cannot be regarded as a direct substitute to international portfolio diversification.

The conclusions of Jacquillat and Solnik were disputed by Errunza and Senbet (1981) who argued that MNCs do have superior risk-return characteristics when compared to pure domestic portfolios. Errunza and Senbet (1981, p.402) demonstrated that in the presence of market imperfections in the product and factor markets, MNCs possess unique advantages over purely domestic firms because of their ability to benefit from these imperfections and in the process provide an effective method of indirect portfolio investment diversification. Errunza and Senbet (1981, p. 408) argued that:

If the United States market is well functioning, investors must accept a smaller equilibrium expected return on multinational stock than

otherwise equivalent but purely domestic stocks. In other words, they pay a price premium An international firm is not a costless financial intermediary. Moreover, since the diversification services provided by multinationals are already "priced out", attempts to verify these services through traditional performance evaluation techniques as well as through risk-return generating processes are unwarranted."

Errunza and Senbet (1981) tested the hypothesis that United States MNCs should derive excess market valuation attributable to the benefits of market imperfections arising from their international involvement. The investigators observed that the degree of international involvement of the MNCs is positively related to excess market value and is very significant after controlling for domestic market structure and risk variables during the study period. The performance of the United States MNCs was sub-divided into the periods 1968 - 73 and 1974 - 77. It was shown that the relationship between international involvement and excess market valuation was stronger during the 1968 - 73 period than the 1974 - 77 period. The reason for this is that the earlier period was characterized by United States restrictions on capital flows in comparison with the later period which was devoid of such barriers.

Bishara (1981) compared the performance of Canadian MNCs with those of Canadian conglomerates diversifying domestically and a hypothetical portfolio of internationally diversified securities. It was shown that during the 1965 - 76 study period the Canadian MNCs were able to outperform Canadian conglomerate firms with regard to both their profitability and riskiness. The results indicate that Canadian MNCs were more successful in diversifying away their unsystematic risk than conglomerate firms. Bishara (1981, p.49) showed that the superior performance of the MNCs relative to the conglomerate firms was due to the portfolio effect that results from the diversified business activities of MNCs where the economic cycles in the different countries in which they operate are less than perfectly and positively correlated. The performance of the Canadian MNCs were then compared with a portfolio of international securities. It was shown that the international portfolio was able to outperform the Canadian MNCs with regard to both profitability and riskiness. The superior performance of international portfolios is attributable to the fact that the undiversifiable systematic risk at a domestic level is to a certain extent diversifiable at an international level. Therefore, it is suggested that investors are more likely to improve their portfolio performance by diversifying into international securities than investing in MNCs.

Fatemi (1984) provided evidence on the rates of return realized by shareholders in United States MNCs compared to those of uninational (operating in United States only) companies (UNCs) during the period January 1976 - December 1980. A portfolio of 84 MNCs each with at least 25 percent of their annual sales generated from international operations was compared with a portfolio of 52 UNCs. Fatemi (1984) showed that: 1) the monthly returns of the two portfolios are statistically identical and disregarding risk, MNCs and UNCs provide their shareholders with the same return. 2) The monthly rates of return of the MNCs fluctuate less than those of the portfolio of UNCs. This suggests that corporate international diversification may reduce shareholders' total risk. 3) The average beta values of MNCs are significantly lower and more stable than those of UNCs, indicating that corporate international diversification reduces the degree of systematic risk. Further tests indicated that the higher the degree of international involvement, the lower the beta value. Fatemi (1984) concluded that MNCs provide their shareholders with the same risk-adjusted returns as those provided by UNCs. However, when MNCs operate in markets or products in which they do not have a competitive advantage, the shareholders experience negative abnormal returns.

4.5 Obstacles to international portfolio diversification

The discussion in the preceding sections has clearly indicated that international portfolio diversification offers substantial advantages over a strategy of investing in domestic securities only. It was shown that international portfolio diversification has the potential for reducing the portfolio risk and also increasing the expected returns. However, despite the clear advantages of international portfolio diversification, not many individuals or institutional investors are investing in foreign securities to improve portfolio performance. Hertzberg (1981) has shown that United States investors generally have a low exposure to international portfolio diversification. It was also shown that investors in Western Europe have traditionally invested more of their funds internationally than investors in the United States. Nevertheless, the total volume of funds invested in foreign securities is low in relation to domestic investments for all major countries. This suggests that there are several obstacles in international capital markets that limits the scope of investing in foreign securities. Several possible obstacles will be identified and evaluated in this section.

4.5.1 Foreign exchange risk

The fluctuations in value of a foreign currency can create uncertainty in the capital markets and this can have an adverse effect on the value of the securities concerned. Levy and Sarnat (1975) used the Markowitz model to derive an optimum investment portfolio made up of securities of the United States and Israel covering the study period 1951 - 73. During this period the Israeli currency was severely devalued because of the high rate of inflation prevailing there. Levy and Sarnat (1975, p.201) showed that the analysis of portfolio investment in nominal terms is misleading and that devaluation of the Israeli currency should be reflected by conducting portfolio analysis in real terms. Levy and Sarnat (1975, p. 203) demonstrated that when real rates of return were used for constructing optimal portfolios, Israeli securities would not be part of the efficient set available to United States investors. This suggests that, foreign exchange risks can influence the composition of efficient international portfolios significantly.

Biger (1979) investigated the effects of foreign exchange risk and its implications for international portfolio diversification. This study analyzed efficient portfolios in 13 major industrialized countries covering the period 1966 to 1976. The countries included in this investigation are shown in table 4.4.

Table 4.4 : Countries included in determining the effect of foreign exchange risk in constructing efficient international portfolios.

Australia	XJapan
Brazil	Netherlands
XCanada	Sweden
XDenmark	Switzerland
XFrance	United States
XGreat Britain	XWest Germany
Italy	

XEx post efficient international portfolios were constructed from the perspective of these countries.

Source : Biger (1979)

It was shown that risky assets were similarly priced across the 6 selected nations, which suggests that international capital markets are efficient. It was shown that Japanese and Australian securities were the most efficient in terms of risk-return characteristics. Even after taking into consideration the risk arising from foreign exchange fluctuations, it was shown that both Japanese and Australian securities were included in each

country's efficient portfolio. The foreign exchange adjusted returns were used to construct ex post efficient international portfolios from the perspective of the six selected nations : France, West Germany, Denmark, Canada, Great Britain, and Japan. It was shown that efficient international portfolios were superior to the efficient national portfolios of the individual countries. Biger (1979) concludes that fluctuations in foreign exchange do not play a significant role in constructing efficient international portfolios. This finding contradicts the Levy and Sarnat (1975) observation (when an optimum portfolio of United States and Israeli securities is constructed, the latter would not be part of the efficient set for United States investors).

Levy and Sarnat (1975) and Biger (1979) have analyzed efficient international portfolios using the Markowitz portfolio selection model, thereby ignoring the presence and influence of risk-free securities. Therefore, both these studies have ignored to test the validity of the CAPM in an international context. One of the assumptions of the CAPM is that only one currency exists. Grauer, Litzenberger, and Stehle (1976) have argued that if financial assets are freely traded and if risk-free assets are available, the CAPM is also applicable in the international context where several currencies exist. Grauer et al. (1976) have shown that investors evaluate

investment opportunities in real terms and are not influenced by foreign exchange risk if the capital markets are efficient. This is based on the assumption that participants in capital markets have homogeneous tastes and expectations. The price of real goods and services is, therefore, expected to be equal throughout the world and price changes are caused by changes in the country's monetary policy. Grauer et al. (1976, p.252) conclude that foreign exchange risk has no significant influence in the construction of an optimal world market portfolio. This finding confirms that the CAPM and also the separation theorem developed by Tobin (1958) are both valid in an international context.

4.5.1.1 Foreign exchange markets and exchange risks

The purchase of a foreign security requires the purchase of the currency in which the security is denominated. The currency transactions take place on foreign exchange markets, and this adds to the risk of investing in foreign securities. Most developed countries have well established foreign exchange markets enabling the purchase and sale of currencies with relative ease. The commercial banks in most countries play an important role in the supply and demand for foreign exchange. The foreign exchange departments of commercial banks provide facilities for customers to buy and sell foreign currency. The

foreign exchange market can be divided into two distinct categories. In the "spot" market, foreign exchange transactions are traded currently or on the spot. An investor can also protect himself against exchange risk fluctuations by the use of "forward" or futures market. In this market, an investor can buy a futures contract for the exchange of one currency for another at a specific future date and at a specific exchange ratio. These foreign currency transactions involve small transaction costs because of the large volume of business done in this market.

Jacob and Petit (1984, p. 845) have given two reasons why the foreign exchange risk component may not be detrimental to an investors' well-being as seems apparent from tables 4.2 and 4.3 in section 4.2. Firstly, investors are also consumers, and therefore, the loss in wealth due to the decline in a foreign currency's value may be compensated by a corresponding decline in the domestic price of goods and services imported from that country. The decline in the value of the dollar reduces the South African investor's investment in the United States, at the same time it becomes less expensive for a South African investor to purchase goods and services from the United States. Secondly, fluctuations in foreign exchange value may not be as risky as implied by the standard deviation of the exchange rates. The reason for this is that some of

the foreign exchange risk may be diversifiable by holding a mix of currencies that are not closely related to each other or the domestic currency of the investor.

Exchange rate fluctuations introduce uncertainty into international portfolio diversification because one currency may fluctuate uniformly in relation to all other currencies. For instance, if the South African rand is performing poorly relative to all other currencies, then exchange rate fluctuations increase risk because they result in all foreign investments performing poorly and thereby decreases the risk reduction possibilities of foreign investments. For example, without exchange rate fluctuations, the return on West German and Australian securities may be reasonably independent. Therefore, the inclusion of securities from both countries lowers the risk of a South African investor. However, if the exchange value of the rand is likely to move in the same direction against both countries and the fluctuations are large, then for a South African investor the securities of the two countries are highly correlated with each other. The argument presented here suggests that without hedging, currency risks can be reduced but not eliminated.

Reduction in foreign exchange risk can be achieved by hedging all transactions in forward or futures foreign exchange markets. A futures contract may reduce the

exchange risk associated with foreign investments, but this risk cannot be completely eliminated by hedging. Forward contracts can be undertaken to cover expected cash flows from foreign investments. However, if the actual cash proceeds are larger than anticipated, some foreign currency may have to be exchanged at the spot rate prevailing at that time. Furthermore, future spot rates usually cannot be predicted with complete certainty, and this will add to the total risk of foreign security investments. However, the "unhedgeable" risk is likely to be very small in relation to the risk exposure of fluctuations in security prices of domestic and foreign securities. Investment managers can take appropriate action to minimize the variations in exchange rates relating to currencies in which foreign securities are denominated. Therefore, exchange rate fluctuations are not a major obstacle to international portfolio diversification.

The high volatility in foreign exchange rates has resulted in increased attention paid to the management of foreign exchange risk by portfolio managers and others involved in foreign transactions. Various organizations are providing exchange rates econometric forecasting models that can assist in reducing foreign exchange risk. However, Goodman (1979) has shown that the predictive accuracy of most of the foreign exchange rates forecasting models is so poor that they are likely to be of little

value to the users of such service. The exposure to foreign exchange risk can be covered by the use of forward contracts or a combination of spot and money market transactions. However, Folks (1972) has shown that there is no clear answer to the cover/not cover paradigm and suggests that optimum level of uncovered exposure must be seen in the context of the risk preference of the investor. Shapiro (1975) has shown that the anticipated exchange rate changes can be used as a basis of selecting optimal sources of financing and thereby minimize exchange risk.

Jacque (1981) has shown that a major shortcoming of foreign exchange risk management is that it is focused exclusively on short-term decisions involving accounting exposure components of a firm's working capital. By contrast the longer-term dimension of foreign exchange risk management, such as long-term debt financing and debt refunding in a multicurrency world are generally ignored. Furthermore, researchers as well as practitioners generally limit their risk management by assuming a two-currency world (foreign currency in which the exposure is incurred and the reference currency in which financial statements are presented to shareholders). A serious shortcoming of this approach is that it ignores the diversification effect of holding a portfolio of exposures denominated in different currencies whose prices are correlated. Therefore, the

total risk of foreign currency exposure tends to be understated.

The Rockefeller Foundation sponsored a study on the functioning of the worldwide foreign exchange market with specific reference to the changes currently taking place and those anticipated in the future. Goedhuys (1985) reports that this study showed that the volatility of exchange rates have worsened in the past few years. Furthermore, it was observed that the worldwide investment activity by the large institutional investors has increased significantly in the past five years. These large institutional investors appear to be very aggressive and speculative in their foreign security investment and this has largely contributed towards the increased volatility of the foreign exchange market. Goedhuys (1985) also reports that in the construction of international portfolios, views on the outlook of individual securities tend to play a much larger part in investment decisions than the associated currency prospects. Nevertheless, portfolio managers are protecting their foreign investments by increasingly relying on methods of financing that will minimize foreign exchange losses. It is further stated that the market risk predominates over the currency risk, but the latter is receiving more attention of portfolio managers than in the past.

4.5.1.2 Exchange controls and exchange rate policy

A study by Guy (1978b) in section 4.3 has demonstrated that the existence of foreign exchange control can have a detrimental effect on the performance of internationally diversified portfolios. An efficient domestic foreign exchange market and freedom from exchange control are prerequisites for creating a diversified international portfolio. There have been major developments in exchange control and the market for foreign exchange in South Africa in recent years. This section will highlight these developments and evaluate its implications for international portfolio diversification by South African investors.

4.5.1.3 The market for foreign exchange in South Africa

Giddy and Dufey (1975) demonstrated that the foreign exchange markets in the major industrialized countries during the post - 1973 period can be regarded as efficient in terms of the EMH. However, this observation is not necessarily applicable to South Africa because of the institutional and environmental limitations of the local market. An important feature of South Africa's exchange rate policy is the official control exercised by the South African Reserve Bank over all foreign exchange transactions. All foreign exchange receipts must be sold

to authorized dealers, and all foreign exchange requirements must be purchased from them in accordance with imports and other transfers for which prior permission must be obtained from the Reserve Bank. The exchange rate policy in South Africa has changed substantially in recent years. This section will review the historical background of exchange rate policy in South Africa so that an assessment can be made of any deficiencies of the present system and appropriate recommendations for improvements can be suggested.

South Africa signed the Bretton Woods Monetary agreement along with other founder members in 1945 and thereby became party to the system of stable but adjustable par values from time to time. Nevertheless, provision was made within the agreement for a devaluation or revaluation of a currency in the case of fundamental disequilibrium in the economy (Goedhuys, 1982). A significant development of South Africa's long-term exchange rate policy was the governments' response to large capital outflows following the Sharpeville political disturbances in 1961. The imposition of Exchange Control Regulations of 1961 had far reaching implications for South African residents as well as non-residents.

The Financial Mail (1983) has shown that exchange control over residents was tightened, was extended to non-residents, and was reinforced by stricter import controls. The most important restrictive measure was the introduction of controls against the free repatriation of equity investment in South Africa by non-residents. Foreigners could now sell South African listed securities only for "blocked rands", which became transferable only after being invested in certain prescribed investments for a period of not less than five years. Very shortly afterwards a concession was made which enabled non-residents to sell their South African investments to other non-residents. Furthermore, emigrating residents whose assets exceeded the allowances granted by the authorities, left the balance behind in blocked rands. The blocked rand in effect became South Africa's second exchange rate.

The Exchange Control Regulations of 1961, as amended, precluded South African residents from acquiring foreign securities from income derived in South Africa. Therefore, any person or institution resident in South Africa will have to make application to the South African Reserve Bank for permission to acquire foreign securities. As a rule, exchange control permission is only granted to resident South African companies when making "direct" investment in a foreign country where some form of control is obtained over the foreign company concerned. In recent

years, the Reserve Bank has been very favourably disposed towards foreign investments by South African companies which are of strategic importance to the country i.e. where it promotes imports, exports, or where it strengthened South Africa's international business status. The usual requirement for approving such direct investments is that the South African investor finances the acquisition from overseas borrowed funds so as to minimize any possible drain on the country's foreign reserves. The present exchange control regulations prohibits investments by South African residents in foreign non-direct or portfolio investments. However, several large South African companies and institutional investors have accumulated large portfolios of foreign securities out of proceeds from foreign earnings. Nevertheless, the holding of foreign securities in South Africa is very small in comparison with the developed countries not constrained by exchange control restrictions.

In February 1976, the exchange control regulations were partially relaxed and this enabled free and direct transferability of the blocked rands into "securities rand". Nevertheless, severe restrictions to the exchange control regulations still remained. Neither immigrants who had been in South Africa longer than three years, nor ex-residents still holding blocked rands could automatically convert these balances into securities rand.

Furthermore, the securities rand rate was trading at a substantial discount to the official exchange rate. Tew (1982) showed that during the sixties, the Bretton Woods system of stable exchange rates ceased to be functioning effectively. South Africa experimented with various measures in the world of floating currencies, switching the international currency link several times between the dollar and the pound and even experimented with independent managed float.

It became apparent to the South African authorities that the existing methods of exchange rate determination was largely influenced by the vagaries of the currency to which it was linked or by intermittent devaluations and revaluations of foreign currencies. To remedy the situation, a Commission of Inquiry (De Kock Commission) was appointed to investigate three broad areas, namely, the money market, the foreign exchange markets, and monetary policy. The De Kock Commission (1978) interim report identified several problems with the foreign exchange policy in South Africa. The basic weakness of the exchange rate system was the absence of an active and competitive foreign exchange market in South Africa. It was shown that the South African Reserve Bank not only determined the rand-dollar exchange rate but also prescribed the buying and selling rates at which banking institutions had to deal with their clients. In effect, the South

African foreign exchange market was subject to a form of price control. Furthermore, the Reserve Bank acquired a large proportion of the foreign currency inflows and assumed the role of "price leader" in the local foreign exchange market.

The De Kock Commission (1978, p.15) also cited the deficiency in the spot foreign exchange market arising from the artificially high spreads between buying and selling rates charged by authorised currency dealers in South Africa. It was shown, that by international standards, these spreads were relatively large, and resulted in substantial profits for authorised foreign exchange dealers in South Africa. The relatively wide and fixed spreads rendered the foreign exchange market in South Africa inefficient. Firstly, it resulted in increased costs for both buyers and sellers of foreign exchange and thereby decreased the attractiveness of dealing in foreign transactions. Secondly, the wide margins also had the effect of diverting foreign exchange dealings involving large transactions to overseas exchange markets where narrower margins prevailed.

Besides the shortcomings of the spot foreign exchange market, the De Kock Commission (1978, p.15) also found serious weakness in the forward exchange market. Prior to 1979, forward buyers as well as forward sellers of

foreign currency were subject to a one percent premium above the prevailing spot rate. The forward exchange rate was artificial in that it bore no relationship to the interest rate differentials between the different countries, and was unrelated to the demand and supply factors. Furthermore, forward cover was available only for transactions involving goods and related services. Portfolio managers were precluded from obtaining forward cover for the repatriation of their foreign investments, and this increased the risk of investing in foreign securities. This in conjunction with exchange control has largely contributed to the absence of foreign securities in the portfolios of South African investors.

The De Kock Commission (1978, p.17) reported that the existing exchange control procedures were not effective in protecting the country's official reserves and were being circumvented both legally and illegally in several ways. It was shown that direct exchange controls tend to break down when subjected to stress and when they are really needed. It was further stated that exchange control procedures are an inefficient way of rationing the available foreign exchange among users in normal times. Furthermore, the administrative distribution of foreign exchange is less likely to lead to an efficient allocation of a country's resources than a distribution determined by market forces.

An essential part of both the long-term and short-term recommendations of the De Kock Commission (1978) was the need to develop a more active and competitive spot and forward foreign exchange market in South Africa. From January 1979 the Reserve Bank started to quote exchange rates for the rand on a daily basis. The Financial Mail (1982a, p.751) reports that changes in the exchange rates became more frequent and smaller, and the general trend of the rand seems to be following the country's underlying economic fundamentals quite closely. Under the new system that emerged, following the first interim report of the De Kock Commission, the forward rate began to reflect to some extent the differential between the United States interest rates and those in South Africa. However, the Reserve Bank continued to market the country's gold output, which constitutes a major part of South Africa's foreign exchange earnings, and continued to pay the mining houses in rands. Therefore, the Reserve Bank still continued to exercise a dominating influence on the foreign exchange market. Furthermore, the lack of integration between the spot and forward markets precluded the attainment of a market-determined exchange rate locally.

On 7 February 1983, Horwood (1983a) announced that the South African Reserve Bank had abolished exchange control over non-residents. With it disappeared the financial rand and the dual exchange rate system as it existed in one form or another since exchange control over non-residents was first introduced in South Africa in 1961. Foreign investors were now free to invest or withdraw funds from South Africa, either of a direct or of a portfolio investment nature, without obtaining prior approval from the Reserve Bank and, as before, all current income earned on such investments was freely transferable from the country. The Horwood (1983a) announcement was important in that it resulted in the freeing of the financial markets, but is still left a major part of the exchange control intact. Although there were major concessions on tourist and business allowances, the main exchange control over residents was retained.

Horwood (1983b) announced that from 5 September 1983, the Reserve Bank will pay the South African goldmines in dollars instead of rand for gold supplied to it. The mines were required to sell the dollar earnings to authorised foreign exchange dealers. It was further announced that the Reserve Bank will no longer quote a spot exchange rate but will influence the exchange rate by intervention in the foreign exchange market. Horwood (1983b) also made several announcements to encourage the

development of an efficient foreign exchange market in South Africa. Firstly, it was announced that the forward exchange cover provided by the Reserve Bank to authorised exchange dealers will be phased out over a period of three years and will fall away on 31 August 1986. Secondly, any banking institution which sells forward cover to its clients will be required to buy the required currency in the spot market. In this way, forward exchange transactions will influence the spot exchange rates and the two markets will be effectively integrated.

The preceding discussion has shown that the monetary authorities have come a long way towards the creation of a market-related foreign exchange market in South Africa. However, there are institutional limitations that have prevented a more efficient market for foreign exchange in South Africa. Semadeni (1984, p.94) has shown that a major shortcoming of the local exchange market is that it is very small by international standards, and the rand is not traded internationally on a large scale. Furthermore, the local foreign exchange markets operate during office hours only and this creates liquidity problems. Goedhuys (1982) has shown that the Reserve Bank deals with authorised dealers in dollars only. Therefore, the dealers are required to approach overseas markets to convert dollars into other foreign currencies. Because of the great distance of South Africa from all other major

foreign exchange markets, local dealers face high operating costs on relatively small turnover. As a result, the spread between buying and selling rates for non-dollars is more than double that for United States dollars. Therefore, operators in the foreign exchange market are paying much higher transaction costs than those in the developed countries. The higher foreign exchange costs and the poor liquidity can be a major obstacle for investors in foreign securities. Therefore, the creation of a larger and more efficient market for foreign exchange could facilitate international portfolio diversification in South Africa.

In May 1985, the De Kock Commission released the final report of their exhaustive study of monetary system and monetary policy in South Africa. In line with the basic philosophy of the two interim reports, the final report reemphasises the need to establish a market-related monetary policy in South Africa. The Commission sketched the progress towards abolishing exchange controls arising from the recommendation in the interim reports, namely, the relaxation of exchange control over non-residents. The De Kock Commission (1985) final report recommended that the remaining exchange controls over residents be substantially relaxed and simplified. However, the alternative of completely abolishing exchange controls was not recommended. It was suggested that the recommended

approach would ultimately lead to either the complete phasing out of exchange controls or the retention of a limited set of precautionary controls. The De Kock Commission (1985, p.133) gives the following motivation for further relaxation of exchange controls in South Africa:

" In reaching this decision (the Commission) took special cognisance of the political uncertainties in South Africa. It was also influenced by the realisation that it will still take some time for an active, competitive and generally efficient forward exchange market to develop in South Africa. In these circumstances it was judged that the complete abolition of all remaining exchange control at this stage might produce unacceptable, even though temporary, disruption in the form of some combination of undue downward pressure on the reserves and/or the exchange rate, undue upward pressure on interest rates, and declines in share prices and real estate values."

The De Kock Commission (1985, p.134) recommended that the existing liberal application of exchange control relaxation in respect of direct investments by resident South Africans in foreign companies be further relaxed so that such acquisitions become automatic provided they meet the established criteria. This recommendation is a major

breakthrough for companies such as Barlow Rand, Anglo American Corporation, Liberty Life, etc. who are actively involved in take-over of overseas companies. Under the existing exchange control regulations these companies require approval from exchange control authorities before a take-over deal can be finalised. As secrecy and time are of essence in take-over negotiations, the existing exchange control regulations severely hamper South African companies in making direct investment in foreign companies. If the Commission's recommendation in this regard is accepted, approval will be a formality and this will greatly facilitate foreign take-overs by South African companies.

The De Kock Commission (1985, p.134) also recommended a progressive relaxation of exchange control over foreign portfolio investments by South African residents. The Commission recommended that initially registered insurers, pension funds, and mutual funds be allowed to invest 10 percent of their annual cash inflows in foreign securities approved by the Registrar of Financial Institutions. The De Kock Commission (1985) also recommended that in due course such provisions should be extended to financial institutions and corporate bodies such as mining houses. The Commission also recommended that eventually the prohibition on foreign portfolio investments be extended to individuals and non-corporate bodies. It is believed that this could be accomplished for

instance, by allowing each individual to make annual foreign investments up to a certain amount without approval. The De Kock Commission did not specify any time period but suggested that the state of both the balance of payments and the domestic economy must be conducive for the implementation of these relaxations.

The De Kock Commission (1985) also investigated the prescribed investment requirements of institutional investors in South Africa. In terms of this requirement, institutional investors are required to invest a certain percentage of their assets in government stock and other gilt-edged securities. These compulsory investments create a captive market for public sector borrowing at rates of interest that frequently, and especially in times of inflation, have not resulted in a "real" return. The subsidisation of public sector borrowing is in effect borne by beneficiaries of insurance policies and pension rights. Furthermore, prescribed investments also cause a lack of investment flexibility in that institutional investors have little say regarding the amount and the timing of funds to be invested in prescribed investments. Prescribed investments distort the allocation of scarce resources in the sense that the public sector may be subsidised at the expense of other market participants.

The De Kock Commission (1985,p.19) also recommended that the prescribed investment regulations be withdrawn at some future date. The Commission reported that these regulations have had harmful economic consequences, and they are no longer necessary either to ensure the solvency of the institutions or to finance public sector spending. The institutional investors have long argued that South Africa's long-term interest rates have been artificially low due to the prescribed assets requirements and exchange control regulations. In particular, it has been argued that long-term rates in South Africa's capital markets have not provided satisfactory real rates of return to investors. This is unsatisfactory, considering that real rates of return on long-term funds in the developed countries are currently averaging 5 percent. Nevertheless, institutional investors are obliged to divert funds into prescribed investments despite the availability of more attractive investments. The eventual removal of these constraints should therefore have the effect of raising yields on long-term securities to more competitive levels, moving closer in line to the yields prevailing in the developed countries.

It is submitted that these measures are likely to have major consequences for the investment scene in South Africa. In recent years, the main attraction of the JSE has been the unsatisfactory real rates of return prevailing

in the capital market. Satisfactory real rates of return on capital market securities are likely to divert funds away from the JSE. The low yields on most "blue chip" equities is likely to assist in the trend. It is suggested that investors and institutional investors in particular are likely to give greater consideration to investing in the capital markets in view of the satisfactory risk-return characteristics it would offer. The development of the capital market in turn is likely to lead to a better allocation of funds in the South African economy. It is submitted that the additional flow of funds into the capital markets will be more conducive to economic growth than the current "paper chase" on the JSE.

The De Kock Commission (1985) recommendations relating to the relaxation of exchange controls for South African residents is a recognition that the existing measures are inefficient in rationing available foreign exchange among various domestic users. The Commission is of the opinion that market forces are more likely to allocate foreign exchange efficiently. Furthermore, the recommendations of the Commission are merely the first step towards the ultimate system in which foreign exchange allocation is left entirely to market forces. Nevertheless, it is submitted that the Commission's recommendations are likely to have far reaching implications for South African citizens. The financial

media in South Africa has reacted favourably to the proposed exchange control relaxations. Ryan (1985) reports that most major insurance companies have indicated a desire to invest in foreign securities when the recommendations of the De Kock Commission becomes law. It was reported that the annual cash inflow of the institutional investors is currently nine billion rands, and therefore, there is the potential to invest up to 900 million rands in foreign securities. It is expected that institutional investors will seek foreign securities to improve the risk-return characteristics of their portfolios. However, it is unlikely that the institutional investors will immediately make large investments in foreign securities as they may not have sufficient knowledge of foreign securities markets. Furthermore, their liabilities to investors are denominated in South African currency and they are unlikely to make very large foreign investments.

The existing exchange controls have forced the institutional investors to invest in local equities. Various market observers such as the Financial Mail (1982b, p. 1018), have commented on the weight of institutional funds argument (which states that given the restricted size of the local equity market and the enormous cash flows of the institutional investors seeking investment opportunities, there is a tendency for share prices on the JSE rising to artificial levels). The Financial Mail

(1984) has also indicated that there is a shortage of "blue chip" and other categories of shares sought by the institutional investors, resulting in a limited marketability of better quality shares traded on the JSE. It was also shown that the turnover of shares on the JSE, as a percentage of market capitalization, was only 6 percent in the year 1982. The corresponding figures for the United States and the United Kingdom were 35 and 34 percent respectively. It is submitted that the limited marketability of better quality shares has further contributed towards the artificial equity prices on the JSE.

The weight of institutional funds argument is not strictly valid in that artificially high prices cannot be maintained in the long-term; there are periods when major downward corrections take place such as those witnessed in 1969 and 1976. Nevertheless, the weight of institutional funds is likely to contribute to artificial equity prices in the short-term. The recommendations of the De Kock Commission (1985), when implemented, are likely to have some impact on JSE prices. It is reasonable to expect that institutional investors with their large portfolios would take advantage of the opportunity to invest in foreign securities. This will possibly enable them to attain balanced portfolios, increase return and reduce portfolio risk, and benefit from currency hedging. The outflow of

institutional funds into foreign securities will to some extent stem the flow of funds into the JSE and consequently remove the artificial level of prices prevailing.

The De Kock Commission (1985, p.132) also showed that exchange control has at times contributed to inflation and general economic instability. It cited the 1979 - 83 period during which the gold boom and the balance of payment surplus contributed towards a "bottling up" of funds in the South African economy; an excessive rise in the money supply, and artificially low levels of real interest rates resulted in a further flow of funds into the JSE, with a subsequent rise in equity prices. The De Kock Commission (1985, p.133) showed that during periods when the balance of payments position is in a surplus, a net capital outflow (such as investment in foreign securities) may be desirable in order to prevent an undue appreciation in exchange rate or excessive rise in money supply. Alternatively, when the balance of payments is in deficit, a capital inflow, attracted by high interest rates and realistic exchange rates, may be beneficial for South African investors. Therefore, exchange controls have indirectly contributed towards a decline in real interest rates and artificially stimulated equity values on the JSE. The De Kock Commission (1985,p.3) recognised the various distortions in the interest rates which undermine the efficient working of the financial markets. Therefore,

it makes several recommendations leading to the attainment of realistic and market-related interest rates in the South African financial markets.

It is submitted that the various recommendations of the De Kock Commission (1985), when implemented by the authorities, will probably create an efficient financial market in South Africa. These recommendations are likely to have far reaching implications for investors in South Africa. Firstly, the attainment of market-related interest rates will result in a more efficient flow of funds between the equity market and the capital market, investment funds flowing into the JSE when the interest rates are low, and vice versa when interest rates are high. Secondly, the abolition of prescribed investments by institutional investors is likely to contribute towards market-related interest rates for government and gilt-edged securities, which in turn will facilitate the greater mobility of funds between capital market securities and the equity market. Thirdly, the partial relaxation of exchange control relating to portfolio and non-direct foreign investment will create a more efficient equity market in South Africa. Equity prices on the JSE will probably reflect the underlying fundamentals of the South African economy. Depending on the state of the economy and prospects for listed companies, investment funds can be expected to move between the JSE and the various foreign equity markets.

This will enable South African investors to reap the benefits of international portfolio diversification.

The South African authorities have already set in motion the implementation of the first and second interim reports of the De Kock Commission of Inquiry. The State President and various leading government officials have approved in principle the final report of the De Kock Commission. It would seem that South Africa is well on the road towards a basically market-related economy, with minimal government interference in the market mechanism.

The recommendations of the De Kock Commission received a severe setback with the announcement of a four-month moratorium on foreign loans, reimposition of exchange control on non-residents, and the reintroduction of the financial rand that come into effect on 2 September 1985. These measures were imposed as a result of a capital outflow following the declaration of the State of Emergency in South Africa. It would seem that the existing exchange control regulations are unlikely to be relaxed until political stability (as perceived by foreigners) is restored in South Africa. A gradual process of dismantling exchange controls for both residents and non-residents is appropriate in view of the limited foreign exchange reserves and the possible disruptive effects of a complete abolition. The most opportune moment of phasing

out exchange control would include a healthy surplus in the balance of payments and a strong exchange rate value of the rand. Therefore, it is submitted that the authorities institute an orderly process of abolishing exchange controls in line with the strengthening of the domestic economy and favourable political developments.

4.5.2 Availability of investment information

A further problem associated with investing in foreign securities is the dearth of information relating to foreign securities. The situation is further complicated by the domestic investors' lack of familiarity of the language, legal, cultural, accounting standards, and other institutional characteristics prevailing in a foreign country where an investment is contemplated. The increase in international portfolio investment has highlighted these problems and serious attempts are being made to minimize them. It is generally agreed that the most important means of corporate communication with shareholders is the annual financial report. The extent of disclosure adequacy in the annual financial statements may be a major determinant in the quality of investment decisions.

In recent years, several studies have been conducted into the usefulness of annual financial statements in decisions to invest. The findings of these



studies suggest that individual investors and institutional investors make varying use of company financial statements in making investment decisions. Lee and Tweedie (1975) observed that the majority of individual investors (69 percent) do not regard the annual financial reports as the most important source of investment information. There was a tendency for a large group of individual investors to skim through the annual reports. Financial press coverage was considered to be an important source of information in evaluating investments. Furthermore, economic prospects of a company was considered to be the most important source of information. Chenhall and Juchau (1975) observed that only 30 percent of a group of individual investors rated annual financial statements as the most important source of information in investment decisions. It was also observed that information, both specific and non-specific to a company, which is not disclosed in the annual financial statements, was accorded very high ranking in decisions to invest.

Anderson (1981) used a questionnaire to determine the usefulness of annual financial statements to a group of institutional investors in Australia. It was observed that institutional investors, when making investment decisions, ranked annual financial reports as their most important source of information, followed by stockbrokers' advice, and company visits. This finding suggests that the financial expertise of the institutional investors enable

them to make greater use of financial reports than individual investors. However, financial statements retain their significance when it is realised that other information sources used by investors will still require analysis of financial statements together with economic and capital market information. It is submitted that financial statements play an even more important role in evaluating foreign securities. A prospective investor in foreign securities is likely to have limited access to information that is not disclosed in the annual financial statements of a foreign security i.e. investment advisory services, stockbrokers' opinion, the news media etc. Therefore, despite their limitations annual financial statements assume added importance in evaluating foreign securities.

A South African investor acquiring foreign financial statements is likely to experience problems in interpreting the data received because of the divergent financial reporting standards used in the different countries. Several investigators have stressed the need to establish uniform accounting systems so that the usefulness of annual financial statements to investors and other users is enhanced. Aivazian and Callen (1983) have demonstrated that standardised accounting systems at a national level may convey substantial benefits to investors. It was further shown that it is in the self-interest of the firm to disclose sufficient and standardised information that is

readily understood by shareholders. To the extent that information is not provided or not standardised, shareholders will perceive the company to be riskier. To compensate for the additional risk, shareholders will demand a higher return, thereby increasing the company's cost of capital.

The differences in accounting standards at a national level creates difficulties in the interpretation of results by investors and other users of financial statements. However, these difficulties are insignificant when compared to the variations in accounting standards found in the different countries. A South African investor, for instance, will experience great difficulty in comparing the performance of a Japanese security with a South African security. An evaluation of an overseas security can be made only to the extent that the investor is aware of the accounting standards that are used in preparing the financial statements. This problem has been highlighted by several investigators [Barrett (1976), Parker (1977)], and as a result much attention has been devoted by various national and international organisations to overcome the difficulties of diverse accounting standards. Nevertheless, a domestic investor must make suitable adjustments for the different accounting and auditing standards when analyzing foreign financial statements.

Parker (1977) has shown that accounting theory and practice with regard to consolidated financial statements differ considerably in the different countries, even in such advanced countries such as the United States, West Germany, France, United Kingdom, and the Netherlands. The techniques of consolidation also varies widely in the different countries. The pooling of interest method of accounting for mergers is rarely used outside the United States. There is also considerable diversity in the use of equity accounting for consolidation in the various countries. Parker (1977) has shown that, generally, consolidation of financial statements has not developed rapidly in Western Europe. It is suggested that the holding company and control concepts have not assumed the same level of importance in Western Europe as it has in the United States and the United Kingdom.

Barrett (1976) studied the financial reporting practices reflected in the annual reports of seven countries: United States, Japan, United Kingdom, France, West Germany, Sweden, and the Netherlands, covering the period 1963 to 1972. It was shown that observed financial reporting practices in the seven countries is consistent with the general belief that there is a link between the quality of the financial reporting practice and the degree of efficiency in the national security market. Barrett

(1976, p.22) also showed that the degree of consolidation of a company's financial statements was a reasonable surrogate for such things as overall level of disclosure and comprehensiveness of the firm's financial statements. This observation has great practical significance for investors in foreign securities. These investors are rarely in a position to assess individually the financial statements of the different foreign countries. However, the degree of consolidation of the company's financial statements can provide important insights into overall quality of foreign financial statements.

Gray (1978) investigated the segmental financial disclosure practices of the 100 largest multinational companies based in the EEC during 1972 - 73. It was observed that statistically significant differences existed in the extent of segmental disclosure between the United Kingdom and Continental EEC companies. The United Kingdom companies exhibit a greater disclosure of business analysis of profits and geographical analysis of sales and profits. The Continental EEC companies exhibited significantly greater disclosure of production analysis. This may be an indication of a more production-oriented philosophy in the less developed equity markets, in contrast to the expected financial orientation of countries with highly developed and relatively efficient capital markets.

Kahl and Belkaoui (1981) investigated the disclosure requirements by commercial banks in 18 different countries. It was shown that the extent of the disclosure varies considerably among the countries examined. Several possible explanations for the differences in bank reporting practices in the different countries have been presented. Firstly, it is suggested that the different disclosure practices may be due to the different countries identifying with one particular accounting tradition or model as suggested by Costa and Bourgeois (1977). Secondly, disclosure adequacy is positively correlated with the number of shareholders. Thirdly, there was a positive correlation between asset size and the extent of disclosure.

Nobes (1977a) has shown that the legal system varies between the different countries and this in turn will dictate the quality and quantity of disclosure. In countries such as the United States and the United Kingdom, their company law does not prescribe a very large number of rules relating to what companies should do or how they should comply with disclosure requirements. On the other hand, Continental European countries, especially France and Germany, have a legal system that relies on a large number of all-embracing company laws. Nobes (1977b) has further observed that there is no "uniform accounting" in the sense of prescribed formats of accounts in the majority of the

English speaking countries. By contrast, in the Continental countries "uniform accounting" has long been in operation, applying to formats as well as accounting rules. Published formats are prescribed and allow little flexibility to the individual companies.

The differences in formats of accounting between the English speaking countries and the Continental countries are likely to lead to confusion among the readers of financial statements. The concept of "uniform accounting" has been taken a stage further in countries such as France and Germany. For instance, in France a "chart of accounts", is an additional requirement to the published financial statements. The chart specifies exactly where the balances on the various accounts should be shown. The chart of accounts concept has been severely criticised by McMonnies (1977) who argues that this approach will reduce accounting to a mechanical process. Flexibility is necessary to allow the exercise of judgement to the large variety of situations, so that financial statements "present fairly" the position of a company.

A major force in the international standardisation of accounting standards is the International Accounting Standards Committee (IASC) which was formed in 1973 by the accountancy bodies from nine countries. It is understandably very difficult to reach agreement on

international standards, and many of them are compromises which allow for substantial flexibility. Nevertheless, the IASC is very useful in promoting international understanding of the problems of accounting standardisation. A major objective of the IASC is to improve accounting practices in some countries, and in the case of developing countries the aim is to provide a ready-made package of GAAP. The member bodies of the IASC have agreed to make international standards binding in their countries.

Benson (1976) has also identified the influence of the EEC in the standardisation of accounting practice. The EEC Commission issues directives to member governments which must be adopted after enabling legislation has been promulgated through national parliaments. The arguments for uniform accounting standards throughout the EEC are strong. They include a desire to make the same legal requirements for all companies which have similar legal forms and which operate in competition, and the need to encourage the free flow of investment, trade, and labour by ensuring the provision of reliable homogeneous financial information from all EEC companies. To achieve this objective various directives dealing with presentation and content of accounts, methods of valuation, consolidated accounts etc. have been presented.

A major step towards the objective of attaining international accounting standards came in 1977 when the long envisaged International Federation of Accountants (IFAC) formally came into existence. The IFAC has developed a 12 point programme with the ultimate objective of attaining uniformity in the accounting profession. Another earlier significant development was the formation of Accountants International Study Group (AISG) in 1966. The AISG was created by the accountancy professions in Canada, United States, and the United Kingdom to publish comparative studies of accounting and auditing practices in these three countries. The formation of the AISG further stressed the importance of international cooperation to reach consensus on international accounting standards. Cummings and Chetkovich (1978) report that in October 1974 the General Assembly of the International Federation of Stock Exchanges recommended that its member exchanges in countries whose professional accountancy bodies are members of the IASC, incorporate into their listing requirements a reference to compliance with international accounting standards. As a result of this recommendation, the majority of IASC member bodies are now involved in consultations with stock exchanges in their countries, seeking to achieve requirements that financial statements filed with these exchanges be prepared in conformity with IASC standards. Achievement of the objectives of the IASC and the IFAC will not be quick, but progress is being made

towards the international standardisation of the accounting disclosure requirements.

The AISG (1975) recommends that multiple sets of financial statements, primary and secondary, should be prepared for a company with financial reporting audiences of interest in more than one country. Primary financial statements are prepared to satisfy the reporting requirements of the company's country of domicile. Furthermore, secondary financial statements are prepared for audiences of interest in other countries. If the primary statements include sufficient information to satisfy the requirements of audiences of interest in other countries, they may serve a dual purpose, and secondary statements may not be necessary. The presumption is that all companies will prepare primary statements, and the majority of companies with reporting audiences of interest in more than one country will also prepare secondary statements. The AISG (1975, par. 45) recommends that both the needs of the recipients in other countries and the significance of the differences in accounting and disclosure requirements will influence the decision to prepare separate primary and secondary financial statements.

Several writers have suggested that financial statements can reflect only a single point of view, that of the country of domicile of the company - single domicile reporting. Those supporting single domicile reporting

argue that business events and transactions are influenced to a large extent by their impact on financial statements. In other words, existing accounting principles, business decisions and financial reporting are closely interrelated. Therefore, proponents of single domicile reporting hold the view that financial statements can present only a single representation of the financial position and results of operations - only for a given time, under a certain set of rules, and for any given purpose. Mueller (1975) argues that the intimate interrelationships of reported events and the local "reporting culture" make meaningful restatements often nearly impossible. It is further argued that in the case of several events, simple restatements would not be adequate, but rather, comprehensive reconstructions of the transactions to be made in terms of the cultural, legal, and other institutional foundations to which secondary readers are accustomed.

The arguments presented by proponents of the single domicile theory has influenced many multinational companies to use this approach in financial reporting. Mueller and Walker (1976) reports that a number of multinational companies based in Canada, Japan, and Sweden restate their consolidated financial statements from their respective domestic currencies to United States dollars. Furthermore, these companies have also adopted the practice

of translating the text portions of their financial statements to the English language. Multinational companies of several European countries have adopted the practice of translating the annual reports into other languages (mainly English) without restating for other currencies. Furthermore, a booklet in English explaining the accounting practices adopted is included with the financial statements. All these variants preserve the single domicile point of view. The advantage of the single domicile point of view is that it avoids the complexities of restating financial statements in conformity with accounting standards in foreign countries.

A third approach to financial reporting by multinational companies is to conform to international reporting standards. Corbett (1978) argues that international reporting standards seem to be the perfect answer for multinational companies and companies having shareholders dispersed internationally. Ideally, with identical standards, financial transactions would be recorded similarly from country to country and reported uniformly to shareholders of different nationalities. Such an approach would be particularly beneficial to investors evaluating foreign securities. The IASC is indeed striving for this ideal where financial events in the different countries would be recorded under the same guiding standards despite the varying cultural, legal, and other

institutional differences. However, at this stage, the IASC has not reached consensus on a fully comprehensive range of international accounting standards. It is suggested that while comprehensive accounting standards are being prepared, the primary/secondary financial statements recommended by the AISG may be used as an interim measure. Eventually, international accounting standards would represent a single basis for all financial reporting in the different countries, and the problem of evaluating foreign securities would be considerably diminished.

4.5.3 Liquidity of foreign investments

The liquidity of an investment is an important consideration in investment decisions. Fouse (1976) has defined liquidity as the ability to buy and sell a security quickly, without the price changing substantially from the prevailing price of the previous transaction. The assumption here is that in the absence of new information regarding the specific security, there should be no significant price changes over successive transactions. The greater the uncertainty in relation to whether the investment can be bought or sold, the greater the price concession required to buy or sell it, the greater the liquidity risk. (The discussion in chapter 2 has shown that poor liquidity is a characteristic of a "thin market" which is dominated by a handful of large investors). These

large investors generally take a very long-term view of investments, and therefore, trading volumes are low in thin markets. The poor liquidity in thin markets presents a major problem for large institutional investors who usually acquire a major stake in their target investments. Thin markets are likely to cause a disruptive effect on the orderly pricing of securities. Furthermore, poor liquidity could result in an investor locked into a particular investment and could result in a substantial loss in the event of a forced sale. The opposite effect will be evident in the event of a large purchase of a particular security for which there are few willing sellers, the large price increase being unrelated to any improvement in the security's intrinsic value.

A major obstacle to international portfolio investment is that other than the LSE and the NYSE, few stock markets possess adequate liquidity. For instance, Jennergren and Korsvold (1975) have shown that the stock markets in Norway and Denmark have only a handful of securities that enjoy substantial trading volumes. Bergstrom (1975) has shown that investment liquidity is to a large extent influenced by the general economic climate prevailing in a country, and therefore, there should be low consistency between the liquidity in the different countries. It was also shown that on several occasions trading in the Japanese market was heavy while the volume of trading in the United States exchanges was relatively

light. Bergstrom (1975) also demonstrated that the volume of trading on the twelve largest stockmarkets outside the United States has increased substantially in recent years. Bergstrom (1975) concludes that in the light of such evidence, the standard argument, that United States institutions should not invest abroad because of poor liquidity is highly suspect.

Shohet (1974) has made a detailed study of liquidity of stock exchanges in the United States, Japan, United Kingdom, and continental European countries. It was shown that the liquidity of continental European stock exchanges is rather low. It was shown that in France, the government has substantial interests in listed natural resource enterprises, the nationalized banks and insurance companies; in turn the financial institutions own large interests in other listed companies. In Germany, the banks and other financial institutions have sizeable equity interests in one another and other listed companies. In Italy, the government has the largest interest in Italian industry. Shohet (1974, p.66) has shown that in Japan large cross holdings of investment exist between customer and supplier, and between borrower and lender. The financial institutions, banks, and insurance companies also have sizeable investments in "friendly" enterprises. As a result of these arrangements very few securities are available to investors outside this group and this reduces the liquidity of Japanese securities.

Shohet (1974) measured the volatility of the market indices in the United States, United Kingdom, Japan, Netherlands, France, and Germany during the period 1961 - 72. It was observed that stock markets in the Netherlands, France, and Germany had relatively poor liquidity in comparison with stock markets in the other countries. The following strategy to maximize the returns associated with market volatility was used : sell the investment in the market index before a decline of 10 percent or more, and reinvest the proceeds at the new low points. It was observed that using this strategy the investment returns of the Netherlands, France, and Germany were substantially greater than the returns for the United States and the United Kingdom. Shohet (1974, p.67) concludes that the greater volatility of foreign stock markets creates favourable opportunities for investment. It was shown that it is unlikely that substantial investments could have been made at the peaks or bottoms of the stock market cycles. Nevertheless, the volatility of international markets and the large potential benefits created by major swings in these markets, justifies investments in foreign securities.

4.5.4 Transaction costs and complexities of operating in foreign markets

An investor seeking to create an international portfolio must be aware of the higher administrative costs of investing in foreign securities. Firstly, there are the costs involved in placing a buying/selling order and the receipt/delivery of the certificates for the underlying securities. Because of the greater physical distance between the domestic investor and the foreign country, substantially higher transaction costs are to be expected. Bergstrom et al. (1983) have shown that commission rates in many countries are much higher than those charged in the United States. However, it should be noted that on many foreign stock exchanges it is sometimes possible to negotiate reductions in brokerage costs when dealing with large orders. Furthermore, there are the costs associated with nonresident shareholders tax imposed by most foreign countries. The withholding tax varies from country to country but is usually 15 percent on share dividends and 10 percent on interest earned by South African investors in a foreign country. However, South Africa has signed avoidance of double taxation treaties with several major industrialized countries. Therefore, a South African investor may claim tax credit which totally or partially offsets the withholding taxes paid in a foreign country.

Marjos (1978) has argued that the administrative problems and costs of owning foreign securities has declined substantially as a result of growth of American Depository Receipts (ADRs). While the ADRs are specifically designed for the benefit of United States investors, foreigners such as South African investors, may also derive benefits from using this mechanism. Khoury (1983) has presented a detailed outline of the function of ADRs. A direct purchase of a foreign security is not necessary if an ADR for that security is available. ADRs are financial instruments issued by United States banks against the underlying shares deposited with the bank's overseas branch or foreign custodian. ADRs allow investors to trade in foreign securities without taking physical possession of them. Investors in ADRs pay dollars for their investment and receive dividends and proceeds of sales in dollars. ADRs could be particularly useful to South African investors in that the local foreign exchange market deals mainly in dollars, higher exchange costs are incurred for non-dollar currencies. However, changes in exchange rates of the currency concerned are reflected in the value of ADRs.

The shares of many large European, Japanese, Australian, and even South African goldmining companies are available in ADRs. Investors can trade in ADRs in exactly the same manner as they can deal in United States domestic

securities. All ADRs are registered in the name of the owner, who can instruct the bank to sell the ADR. The bank will then notify its foreign affiliate to execute a selling order in the underlying security in the country in which it is listed. The banks offer several services related to ownership of ADRs. The banks will collect dividends, provide information on rights issues, take-over deals, shareholders' meetings, and other relevant information to holders of ADRs. For these administrative services provided to clients, the banks will charge a fee. Most ADRs are traded in the over the counter market (OTC), several are listed on the AMEX, and some of the largest and best known foreign securities are listed on the NYSE. Because of the efficiency of the United States capital market, trading in ADRs is cheaper than trading in the countries where the shares are listed. Occasionally, there are price differences between the market in which ADRs are traded and the country where the underlying shares are traded. This creates arbitrage opportunities, and will also enhance the liquidity and efficiency of the ADR market.

There are several advantages of using ADRs as a means of investing in foreign securities. Firstly, trading takes place in the highly efficient United States securities market, saving an investor both time and cost in acquiring

securities of EEC countries, Japan, Hong Kong, Australia, etc. Secondly, ADR investors receive a greater amount of information related to their underlying securities from ADR-issuing banks than that received directly from many foreign companies. The banks' foreign affiliate will provide more timely and meaningful information than information which the investor could himself have received from a foreign country in a foreign language. Furthermore, ADRs are issued by major United States banks, and are registered in the name of the owners, regardless of whether the underlying security is registered or a bearer security. Therefore, the investor is protected from the risk of securities being lost or stolen. Another advantage of ADRs is that as all dealings are in United States dollars, the investor does not have to worry about currency convertibility and exchange rates of the different countries whose securities are being traded. It would seem that ADRs offer a very efficient way to invest in securities of countries outside the United States.

Bettner (1981) has shown that a method whereby the benefits of international diversification can be attained and yet minimize the associated problems is to invest in mutual funds and investment companies that specialize in international securities. This approach is particularly useful to individual investors who do not have the expertise to invest directly in foreign securities. This

approach will also solve the information problem because professional managers of the funds are expected to be familiar with foreign securities and their markets. In recent years, several mutual funds with a distinctly international orientation have emerged to meet the needs of individual investors seeking international portfolio diversification. Many of these mutual funds and investment companies are listed on various stock exchanges in the United States, and this reduces the liquidity problems associated with foreign securities. Reilly (1982) has shown that a wide variety of internationally oriented funds are available in the United States, the investor can choose those funds which best meets the desired level of international diversification. For instance, an investor with a particular interest in Japanese securities may purchase shares in the Japan Fund or in the Nomura Capital Fund of Japan, both being actively traded on stock exchanges in the United States.

The available empirical evidence on the performance of internationally diversified mutual funds is encouraging to prospective investors in foreign securities. The classic study by McDonald (1973) showed that the eight internationally oriented French mutual funds outperformed the domestic mutual funds during the period 1964 - 69. Farber (1975) compared the performance of a group of mutual funds investing internationally and called

"world funds" with the performance of a group of mutual funds investing mainly in the EEC countries and called "European funds". It was shown that during the period 1963 - 1971 the world funds outperformed the European funds in terms of the risk-return characteristics. It can be concluded that internationally oriented investment funds are worthy of serious consideration by investors. However, internationally diversified funds are very specialised and therefore careful analysis is required before funds are committed to these investments. The United States offers by far the widest selection of international investment funds having the necessary liquidity, and seems an appropriate choice by South African investors seeking international investment diversification but not having the expertise to undertake direct investment.

4.6 Summary and conclusions

Empirical evidence strongly supports the view that international portfolio diversification has superior risk-return characteristics in comparison with exclusive domestic diversification. Various studies have shown that the inclusion of foreign securities enables a domestic investor to earn higher returns and to lower investment risk. The lower the covariance between the domestic country and foreign countries, the greater the expected benefits from international diversification.

International securities tend to maximize the portfolios' long-term rate of return, even though many year-by-year returns may be less than those available from domestic investments. It has been shown that several MNCs have been able to attain superior performances in comparison with domestic portfolios. However, international portfolio diversification is able to outperform MNCs with regard to both profitability and riskiness.

The final report of the De Kock Commission (1985) has made several recommendations that are likely to have far reaching consequences for investors in South Africa. Firstly, direct investments by South African residents are to be automatic, provided they meet established criteria. Secondly, there is to be a progressive relaxation of exchange control over portfolio investments by South African residents. Initially, registered insurers, pension funds, and mutual funds will be allowed to invest 10 percent of their annual cash inflows in foreign securities. In due course these provisions are to be extended to financial institutions, corporate bodies, and eventually individuals and non-corporate bodies. It is submitted that this recommendation will remove the major obstacle to investing in foreign securities by South African residents. The De Kock Commission recommended that prescribed investments be withdrawn at some future date. The removal of this constraint is likely to divert funds

away from the JSE. The outflow of funds into foreign securities will to some extent stem the flow of funds into the JSE. The eventual relaxation of exchange control is likely to create a more efficient flow of funds between the capital market and the equity market.

The differences in accounting standards applicable in the different countries complicates the evaluation of foreign securities. Furthermore, the differences in language, culture, legal framework, and economic system will to some extent be reflected in the financial statements. It has been suggested that international accounting standards seem to be the best approach to solve the problem of reporting to shareholders in different countries. Several international organisations such as the IASC and the AISG are striving to establish international accounting standards. Attaining this objective will be difficult because of the conflicting national interests. At this stage no consensus on a fully comprehensive range of international accounting standards has been reached. Therefore, particular attention should be devoted to the relevant accounting standards which are in use when foreign securities are being evaluated.

A major obstacle to international portfolio diversification is that other than the NYSE and the LSE, few stock markets possess adequate liquidity. Empirical

evidence suggests that poor liquidity and greater volatility of several stock exchanges has created favourable opportunities for investors to benefit from major swings in these markets. It has been shown that the administrative problems and higher costs of owning foreign securities has declined substantially as a result of growth in ADRs. The shares of many multinational and internationally recognised companies outside the United States are available in ADRs. The liquidity problems of foreign securities is eliminated because ADRs are listed on highly efficient United States stock markets. The emergence of mutual funds and investment companies that specialise in international securities has largely solved problems that are likely to arise when direct investment in foreign securities is made.

CHAPTER 5INTERNATIONAL SHARE PORTFOLIO DIVERSIFICATION : POSSIBLE
INVESTMENT OUTCOMES FOR SOUTH AFRICAN INVESTORS.5.1 Introduction

The existence of a relatively high degree of positive correlation between securities within an economy suggests the possibility that risk reduction might be facilitated by diversifying security portfolios internationally. The objective of this chapter is to determine the potential gains from such diversification for South African investors during the 1969 - 83 period. In particular, the returns on domestic portfolios will be compared with efficient portfolios of international securities.

Inter-country correlation coefficients will be tested to determine if they have changed significantly during the 1969 - 83 study period. Particular attention will be devoted to test the stationarity of inter-country correlation coefficients during the study period, thereby enabling tests of the necessary and sufficient conditions for deriving benefits from internationally diversified portfolios. The returns from international securities will

be calculated on an adjusted basis (for currency fluctuations) as well as on an unadjusted basis. The total risk of international securities will be evaluated in the context of domestic market risk and exchange risk. The composition of optimal international portfolios available to South African investors will be used as guidelines for highlighting possible areas for foreign security investments.

5.2 Research design and methodology

In order to demonstrate the outcome to South African investors of international portfolio diversification, information on the risk and return on equity capital of 18 countries (including South Africa) have been collected (see table 5.1). The foreign countries selected for examination were chosen on the basis of the following criteria:

- i) an acceptable level of past political stability
- ii) reasonable availability of sufficient data to permit the calculation of annual return and risks (adjusted for foreign exchange fluctuations) on industrial share market indices.

The countries chosen for investigation satisfy these predetermined investment criteria. Furthermore, these are countries with which South Africa has had important trade links in the past and are therefore suitable candidates for security investments. Errunza (1983) has demonstrated the importance of political stability by showing that portfolio managers are generally reluctant to invest in countries considered to be high socio-political risks.

Table 5.1 : Countries whose investment performance will be compared with investment in South African equities.

* Australia	**Netherlands
* Austria	New Zealand
* Canada	*Norway
* Denmark	South Africa
**France	**Spain
Finland	*Sweden
**Germany	Switzerland
**Italy	*United Kingdom
* Japan	*United States

* These countries have recently imposed trade sanctions against South Africa.

**These countries have indirectly imposed trade sanctions against South Africa.

In deciding on the period covering the study, several factors were considered. The period chosen had to be long enough for the results to be representative of the phases of the business cycles operating in the different countries. On the other hand, it was felt that the study should not probe too deeply into the past. Past information on the risk-return relationships of securities would be less reliable than current information; and the intention is to study the current and future benefits from international portfolio diversification available to South African investors. It was, therefore, decided that the study would cover the fifteen year period from 1969 to 1983, a relatively current period and sufficiently representative of the different phases of the business cycles.

For the purposes of this study, gains or losses from foreign exchange fluctuations have been included in the calculation of the returns on assets and have therefore been included in the measure of risk. Risks on foreign investments stemming from exchange restrictions and political instability were disregarded. Firstly, these risks cannot be quantified. Secondly this study is

confined to countries with stable political backgrounds; and, thirdly, it can be argued that these risks can be expected to be reflected in the prevailing prices of the securities concerned. This study covers the period during which the foreign exchange rates have been allowed to "float". Therefore, the currency factor is likely to have some impact on the risk-return characteristics generated by foreign securities.

The complexity of operating in international financial markets presents one with different tax structures, exchange controls, exchange risks, and monetary interrelationships. Thus far, no satisfactory asset pricing theory applicable in an international context has been developed. As a result, the risk of an investment cannot be represented by a single risk measure such as a domestic or international beta. Therefore, the well known risk-reward optimization principle developed by Markowitz (1959) has been used to construct efficient international portfolios. In developing the risk-reward optimization principle Markowitz (1959) assumes that money has a diminishing marginal utility. Therefore, the investors' expected utility will be maximized by holding a set of portfolios, each of which either maximizes the rate of return given the standard deviation, or minimizes the standard deviation given a rate of return.

The locus of all such points comprises the efficient curve, with each point on the curve representing a particular combination of investment proportions in various countries. The concept of efficient portfolios can be used to derive optimum portfolios which represents an optimal allocation of assets in various foreign securities.

Given the historical rates of return (1969 to 1983), it is possible to compute the rates of return and standard deviations of efficient portfolios which would have accrued to South African investors who purchased foreign securities in specified combinations. From an investor's point of view, the most profitable or beneficial of these combinations would be those securities which, for any given risk level, maximizes the portfolio return. Portfolios which have these characteristics enable the construction of an optimal portfolio from a given set of securities and can be obtained through methods of quadratic programming, for which standard computer algorithms are available. The computer facilities of the Graduate School of Business, University of Cape Town, have been used for determining optimal ex post international portfolios, as well as the multidimensional scaling of portfolios representing diversification opportunities available to South African investors.

In order to determine the composition and location of an efficient frontier from which an optimal portfolio is selected, this study has used estimates of expected returns, variances, and covariances (Full Covariance Model) for a set of securities representing the different countries under consideration. Furthermore, the estimated parameter values have been treated as true parameter values, and estimation risk has been ignored. Alexander and Resnick (1985) have shown that if the Full Covariance Model is used, the composition of the optimal (tangency) portfolio when estimation risk is recognised will be identical to its composition when estimation risk is ignored, provided that at least 6 securities are investigated and at least 10 observations per security are made. Therefore, it is submitted that the composition of the optimal portfolios is unaffected by estimation risk inherent in using unadjusted historical data for the 1969 - 83 study period.

International security investments involve dealing in markets with different trading procedures and currencies. Thus, the standardisation of statistical information becomes an important consideration. The share price indices and foreign exchange rates have been obtained from various issues of International Financial Statistics (published by the International Monetary Fund). The share price indices available in this publication are the

officially recognised and standardised data for the respective countries (Standard and Poors 500 index for the United States, Financial Times Index for the United Kingdom, etc.). The share price index for each country represents the average change in share prices and is therefore the appropriate measure of capital gains or losses on equity transactions.

The dividend yield on shares of overseas countries has been obtained from back issues of publications such as the Economist, Financial Times, and the U.N.O. Monthly Bulletin of Statistics. The dividend received has been reinvested in fractional shares at current prices after deducting the withholding taxes applicable to the relevant country. The total gain from equity investment (capital gains and dividends) has been adjusted for changes in foreign exchange rates between South Africa and the country of investment. As a result, the rates of return used in this study are the relevant rates obtained in South African currency. A general expression for the calculation of the rate of return on a foreign investment which makes adjustments for possible changes in currency fluctuations is:

$$R = \left(\frac{D_1 + P_1}{P_0} \right) \times \frac{F_1}{F_0} - 1$$

where: R = rate of return on foreign investment
 D_1 = annual dividend yield in the foreign currency
 P_0 = beginning price of the foreign security in
 foreign currency
 P_1 = ending price of the foreign security in
 foreign currency
 F_1 = ending price of foreign currency in terms of
 the South African rand
 F_0 = beginning price of foreign currency in terms
 of the South African Rand.

According to investment theory, foreign securities are likely to improve the risk-return characteristics of diversified portfolios. This expectation has been confirmed by several empirical investigations in overseas countries. Because of the relatively underdeveloped industrial sector and the economic domination by the mining sector, the South African economy is not likely to be highly synchronized with those in the more advanced countries. Historically, return on gold investments have achieved counter-cyclical effects with the market portfolio. Therefore, South African goldmining shares are likely to have negative correlations with the various

foreign equity markets, and are therefore likely to perform as diversifying (risk reducing) assets. Therefore, a portfolio consisting of South African goldmining shares and equity shares of the more industrialized countries can be expected to outperform a domestic portfolio that comprises South African securities only.

The main objective of this study is to determine the extent to which the various benefits associated with international portfolio diversification are likely to be attained by South African investors during the study period. Therefore, the following hypothesis is tested:

Hypothesis: The South African economy is expected to have low correlations with the economies of the more advanced industrialized countries. Furthermore, the expected negative correlations between South African goldmining shares and foreign equity markets is likely to improve the risk-return characteristics of international security portfolios. In addition, the potential benefits are expected to outweigh the problems encountered. Therefore, South African investors are likely to derive substantial benefits from having internationally diversified portfolios.

5.3 Empirical evidence of possible benefits of international portfolio diversification

In this section an ex post analysis of allocating funds for international portfolios will be presented. This approach allocates investment funds after reviewing the results of a period that has already passed. Because of the benefit of hindsight an ex post analysis can be said to represent investments made with perfect knowledge of the security markets. In section 5.3.1 the risk-return characteristics of investing in 18 major industrialised countries will be presented. The risk-return characteristics are also expressed in South African rands so that the influence of various foreign currencies on South African based international portfolios can be quantified. In section 5.3.2 funds are allocated in various foreign countries so that optimal risk-return trade-offs are obtained. The composition of optimal portfolios will identify those foreign countries that (ex post) could have improved the portfolio performance of an investor based in South Africa.

5.3.1 The risk-return trade-off from international portfolio diversification

In order to demonstrate the possible benefits to a South African investor from international portfolio diversification, the rates of return and risk represented by standard deviation was calculated for share investments in 18 major industrialised countries during the period 1969 - 83. A matrix of correlation coefficients for the annual rate of return of the 18 countries investigated was calculated and is used in all subsequent calculations (variances, covariances, optimal international portfolios etc.). These results are shown in table 5.2.

Table 5.2 : Rates of return, standard deviations, and coefficient of correlation of equity investments for 18 selected countries during 1969 - 83.

Country	Compound annual return (percentage)	Standard deviation (percentage)	Correlation (R) with South Africa	
			Industrial shares (3)	goldmining shares (4)
	(1)	(2)		
Australia	10,84	20,06	0,7055	0,0795
Austria	9,19	14,63	0,0346	0,1471
Canada	14,07	18,48	0,6718	0,1589
Denmark	20,80	29,15	0,1445	-0,3204
France	7,24	21,24	0,3904	0,0021
Finland	20,54	20,45	0,1609	0,1304
Germany	15,14	17,07	0,0882	-0,5326
Italy	0,06	16,35	0,5606	0,2970
Japan	25,60	21,99	0,1432	-0,3562
Netherlands	11,97	14,91	0,1441	-0,4383
New Zealand	12,11	15,61	0,4385	-0,1048
Norway	12,77	24,25	0,3742	0,2774
South Africa (industrial shares)	11,17	21,43	1,0000	0,4800
South Africa (goldmining shares)	22,45	50,17	0,4800	1,0000
Spain	1,97	21,48	-0,1117	0,0773
Sweden	18,08	20,52	0,1534	0,0125
Switzerland	16,10	18,32	0,2698	-0,4242
United Kingdom	13,11	22,35	0,2127	-0,4548
U.S. of America	12,18	18,76	0,2195	-0,3329
Average	13,44	19,74	0,32	-0,02

The annual rate of return on equity investments ranged from a high of 25,6 percent for Japan to a low of 0,06 percent for Italy. The average annual rate of return for all 18 countries is 13,44 percent, which is slightly higher than the returns on South African industrial shares. However, the average annual returns on South African goldmining shares is substantially higher than the average returns for all 18 countries. The superior performance of goldmining shares reflects the investors turning to gold investments during the period of rapid inflation that prevailed during the study period. The inter-country differences in risk (standard deviations) also varied considerably, South African goldmining shares, having had the highest standard deviation (of 50,17 percent) while Austria had the lowest standard deviation of 14,63 percent. Of particular interest is the low correlation of returns among the different countries. Despite the relatively poor performance of the local industrial shares, South African investors may still benefit from international diversification because of the low average correlation of returns (0,32) with the other overseas countries.

South African goldmining shares offer unique opportunities for those seeking international portfolio diversification because of the low average correlation of returns (-0,02) with the overseas countries. In fact, these

shares are negatively correlated with 8 of the 18 countries included in the study. Despite the relatively good performance of the South African goldmining shares, local investors can benefit further from investing in foreign securities. The inclusion of foreign securities in a portfolio of South African goldmining shares are likely to reduce substantially the relatively high (50,17 percent) standard deviation of the latter category of shares.

Markowitz (1959) has shown that as long as the correlation of returns among the different investments options is not perfect (less than 1) a sufficient, but not a necessary condition for portfolio diversification exists. It can therefore be concluded that even relatively low return foreign securities may materially reduce the risk of an internationally diversified portfolio held by South African investors.

In order to determine the role played by foreign currencies in the risk-return characteristics of an internationally diversified portfolio, a more detailed analysis of the empirical results is necessary. Table 5.3 contains the performance and volatility for the 18 countries in local currencies for the period 1969 - 83.

Table 5.3 : Risk and returns (in local currencies) from international portfolio diversification in 18 selected countries during 1969 - 83

Country	Domestic compound annual return (percentage)	Ranking of return	Domestic risk per annum (percentage)	Ranking of risk
Australia	9,20	11	17,83	10
Austria	8,10	14	12,54	19
Canada	11,85	7	16,51	12
Denmark	18,93	2	26,75	2
France	7,21	16	17,94	9
Finland	17,92	4	18,53	7
Germany	8,55	13	13,51	16
Italy	3,49	19	14,31	15
Japan	18,44	3	18,56	6
Netherlands	7,09	17	13,19	17
New Zealand	10,32	9	12,93	18
Norway	9,73	10	22,29	3
South Africa (industrial shares)	11,17	8	21,43	4
South Africa (goldmining shares)	22,45	1	50,17	1
Spain	5,11	18	18,50	8
Sweden	17,78	5	17,65	11
Switzerland	7,51	15	14,92	14
United Kingdom	13,25	6	19,33	5
U.S. of America	8,98	12	16,06	13

The performance and risk measures in table 5.3 are expressed in the currency prevailing in the country where the market is located. The domestic risk is defined as the standard deviation of the annual domestic returns over the 1969 - 83 period. From the ranking of the domestic annual returns it can be seen that the best returns during the study period have been attained by South African goldmining shares, Denmark, Japan, and Finland. However, these countries also have the largest risk, as can be seen from the rankings of the domestic risk. It is noteworthy that South African industrial shares have a relatively high domestic risk but only average domestic returns. This observation is further confirmation of the benefits accruing to South African investors from international portfolio diversification.

The risk-return characteristics represented in table 5.3 have been expressed in the domestic currency where the investment is made. However, South African investors are more concerned with the performance of their foreign investments expressed in South African currency. Therefore, the figures contained in table 5.4 are the risk-return characteristics of investment expressed in rands.

TABLE 5.4 : RISK AND RETURNS (in South African rands) FROM INTERNATIONAL PORTFOLIO DIVERSIFICATION IN
18 SELECTED COUNTRIES DURING 1969 - 83

Country	Compound Annual Return (percentage)	Ranking of annual return	Exchange gain or (loss) (percentage)	Total risk (RSA rands) (percentage)	Ranking of total risk	Domestic risk (percentage)	Exchange risk (percentage)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Australia	10,84	15	1,64	20,06	11	17,83	9,75
Austria	9,19	16	1,09	14,63	19	12,54	8,36
Canada	14,07	8	2,22	18,48	13	16,51	9,08
Denmark	20,80	3	1,87	29,15	2	26,75	11,16
France	7,24	17	0,03	21,24	8	17,94	8,75
Finland	20,54	4	2,62	20,45	10	18,53	9,45
Germany	15,14	7	6,59	17,07	15	13,51	11,48
Italy	0,06	19	(3,43)	16,35	16	14,31	7,98
Japan	25,60	1	7,16	21,98	5	18,56	11,27
Netherlands	11,97	13	4,88	14,91	18	13,19	10,24
New Zealand	12,11	12	1,79	15,61	17	12,93	10,51
Norway	12,77	10	3,04	24,25	3	22,29	8,27
South Africa (industrial shares)	11,17	14	-	21,43	7	21,43	-
South Africa (goldmining shares)	22,45	2	-	50,17	1	50,17	-
Spain	1,97	18	(3,14)	21,48	6	18,50	9,64
Sweden	18,08	5	0,30	20,52	9	17,65	9,19
Switzerland	16,10	6	8,59	18,32	14	14,92	13,25
United Kingdom	13,11	9	(0,14)	22,35	4	19,33	9,33
U.S. of America	12,18	11	3,20	18,76	12	16,06	10,22
Average	13,44		2,25	21,43		19,10	9,88

The total risk is defined as the standard deviation of the annual returns of each country expressed in South African rands during the period 1969 -83. The exchange risk is defined as the standard deviation of the annual returns of exchange rates in the different countries (expressed as a percentage per annum). The exchange gain or (loss) is defined as the percentage return per annum of the respective currencies of the various countries being investigated. The exchange gain or (loss) reflects the extent to which the various foreign currencies have moved in relation to the South African currency during the 1969 - 83 period. The South African rand appreciated in value against the currencies of Italy, Spain, and the United Kingdom (indicating an exchange loss for the South African investor). For the remaining countries the South African rand depreciated in value against their currencies (indicating an exchange gain for the South African investor).

Table 5.4 shows that the exchange gain or loss from foreign investments has had a significant influence on investment performance. As a result of a substantial foreign exchange gain from investing in Japan, investing in this country has replaced investing in goldmining shares as the best return that may be available to local investors. It is also interesting to observe that exchange gains have reduced the relative attractiveness of investing in South



African industrial shares (ranking of returns lowered from position 8 to position 14). As a result of exchange risk (column 7), the total risk (column 4) of investing in all foreign countries is higher than the domestic risk (column 6) in the respective countries. As a result of this, the risk ranking of South African industrial shares has improved from position 4 (in table 5.3) to position 7 (in table 5.4). Therefore, the currency factor appears to have had an important influence on both risk and returns associated with international portfolio diversification. The results in table 5.4 indicate that the exchange gains from the various foreign currencies have generally enhanced the attractiveness of investing in foreign securities from the standpoint of a South African investor.

It can also be seen from table 5.4 that the differential between the risk in South African rands (column 4) and the risk in domestic currencies (column 6) is generally smaller than the exchange risk (column 7). Solnik and Noetzlin (1982) have shown that this is due to the low and possibly even negative correlation between security prices and exchange rate movements. This leads to an important observation that foreign securities that are attractive to a South African investor may not necessarily be attractive to an investor in another country whose base currency is say, United States dollars or British pounds. Therefore, optimal international portfolios will vary from

one country to another, depending on the risk-return characteristics of securities as well as exchange rate movements in the different countries.

While the currency factor is important, it is not a major element in the performance and risk components of an internationally diversified portfolio (representing the 18 countries during 1969 - 83). This can be clearly seen from the data presented in table 5.4. The overall impact of exchange gains or losses on investment returns should be judged in relation to a specific internationally diversified portfolio. It can be seen from table 5.4 that the overall exchange gains enhanced the average annual total returns of an unweighted international portfolio by (2,25) percent, which amounts to 16,74 percent of the average total return over the 1969 - 83 period. Therefore, the currency factor has not been a major component of total return even though the South African rand was generally devalued against the other currencies during the study period.

It can also be seen from table 5.4 that the total risk (column 4) is less than the sum total of the domestic risk (column 6) and exchange risk (column 7). This is because there is usually a weak or possibly a negative correlation between currency and domestic risk. The exchange risk as a component of the total risk attached to a foreign investment also requires to be further analyzed, and the data is presented in table 5.5.

Table 5.5 : Profile of currency factor in total investment risk
for 18 selected countries during 1969 - 83.

Country	Total risk in RSA rands (1)	Risk in domestic currency (2)	Risk differential (currency factor) (3)	
			(1)	(2)
Australia	20,06	17,83		2,23
Austria	14,63	12,54		2,09
Canada	18,48	16,51		1,97
Denmark	29,15	26,75		2,30
France	21,24	17,94		3,30
Finland	20,45	28,53		1,92
Germany	17,07	13,51		3,56
Italy	16,35	14,31		2,04
Japan	21,98	18,56		3,42
Netherlands	14,91	13,19		1,72
New Zealand	15,61	12,93		2,68
Norway	24,25	22,29		1,96
South Africa (industrial shares)	21,43	21,43		-
South Africa (goldmining shares)	50,17	50,17		-
Spain	21,48	18,50		2,98
Sweden	20,52	17,65		2,87
Switzerland	18,32	14,92		3,40
United Kingdom	22,35	19,33		3,02
United States	18,76	16,06		2,70
Average	21,43	19,10		2,59

Table 5.5 shows that the risk of a foreign investment in South African rands (column 1), risk in domestic currency (column 2), and the resulting differential or portion of risk that can be ascribed to the currency factor (column 3). Currency risk averaged 2,59 percent and amounts to 13,1 per cent of the total risk involved in an unweighted portfolio investment comprising the 18 selected countries. As in the case of annual returns, the aggregate impact of the currency factor on the total risk can only be evaluated in terms of a specific internationally diversified portfolio. Nevertheless, the results suggest that exchange risk makes up only a small amount of aggregate investment risk of an internationally diversified portfolio. These results also illustrate that portfolio managers tend to exaggerate the risk associated with international portfolios.

5.3.2 Optimal ex post allocation of assets in efficient international portfolios

In recent years, portfolio managers have devoted much attention to efficient allocation of funds so that the best risk-return trade-off is obtained. Solnik and Noetzlin (1982) have shown that the asset allocation decision is a particularly important and potentially profitable aspect of managing international portfolios since the major markets are not synchronized. The

technique of constructing efficient portfolios for the optimal allocation of funds for portfolio investment has become standard practice for large institutional investors. The optimal portfolio computer programme used for this study considered portfolios on the efficient frontier with positive investment constraint (no short selling). Fung (1979) has shown that one of the major difficulties in allocating funds for portfolio diversification is that mean returns may turn out to be negative. This can cause serious distortions in the construction of optimal portfolios if the observed mean returns are taken to be the proxy for expected returns. Yallup (1982) has shown that a sufficient condition for benefits to accrue from international diversification is that the minimum risk portfolio should contain at least two non-zero investment proportions.

The efficient frontiers for the case in which investments can be made in all 18 countries included in this study are presented in figures 5.1 to 5.5. The curve, labelled E, summarizes the efficient risk-return (ex post) combinations which were attainable to an investor who had owned an internationally diversified portfolio of equity shares. However, in order to determine the proportion of investment in each of the various countries, we must choose the optimal portfolio. This can be accomplished by using the market equilibrium model developed by Lintner (1965)

and Sharpe (1964). The market opportunity line is represented by (r_1) (this line rises from the intercept on the X-axis which reflects the risk-free rate of return). The average risk-free rate of return during the study period was 10 percent. The optimum unlevered portfolio for a particular risk-free rate is given by the point at which the appropriate market opportunity line is tangent to the locus of efficient portfolios i.e. points a in figures 5.1 to 5.5.

FIGURE 5.1 : Efficient portfolios available from international diversification
(no limit to investment in specific country)

260

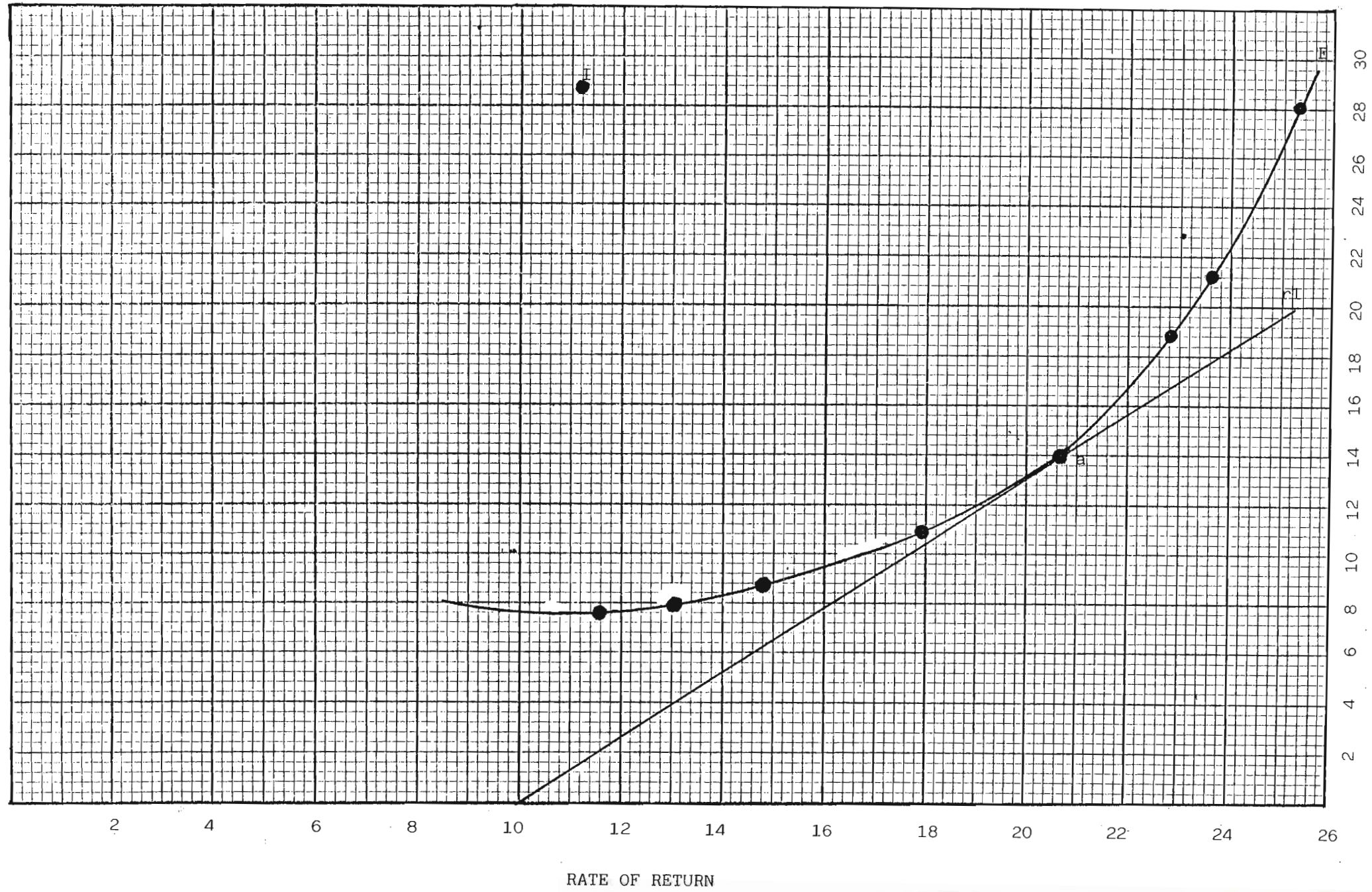


FIGURE 5.2 : Efficient portfolios available from international diversification
(50 percent limit to investment in specific country)

261

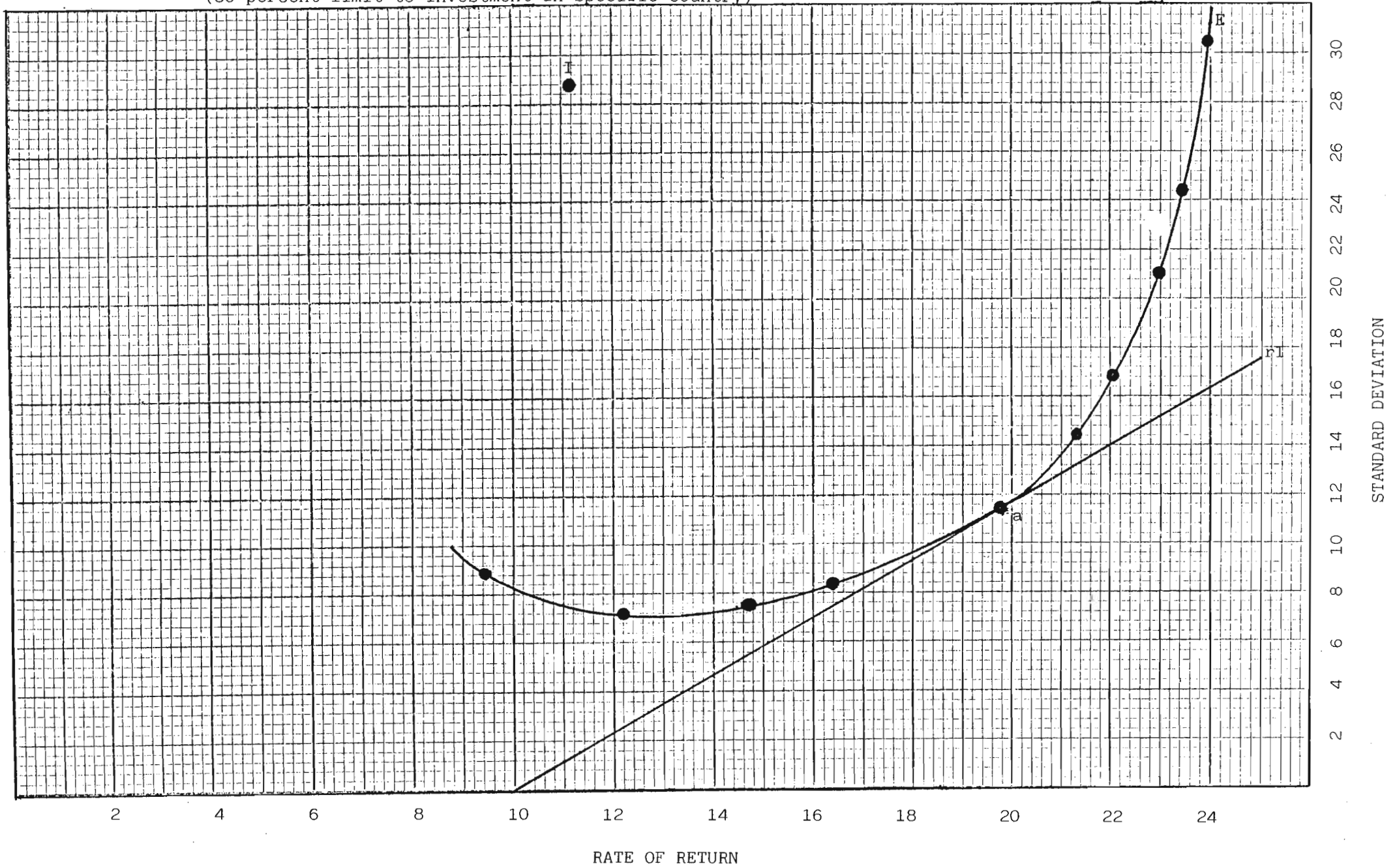


FIGURE 5.3 : Efficient portfolios available from international diversification
 (33 percent limit to investment in specific country)

262

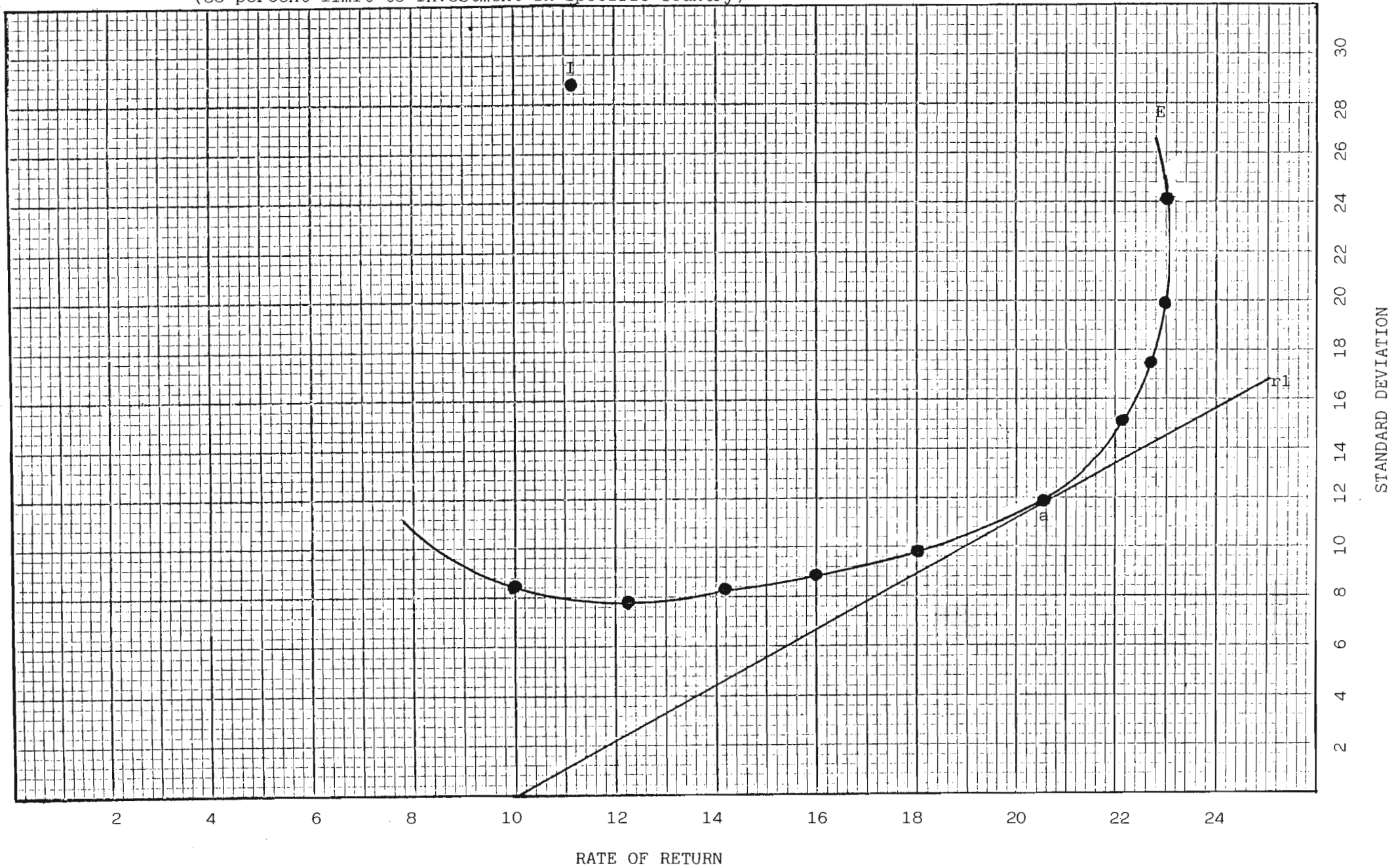


FIGURE 5.4 : Efficient portfolios available from international diversification
 (20 percent limit to investment in specific country)

263

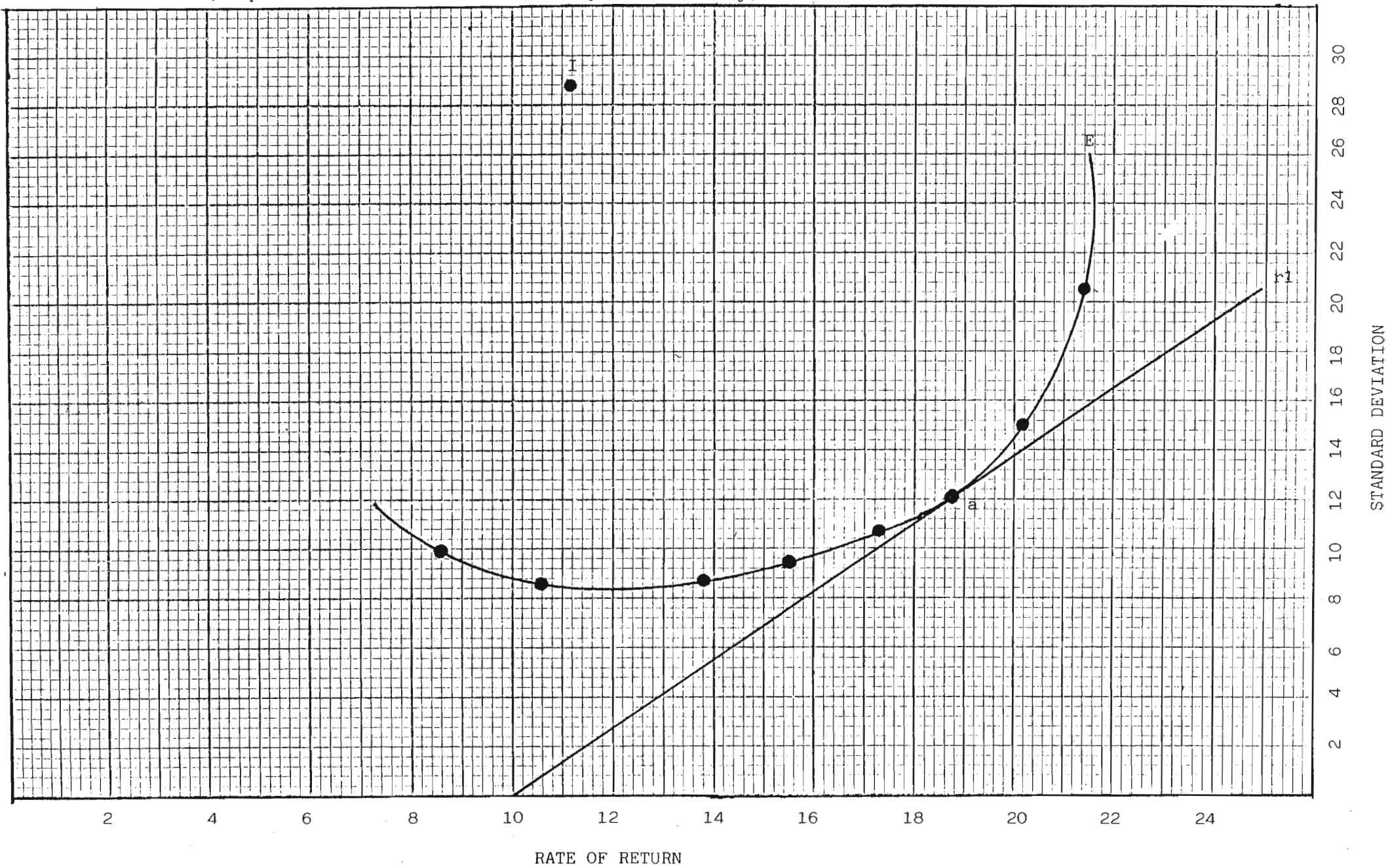


FIGURE 5.5 : Efficient portfolios available from international diversification
(10 percent limit to investment in specific country)

264

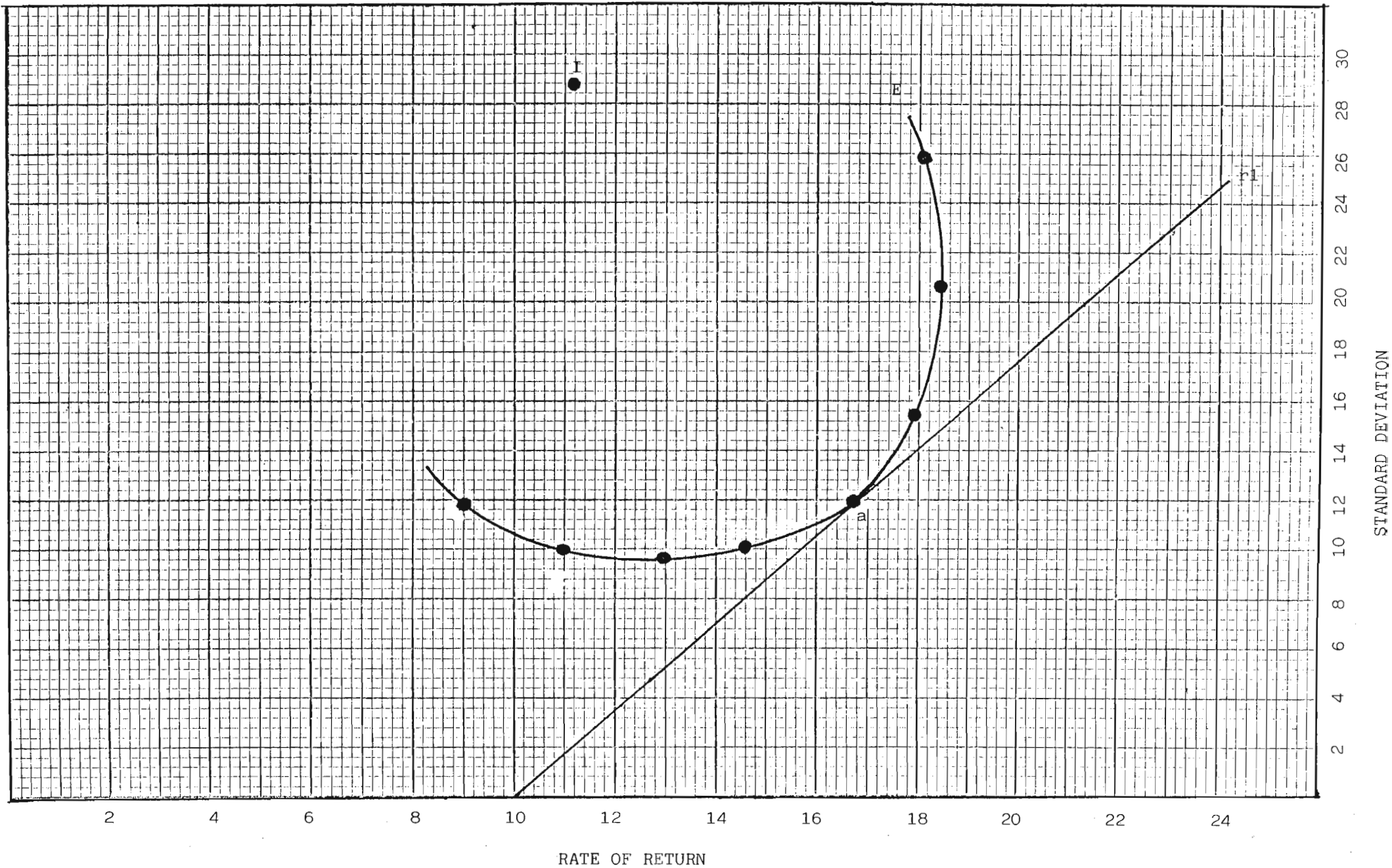


Table 5.6 : Composition of (ex post) optimal international portfolios for various levels of maximum investment in specific countries during 1969 - 83 (risk-free rate of return = 10%)

Country	No limit	50 percent limit	33 percent limit	20 percent limit	10 percent limit
Australia					3,52
Austria		1,18		2,99	10,00
Denmark					5,34
Finland	17,03	16,20	18,77	15,74	10,00
Germany				9,82	10,00
Japan	40,84	39,80	33,00	20,00	10,00
New Zealand		1,05	0,62	7,56	10,00
Norway					1,14
South Africa (goldmining shares)	14,15	13,89	13,66	12,72	10,00
Sweden	11,59	11,50	12,61	11,17	10,00
Switzerland	16,39	16,38	21,34	20,00	10,00
United Kingdom					10,00
Totals	100,00	100,00	100,00	100,00	100,00
Portfolio return	21,90	21,58	21,16	19,12	16,86
Portfolio standard deviation	12,50	12,24	11,90	10,30	9,31

Table 5.6 specifies the investment proportions for five such optimal portfolios, i.e. no limit, 50, 33, 20, and 10 percent limit to investment in a single country. The five optimum portfolios shown are in each case the so-called corner portfolios, i.e., those for which further reduction in variance can be achieved through the inclusion or omission of additional securities. The rates of return and standard deviations for the corner portfolios are shown in the last two rows of table 5.6. The other attainable combinations of return and standard deviations can be found by interpolation between the corner portfolios, as is done by lines drawn between the points in figures 5.1 and 5.5. Although 18 countries are investigated in this study, only 12 countries are included in at least one of the optimal portfolios, and Norway can be ignored because a negligible proportion of one of the portfolios is invested in this country. Investments in Japan, Switzerland, Finland, and South African goldmining shares account for the majority (40 to 88 percent) of the various optimal portfolios. Canada, France, Italy, South African industrial shares, Spain, and the United States are excluded from all optimal portfolios.

An explanation of these results can best be seen by setting out a correlation matrix for the countries which are included in at least one optimal portfolio (table 5.7). Japan, which taken by itself is characterised by a

high return and also a high level of risk, has a relatively large share in optimal portfolios owing to generally low covariances with other countries in the efficient set. The return on Japanese investments is negatively correlated with three countries, while it has low positive correlations with the remaining eight countries. Therefore, despite Japan's relatively high standard deviation, because of low correlations, its inclusion tends to reduce the risk of the overall portfolio. This is especially true since the investment returns of Japan are negatively correlated to the South African goldmining shares, and the latter comprises a fairly large share of all the optimal portfolios. South African goldmining shares, on the other hand, become part of the optimal portfolios on their own merits, these shares having both a very high rate of return and a very high risk level. However, the return on South African goldmining shares is negatively correlated with six countries, while the correlation with the remaining five countries is close to zero.

TABLE 5.7 : INTER-COUNTRY CORRELATION COEFFICIENTS FOR COUNTRIES INCLUDED IN (EX POST) OPTIMAL INVESTMENT
PORTFOLIOS

Country	1	2	3	4	5	6	7	8	9	10	11	12
1. South Africa - goldmining shares	1,000	0,079	0,147	-0,320	0,130	-0,532	-0,356	-0,104	0,277	0,012	-0,424	-0,454
2. Australia		1,000	-0,279	0,187	-0,082	0,035	0,254	0,585	0,304	0,093	0,306	0,350
3. Austria			1,000	0,091	0,260	-0,053	-0,100	-0,263	0,242	-0,157	-0,039	-0,171
4. Denmark				1,000	0,483	0,566	0,621	0,460	0,293	0,502	0,400	0,229
5. Finland					1,000	0,177	0,206	0,436	0,697	0,141	0,109	-0,078
6. Germany						1,000	0,552	0,016	-0,143	0,399	0,876	0,673
7. Japan							1,000	0,199	-0,052	0,210	0,539	0,494
8. New Zealand								1,000	0,545	0,116	0,082	0,027
9. Norway									1,000	0,032	0,036	-0,256
10. Sweden										1,000	0,228	0,204
11. Switzerland											1,000	0,698
12. United Kingdom												1,000

Gold has traditionally been an investment medium whose popularity is closely linked to economic and political instability. Shishko (1977) has shown that European investors have a long history of including gold in their portfolios, whereas United States investors have been more reluctant to follow this strategy. McDonald and Solnik (1977) have demonstrated that goldmining shares are widely recognized as diversifying (risk reducing) assets because of their negative correlations with the market. The results of this study confirms the risk-reducing properties of goldmining shares for South African investors pursuing international portfolio diversification. South African goldmining shares on their own have a high risk (standard deviation of 50,17 percent). However, the results in table 5.6 show that the inclusion of goldmining shares as well as foreign securities in optimal portfolios enables a substantial reduction in the risk of the portfolios (standard deviation between 9,31 and 12,50 percent).

In recent years, United States investors have become major investors in South African goldmining shares. Beckers and Soenen (1984) have shown that a strong negative correlation has been observed between the return on gold (in United States dollars) and the strength of the dollar. It was further shown that gold investments valued in

non-dollar currencies showed a better risk-adjusted performance than their dollar counterparts. Therefore, United States investors can be expected to show a preference for South African goldmining shares in comparison with gold options and other investments denominated in dollars. This line of reasoning also suggests that any goldmining shares quoted in a non-United States dollar base currency should behave less erratically than their dollar denominated gold investments. The former investment will have a lower specific risk component. The increasing exposure to South African goldmining shares by United States investors is confirmation of an appreciation of the superior risk-adjusted performance of such investment.

Institutional investors in South Africa have traditionally made large investments in both goldmining and industrial shares. Therefore, it is interesting to note the absence of South African industrial shares from the optimal portfolios. The main reason stems from the industrial shares having a high positive correlation (0,48) with goldmining shares, combined with the fact the rate of return on industrial shares was much lower than that for goldmining shares. As a result, goldmining shares dominate industrial shares and the latter was eliminated from the efficiency curve in the relevant range. Furthermore, the industrial shares of Japan, Switzerland, Sweden, and

Finland have superior risk-return characteristics in comparison with South African industrial shares, and these countries also have negative or only slightly positive correlations with South African goldmining shares.

The potential gains from international portfolio diversification can be more clearly seen by examining figures 5.1 to 5.5 which represent optimal portfolios for different maximum proportions that may be invested in specific countries. The risk-return combinations for portfolios of South African industrial shares is represented by point I. Clearly, investors will suffer losses if they must restrict their portfolios to South African industrial shares only (point I does not lie on the efficient frontier). Diversification among foreign securities and South African goldmining shares would have permitted investors to attain higher rates of return and lower risk of their portfolios than they could have by purchasing a portfolio consisting of South African industrial shares only.

Which combination of securities a South African investor would in fact have chosen cannot be known, since it depends on their individual marginal rate of substitution between risk and return. However, it can be stated that, if an investor wanted to maintain the same variability in return associated with South African

industrial shares, international diversification would have permitted him to earn 25,55 percent as against 11,17 percent, a gain of 128,7 percent in the annual rate of return (figure 5.1). Analogous calculations can be carried out to demonstrate the reduction in risk attainable by internationally diversified portfolios with the same expected rate of return as that from investing in South African industrial shares alone. An inspection of figure 5.1 shows that risk can be reduced from 21,43 percent to 5,7 percent, a reduction of 73,4 percent in the annual standard deviation.

Because of the high risk associated with investing in South African goldmining shares, the standard deviation does not fall in the range plotted in figures 5.1 to 5.5. Nevertheless, because of the high risk, investing in South African goldmining shares alone is unlikely to produce optimal investment performance for a local investor. It is only when the South African investor diversifies his portfolio to include countries such as Japan, Sweden, Switzerland, New Zealand and Finland that a significant improvement in portfolio performance (reduction of risk) results. The systematic nature of risk reduction through international diversification is reflected in the continuous reduction of portfolio risk at all levels of return as the number of foreign countries are increased. It can be seen from table 5.6 that when the number of

countries in optimal portfolios is increased from five to twelve, the standard deviation is lowered from 12,5 percent to 9,31 percent.

5.4 The stationarity of inter-country correlation coefficients

The analysis in the preceding section suggests that foreign security investments by South African investors would have given rise to substantial gains in welfare associated with portfolio investments. If the past results are considered to be indicative of future developments, then the results of this investigation suggests that future international diversification of portfolios is likely to be profitable and South African investors should take advantage of the benefits it offers. The past results represent potential gains from portfolio diversification, and there is no guarantee that they will be available in the future. Makridakis and Wheelwright (1974) have demonstrated that in order to realise the potential gains from portfolio diversification, the investor must be able to predict the future relationships among the price movements of two or more different national stock exchanges. This condition must be satisfied before the potential ex post benefits of international diversification can be realized on an ex ante basis. Watson (1980) has shown that the above condition would be

fulfilled if the relationships between the national exchanges were stable over time.

Therefore, a study to examine the stationarity of the correlation coefficients of the annual returns of the share market indices of the countries represented in the optimal portfolios during the 1969 - 83 period is necessary. To test for stationarity, the inter-country correlation coefficients were calculated for different sub-periods of the study period. Three tests of stationarity were performed. Firstly, the inter-country correlation coefficients were tested to determine whether they changed significantly, either from one three-year period to the next, or between the three five-year sub-periods. Secondly, the annual inter-country correlation coefficients were regressed over the fifteen-year period of the study to determine whether they varied significantly over the 1969 - 83 study period. The third test of stationarity will determine if the correlation coefficients for the different holding periods are equal.

The results of the first test of stationarity of the inter-country correlation coefficients (South African goldmining shares and other countries included in the optimal portfolios) are presented in table 5.8. As can be seen from this table, only the correlation coefficients

between the South African goldmining shares and Denmark (1972 - 74 sub-period), Germany (1972 - 74 sub-period), New Zealand (1978 - 80 sub-period), Norway (1972 - 74 sub-period), and Switzerland (1978 - 80 sub-period), were significantly different at the five percent level. The conclusion from this test is that inter-country correlation coefficients, in general, did not change significantly from one sub-period to the next over the fifteen-year period of this study. However, a more detailed analysis (presented in section 5.4.1) is necessary to determine to what extent the correlation coefficients for the different holding periods are equal.

TABLE 5.8 : INTER-COUNTRY CORRELATION COEFFICIENTS FOR THREE YEAR AND FIVE-YEAR SUB-PERIODS FROM 1969 - 83

Countries	three-year sub-periods					five-year sub-periods		
	1969 - 71	1972 - 74	1975 - 77	1978 - 80	1981 - 83	1969 - 73	1974 - 78	1979 - 83
RSA goldmining shares - Australia	0,095	0,140	0,132	0,114	0,046	0,085	0,126	0,052
- Austria	0,235	0,198	0,228	0,316	0,133	0,117	0,243	0,178
- Denmark	-0,145	0,218 ^a	-0,172	-0,382	-0,415	-0,128	-0,285	-0,451
- Finland	0,025	0,036	0,132	0,009	0,183	0,018	0,241	0,176
- Germany	0,016	-0,215 ^a	-0,317	-0,562	-0,515	-0,327	-0,417	-0,475
- Japan	-0,282	-0,350	-0,422	-0,317	-0,214	-0,369	-0,386	-0,276
- New Zealand	0,120	-0,128	-0,264	-0,312 ^a	-0,252	0,016	-0,217	-0,142
- Norway	0,317	0,127 ^a	0,351	0,291	0,194	0,212	0,421	0,363
- Sweden	0,152	0,102	0,045	0,120	0,009	0,120	0,037	0,048
- Switzerland	-0,317	-0,421	-0,317	-0,103 ^a	-0,488	0,334 ^b	-0,364	-0,529
- United Kingdom	0,221	-0,217 ^b	0,167	-0,417	-0,386	-0,385	-0,431	-0,521

a = sample inter-country correlation coefficient differs from previous sub-period at 5% level

b = Sample inter-country correlation coefficient differs from previous sub-period at 10% level

Note: The tests of significance used was reported by Chou (1975, pp. 602 - 617) for the difference between two sample correlation coefficients.

The results of the second test of stationarity are presented in table 5.9. It can be seen that with the exception of the correlations among Austria and Finland, Germany and Finland, Japan and Norway, Australia and the United Kingdom, and Austria and the United Kingdom, none of the other inter-country correlation coefficients changed significantly over the entire 1969 - 83 study period (at a 5 percent level of significance). The results of the two tests of stationarity show that the correlation coefficients, in general, have been fairly stable for the period covered by this study. In addition, it was shown in section 5.3.1 that the inter-country correlation coefficients were substantially less than plus one, and therefore, two important conditions for the successful implementation of international diversification appear to be satisfied. According to Yallup (1982), stable and low correlations between returns is a sufficient but not a necessary condition for gains to be derived from international portfolio diversification.

TABLE : 5.9 : Beta coefficients from regression analysis of annual inter-country correlation coefficients over the period 1969 - 83.

Country	Australia	Austria	Denmark	Finland	Germany	Japan	New Zealand	Norway	Sweden	Switzerland	United Kingdom
1. South Africa (goldmining shares)	0,023	0,035	-0,021	0,051	0,071 ^a	0,005	-0,008	-0,002	0,013	-0,062 ^b	-0,023
2. Australia		0,013	-0,034	0,032	0,001	0,026	0,035	0,012	0,002	0,007	-0,075 ^a
3. Austria			0,005	-0,151 ^a	-0,012	0,052	0,057	0,022	-0,052	-0,071 ^b	-0,082 ^a
4. Denmark				0,042	-0,022	0,008	0,022	0,005	0,142 ^b	0,021	0,012
5. Finland					0,090 ^a	-0,075	-0,053	-0,042	0,014	0,029	0,003
6. Germany						0,035	0,007	-0,006	-0,022	0,006	0,022
7. Japan							0,075	0,097 ^a	0,012	-0,013	0,002
8. New Zealand								0,042	0,062	0,004	-0,013
9. Norway									-0,007	0,057	-0,002
10. Sweden										0,031	0,022
11. Switzerland											0,046

a = Regression coefficient (Beta) significant at five percent.

b = Regression coefficient (Beta) significant at ten percent.

5.4.1 The stability of correlation coefficients using chi-square test

The correlation coefficient is a measure of the closeness of relationships between measured values of two variables. The population correlation coefficient (ρ) and its sample estimate (r) are interrelated and conform to a bivariate normal distribution. An important property of this distribution is that for a specific value of one variable, the corresponding value of the other variable will follow a normal distribution. Therefore, a statistical technique known as Student's t -distribution can be used for testing the null hypothesis that the population correlation coefficient is equal to zero. However, the t -statistic is unsuitable for testing null hypotheses when the population correlation coefficient is different from zero. The objective of testing the stability of correlation coefficients is that several sample estimates (r 's) are estimates of the same population correlation coefficient, which does not necessarily equal zero. Therefore, the correlation coefficients can be transformed so that statistical tables can be used. The chi-square technique can be used to transform the sample estimate correlation coefficient (r) to a quantity (Z) which is distributed approximately normally.

Using the chi-square statistic, we test the hypothesis that the correlation coefficients for the different holding periods (1, 2, 5, 10 and 15 years) are equal. This is in essence a test of the stability of correlation coefficients over time. The 1969 - 83 study period was divided into 15 subperiods ($k=15$) of one-year holding period. The chi-square statistics were derived for each of the 171 possible pairs of observations for the 19 countries (industrial shares and goldmining shares counted separately for South Africa). An acceptance was recorded for any χ^2 with values lower than the critical value of χ^2 (28,87) at the 5 percent level. The summarized chi-square results are shown in table 5.10.

Table 5.10 Tests of the stability of correlation coefficients ^(a) during 1969 - 83 (stable pairwise correlations in which the 19 countries are included) ^(b)

Country	Length of sub-periods			
	2 years	5 years	10 years	15 years
Australia	2	11	14	16
Austria	1	9	10	15
Canada	1	13	15	16
Denmark	2	11	13	15
France	0	8	9	13
Finland	3	12	14	15
Germany	0	8	11	13
Italy	2	13	16	17
Japan	1	10	13	15
Netherlands	1	9	10	14
New Zealand	0	7	10	13
Norway	0	7	12	16
South Africa (industrial shares)	1	6	9	12
South Africa (goldmining shares)	0	5	7	11
Spain	2	12	14	16
Sweden	3	11	13	15
Switzerland	1	7	11	13
United Kingdom	3	15	16	17
U.S. of America	3	14	15	16
Total number of stable pairs (out of 171) ^(c)	13	94	116	139
stable pairs (percentage)	7,60	54,97	67,84	81,29

(a) At 5 percent level of significance

(b) Maximum possible per country is 18

(c) Total = sum of column/2

The hypothesis that all correlation coefficients are estimates of the same ρ was rejected for all 171 pairs of countries for a one year holding period. From table 5.10 it can be seen that in the case of a two-year investment horizon, the null hypothesis was rejected in 158 pairs of countries and accepted in only 13 pairs. On the other hand, the results obtained by assuming investment horizons of 5 years, 10 years, and 15 years reveal a substantially increased degree of stability of the sample correlations. The null hypothesis is rejected for all 171 pairs of countries when the assumed investment horizon is one year (not shown in table 5.10). However, the acceptance rate increases with each increase in the assumed investment horizon. For a two-year horizon the acceptance rate of the null hypothesis is only 7,6 percent (13 pairs out of a possible 171). For the fifteen-year horizon, the null hypothesis is accepted for 139 pairs of countries out of 171 cases (81,29 percent acceptance rate).

The extent to which portfolio managers can implement risk reduction through international diversification depends largely on the inter-period stability of expected returns, variances, and the correlation matrix. Lessard (1974) suggested that international factors would produce a high degree of stability in the correlation structure between different countries' stock markets over time. However, Maldonado and

Saunders (1981) have provided evidence that rejects this point of view. They have shown that for time horizons longer than two quarters, the sample inter-country correlations are unstable. Maldonado and Saunders (1981) have argued that the ex ante planning of optimal international portfolios is very hazardous and the investor would have great difficulty in forecasting the outcome of a portfolio investment decision accurately when inter-period correlations are unstable.

Shaked (1985) has identified several deficiencies in the methodology relating to the empirical evidence presented by Maldonado and Saunders, and made three significant modifications to the methodology used by the latter. The three important modifications were: instead of results based on capital gains only, both capital gains and dividend yields were used for calculating returns; correlation coefficients for all countries investigated were constructed; and real rates of returns rather than nominal returns were used for measuring performance. Shaked (1985) investigated the inter-period correlation coefficients for 16 stock markets covering the period 1960 - 79. Shaked (1985) observed that a higher degree of stability is obtained over longer periods than shorter periods i.e. the observed degree of stability of the correlation coefficients increases as the assumed investment horizon increases. The findings of the Shaked

investigation are in agreement with the results of the present study which are presented in table 5.10.

This investigation examined the possible benefits of international portfolio diversification from the standpoint of a South African investor. The results imply that an optimal portfolio representing 18 different countries is unstable for relatively short investment horizons. The results suggest that the efficient frontier (ex post optimal portfolio) is continuously changing, and therefore, the selection of an ex ante optimal investment strategy would be very difficult to identify for short-term durations. The results also indicate that the degree of stability in the international correlation structure increases rapidly and consistently as the investment horizons is lengthened.

The results of this investigation justifies the practical use of the mean-variance model by portfolio managers to allocate funds for international portfolios based on ex post data. The use of the mean-variance model is especially justified for investors seeking international portfolios with medium-term and long-term investment horizons. The high degree of stability observed for longer investment periods suggests the existence of some "noise distortions" that impede the flow of certain international factors that would produce a degree of stability in the

correlation structure between different countries over time. These results are exploratory and present a fertile area for further investigation.

5.4.2 An evaluation of the stationarity of correlation coefficients

Roll (1977) has shown that a necessary and sufficient condition for gains to be derived from portfolio diversification, is that the sample minimum variance portfolio contains at least two non-zero investment proportions. Simply studying the sample minimum variance portfolio has the advantage that investment proportions of this portfolio are independent of expected returns and depend only on the sample covariance matrix. This relaxes the difficulty of assuming unrealistic (negative) expected returns. Therefore, a study of the minimum variance portfolio is a method of indirectly examining the stability of the correlation structure as well as showing directly if there are benefits from international diversification. This study has made use of the minimum variance portfolio as well as the use of tests of stationarity to determine potential benefits (ex post) from international diversification. Therefore, it is submitted that sufficient evidence has been provided to demonstrate that international diversification is beneficial to South African investors.

As argued above, the stability of correlation coefficients is only a sufficient and not a necessary condition for correlation structure stability. Accordingly, tests of stationarity do not imply that one can estimate ex ante returns from portfolio diversification. The ideal situation would be to identify the stochastic process underlying ex post returns. It is submitted that tests of stationarity suggest that ex post inter-country correlations can be used to achieve gains from international diversification beyond those available to the investor who pursues a naive strategy. However, if return-generating data could be provided by another (stochastic) process, even better predictions on portfolio performance could be obtained than those provided by ex post data.

Elton and Gruber (1973) have shown that for domestic portfolio construction, there is great difficulty with respect to compiling accurate matrix of correlation coefficients. The reason for this is that the organizational structure within which security analysis is typically performed does not lend itself to extensive inter-company analysis. Moreover, at the international level, in addition to the usual difficulties of performing domestic security analysis, the analysis of foreign securities is likely to be beset by such difficulties as fluctuating exchange rates, government interference in the

capital and foreign exchange markets, varying accounting standards and disclosure requirements across countries, and language barriers. Hence, it is unlikely that security analysts can generate accurate estimates of future correlation coefficients among all pairs of domestic and foreign securities. Consequently, some type of forecasting model is likely to be an investors best method for obtaining accurate estimates of the future correlation structure of international share prices.

Eun and Resnick (1984) have evaluated twelve alternative forecasting models that can be used to estimate the correlation structure of international share prices. The National Mean Model dominates all other models in terms of forecasting accuracy. This result confirms earlier findings that there is a strong country factor influencing the return-generating process. This study also observed that the Full Historical Model performed well in spite of the random noise contained in the historical data. This result probably reflects the model's ability to capture the influence of the country factor. This finding could help other researchers in developing algorithms that can be used to determine optimal international portfolios. To date, no accurate forecasting model has been developed to provide accurate estimates of future correlations relating to international share prices. Therefore, the challenge to future researchers lies in developing models which might

provide higher correlations between the forecast and actual correlations.

The lack of forecasting methods to predict future correlations among foreign equity investments does not preclude investment managers from using ex post data for constructing portfolios. The results of the stability of correlation coefficients suggests that the probability of success in international diversification is highly correlated with the length of the investment horizon.

Therefore, the recommended investment strategy will depend on the duration of the investment horizon. For short-term investment horizons (correlation coefficients are relatively unstable) a passive strategy is preferred to an active strategy. On the other hand, for long-term investment horizons (correlation coefficients are more stable) an active strategy can be expected to outperform a passive investment strategy. The rationale for these strategies is based on the finding of increased potential utilization of ex post data for longer investment horizons.

5.5 The benefits from international portfolio investment in conditions of unknown future investment performance (ex ante returns)

In section 5.3.2, the optimal allocation of assets in efficient international portfolios was constructed. The combination of the various foreign securities making up international portfolios is optimal ex post. This approach allocated investment funds after reviewing the results of a period that had already passed. Such an analysis is not likely to be of assistance in making investment decisions for the future. In situations where the investor has no information of future investment returns, it can be expected that he adopts a strategy to "buy the market". This strategy implies that the investor would buy all available securities in proportion to their market capitalization. Such a strategy will ensure that the portfolio would be fully diversified. The "buy the market" approach is an ex ante investment strategy in that it avoids the influence of events that actually took place during a given period. Instead, this strategy relies on what was expected before the investment period actually began, without being influenced by events that had already taken place.

For analytical purposes, two distinct groups of investors, each having distinct investment opportunities available to them will be considered:

(a) A South African investor who is constrained by exchange control regulations to limit investments to securities listed on the JSE (goldmining and industrial shares).

(b) A South African investor not constrained by exchange control regulations, and is therefore able to acquire securities on the JSE as well as the securities of 17 foreign countries that are listed in table 5.1 of section 5.2.

In using the "buy the market" approach it would be difficult to determine the proportion of the market capitalization to be invested in the different securities each year. Therefore, it is assumed that each of the above investors would purchase equal rand amounts in each security group available to them. For instance, a South African investor not constrained by exchange control would invest equal rand amounts in goldmining and industrial shares on the JSE as well as in each of the 17 foreign countries.

The risk-return characteristics for each of the above portfolios was calculated during the 1969 - 83 period. Furthermore, the investment characteristics of the two portfolios was plotted on a risk-return diagram for each year, and thereby indicated the respective position of the South African portfolio and the international portfolio for a specific year. Market lines were drawn by joining the South African risk-free rate to the above-mentioned points in each year. The annual returns for each of the two investment strategies as well as the difference between the two strategies was measured from the diagram for both South African market risk as well as the international market risk. The market risks were represented by the standard deviations of the portfolio returns for each year in the two markets under consideration. The relative performance of the two portfolios is presented in table 5.11.

Table 5.11 : Annual returns for South African and international market portfolios at South African and international market risk levels for the period 1969 - 83.

Year	Risk = S. African market risk			Risk = international market risk		
	Annual return (%)		Increase in return from international portfolio	Annual return (%)		Increase in return from international portfolio
	S.A. Portfolio	Internas. portfolio		S.A. Portfolio	Internas. Portfolio	
1969	-21,43	24,86	46,29	-20,15	23,81	43,96
1970	-18,27	6,97	25,24	-17,41	6,04	23,45
1971	5,04	24,17	19,13	4,70	23,10	18,40
1972	36,86	33,53	- 3,33	30,21	31,26	1,05
1973	27,50	26,26	- 1,24	24,35	25,60	1,25
1974	34,66	- 1,88	-32,78	32,17	- 0,63	-32,80
1975	- 5,15	15,48	20,63	- 3,26	13,32	16,58
1976	- 8,40	24,34	32,74	- 6,82	21,85	28,67
1977	- 1,35	3,27	4,62	- 0,96	2,64	3,60
1978	34,38	21,43	-12,95	30,46	19,67	-10,79
1979	41,80	26,70	-15,10	34,14	24,53	- 9,61
1980	70,47	19,56	-50,91	62,23	17,57	-44,66
1981	- 3,06	14,38	17,44	- 2,51	12,79	15,30
1982	12,66	18,87	6,21	10,64	16,39	5,75
1983	40,12	32,66	- 7,46	34,53	29,89	- 4,64
Average % per Year	16,38	19,30	3,08	14,15	17,86	3,71

The figures in table 5.11 indicate that on average, during the 1969 - 83 period, the ex ante selection procedure would have provided fairly large positive returns. Furthermore, these returns could have been attained at either of the two risk levels under investigation. Investment in a portfolio of South African equity shares would have produced annual returns of 14,15 percent and 16,38 percent at the international market risk level and South African market risk level respectively. Investment in the international equity portfolio would have produced annual returns of 17,86 percent and 19,30 percent at the international market risk level and the South African market risk level respectively.

A significant feature of the result in table 5.11 is that the results fluctuate over a wide range. The South African portfolio has produced very erratic returns. An exceptionally high return of 70,47 percent was attained in 1980 and the lowest return of minus 21,43 percent was obtained in 1969 (at the South African market risk). By contrast, the international portfolio produced fairly steady returns, with 1974 being the only year when slightly negative returns were obtained by this portfolio. These results clearly demonstrate the superior diversification properties of an international portfolio in comparison with a South African portfolio. Figure 5.6 highlights the relative performance of the two portfolios investigated.

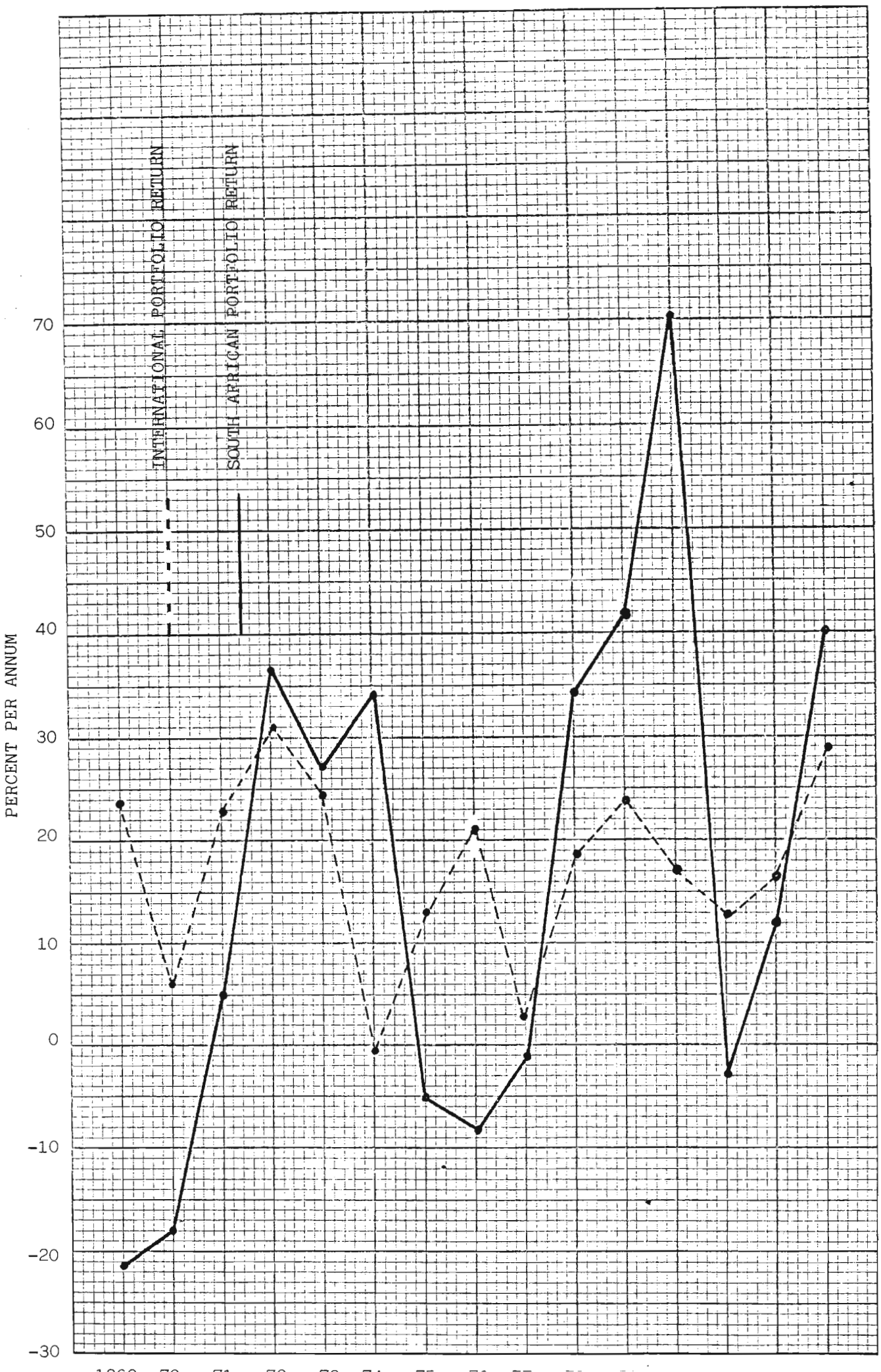


FIGURE 5.6 : The distribution of annual returns of international and South African portfolios during 1969 - 83

Figure 5.6 clearly shows the relatively steady returns provided by the diversified international portfolio. Figure 5.6 also provides an answer to the question why the South African portfolio produced inferior returns on average, despite the very large positive returns in certain years. It can be seen that a South African portfolio outperformed the international portfolio by a wide margin in the years 1974, 1978, 1979, 1980, and 1983. However, the South African portfolio produced large negative returns in the years 1969, 1970, 1975, and 1976. The high positive returns in certain years were insufficient to make up the large losses suffered in a number of years. These results indicate that the South African equities alone provided insufficient diversification to sustain a stable level of returns. By contrast, the international portfolio had no significant negative returns during the study period. Therefore, a collection of relatively smaller but consistent returns of the international portfolio was still able to outperform the South African portfolio which produced both large positive and negative returns. These results also demonstrate the ability of effective diversification to maximize the portfolio's long-term rate of return, even though many year-by-year returns may be less than the corresponding returns of riskier investments.

The results in table 5.11 also show that an international portfolio which spreads the funds over the full range of securities available in equal amounts amongst the different investment categories would, on average, attain excess returns of 3,08 percent per annum in comparison with a South African portfolio which spreads the funds equally between goldmining and industrial shares on the JSE. These comparisons were at the level of risk prevailing in the South African equity market during the study period. When a comparison is made at the risk level prevailing in the international equity market, the investor who purchased both South African and foreign equities attains an average annual gain of 3,71 percent over an investor that operates only on the JSE. Although these gains are large, they are significantly less than those attained by ex post optimum portfolios.

A limitation of the preceding discussion is that the annual returns from an international equity portfolio and an exclusively South African equity portfolio are measured at two different risk levels in each year. The measurement procedures do not consider the actual level of risk for each of the two portfolios. To overcome this deficiency, a standardized return (return adjusted for risk) is necessary for each portfolio. The average risk and return for the 15 years (covering the 1969 - 83 period) was calculated. The standardized return (return/risk) was then calculated and is shown in table 5.12.

Table 5.12 : Standardized returns from South African and international portfolios chosen ex ante

Portfolio	Average Return	Average Risk	Standardized return
South African portfolio	16,38 %	26,56 %	0,6167
International portfolio	17,86 %	9,53 %	1,8740

From the results in table 5.12 it can be observed that the ratio of international standardized return to the South African standardized return is 3,0387. This suggests that the international portfolio has a relative performance which is 3,0387 times that of the South African portfolio when the actual risks associated with the two portfolios are taken into consideration. These results are supported by van den Honert (1984) who also showed that on the basis of standardized returns, international portfolios outperformed South African portfolios during the period 1965 - 82. Without taking into consideration the actual risks associated with the two portfolios, the South African portfolio compares favourably with the international

portfolio. However, on the basis of risk-adjusted performance, the international portfolio is shown to be far superior to its South African counterpart. Because of the erratic nature of the returns on South African equities (especially goldmining shares), a high level of risk is associated with local securities which perform poorly on a risk-adjusted basis. The substantially lower risks and higher growth rates attained in several foreign countries has contributed to the superior performance of the international portfolio.

An explanation of the superiority of the international portfolio can be found in the context of the prevailing exchange control regulations in South Africa. The pattern of returns on the JSE is characterized by the dominance of goldmining shares which comprise a substantial proportion of the total market capitalization. Historically, goldmining shares have provided similar returns to both South African investors (subject to exchange control) and foreign investors (holding diversified international portfolios), and the risk associated with these returns have been vastly different for these two groups of investors. A well diversified international portfolio is able to diversify virtually the entire risk associated with South African goldmining shares. An international portfolio containing goldmining shares is able to attain relatively high returns without adding to the overall portfolio risk. In contrast, a South African investor holding goldmining shares

bears a large element of risk which is not diversifiable because of exchange control. These observations are supported by Carter (1983) who showed that goldmining shares are more efficient for overseas investors who are able to diversify away virtually the entire risk of investing in these shares while also yielding vastly superior returns.

The results of this study provide a strong case for international portfolio diversification by South African investors. Firstly, the ex post benefits from international portfolio investments are substantial and would justify the allocation of funds for foreign investments if exchange control regulations are abolished. It is unlikely that any South African investor will actually attain a point on the efficient frontiers constructed from ex post data. Investors will have to act ex ante and must make investment decisions before the year actually begins and cannot rely on the effect of events that have already taken place during the year. The results of the ex ante investment strategy show that as long as the investor is able to "buy the market", substantial benefits are likely from international portfolios despite not being able to attain portfolios that lie on the efficient frontier.

The results of both the ex post and ex ante investment strategies show that South African investors are likely to derive substantial benefits from international portfolio diversification. The analysis in chapter 4, (sections 4.5.1 to 4.5.4) has shown that the problems associated with acquiring foreign securities can easily be overcome. The results of this investigation support the hypothesis predicting the effectiveness of foreign security diversification from the standpoint of a South African investor. The results of this study show that local investors are bearing a high cost for the inability to attain effective diversification and reduce the risk of their portfolios as a result of exchange control. In view of the public welfare implications of foreign security investments, representations should be made to the authorities with the view to expediting effective and meaningful exchange control reform in South Africa.

5.6 Multidimensional scaling of international portfolio investments

The technique of multidimensional scaling is used extensively by statisticians seeking goodness of fit of experimental data. Multidimensional scaling is a technique of representing n observations geometrically by n points, so that the interpoint distances correspond in some sense to experimental dissimilarities between observations.

Kruskal (1964a) has shown that the dissimilarities and distances are monotonically related, and developed a technique of multidimensional scaling to compute configuration of points which optimizes the goodness of fit. Kruskal (1964b) subsequently developed a computer programme to facilitate the calculations necessary for using multidimensional scaling.

Correlation coefficients are important in that they provide the degree of co-movement between a group of investment alternatives. Multidimensional scaling provides a pictorial representation of the price series of a security through time as a single point in two-dimensional space. Greenacre and Underhill (1982) have demonstrated that when a number of securities are represented in two-dimensional space a map of points, as well as their proximities, distances, and groupings can be obtained. Therefore, multidimensional scaling provides much more information on diversification than the individual measure of co-movement between two securities. Multidimensional scaling provides valuable information on groupings of various securities that will provide risk reduction and return maximization opportunities for the investor. The closer the points on a two-dimensional space, the greater the degree of their co-movement and therefore, the lower

their diversification potential when combined in a portfolio.

A scaling of the 18 countries during the 1969 - 83 period is represented in figure 5.7. The scaling was derived from using the correlation between price series of each pair of countries as a measure of similarities between the different countries. The closer the two points in the plot, the higher the degree of co-movement and the lower the diversification opportunities. By contrast, points that are far apart represent good diversification opportunities.

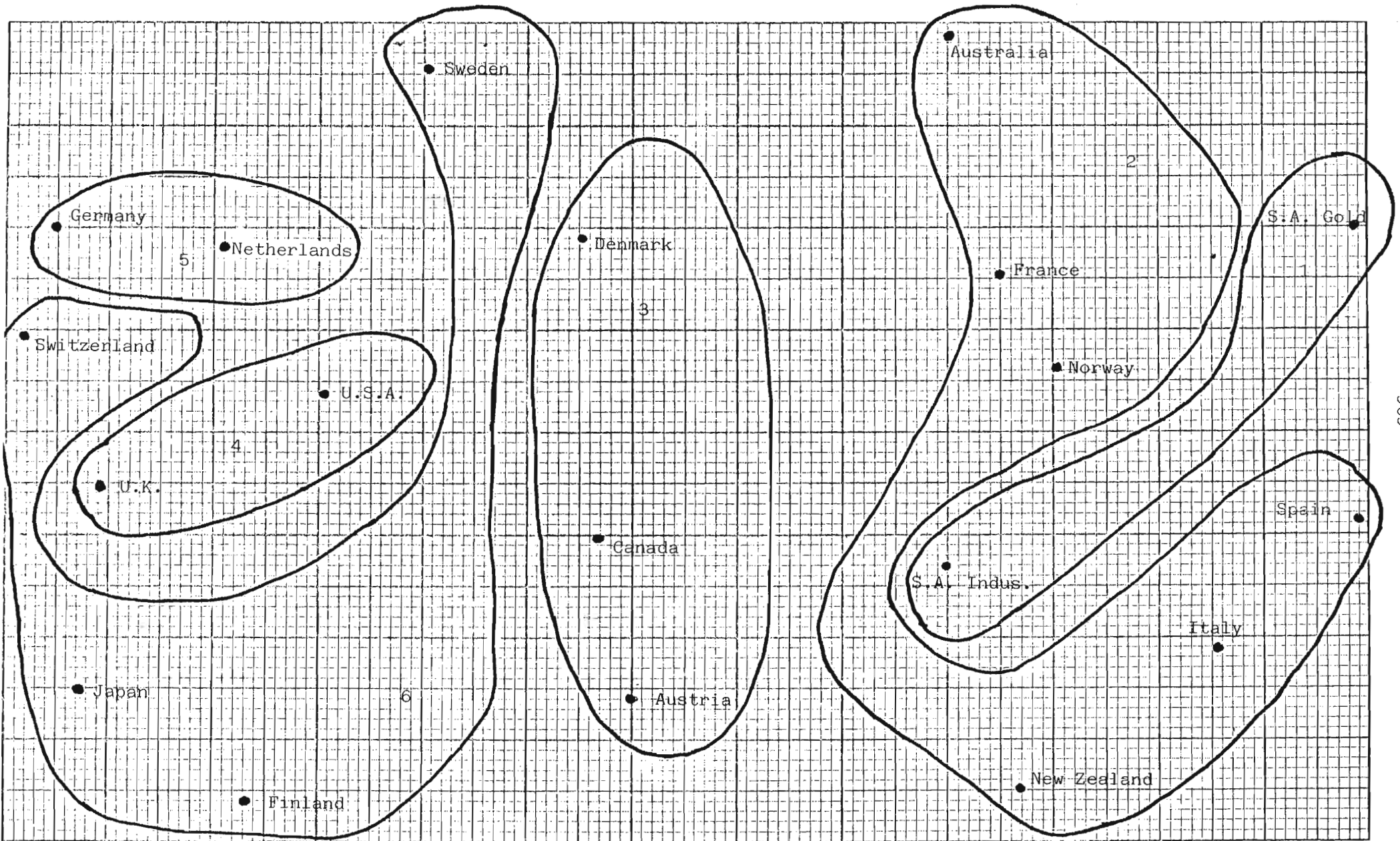


FIGURE 5.7 : A multidimensional scaling of securities for 18 countries

It can be seen from figure 5.7 that both the South African goldmining shares and industrial shares are on the right hand side of the plot. It can also be seen that the majority of the countries that are included in ex post optimal international portfolios available to South African investors (table 5.6) are situated in the left hand side of the plot. Furthermore, countries included in optimal portfolios are generally further apart from South African securities than countries that have been excluded. To facilitate analysis "cluster loops" have been arbitrarily inserted to the various countries represented in figure 5.7. The first cluster (1) is made up of securities available to South African investors. The countries on the left hand side are generally further apart from goldmining shares compared to industrial shares. This confirms the observation in the preceding section which showed that goldmining shares are more suitable than industrial shares for inclusion in international portfolios.

The second cluster (2) is positioned very close to South African securities, indicating relatively poor diversification opportunities for the South African investor. The third cluster (3) represents an intermediate

position between good and poor diversification opportunities available to South African investors. Cluster four (4) is positioned far away from South African securities, indicating useful diversification possibilities for local investors. The countries included in cluster four, namely, the United States of America, and the United Kingdom were shown to have produced poor annual returns relative to the other foreign countries considered (table 5.2) with relatively high risks. However, it can be clearly seen from figure 5.7 that their price movements did not behave like other countries that also yielded poor returns and high risks (cluster 2 and 3). A possible explanation for this observation is that the United States and the United Kingdom comprise the largest percentage of the total world equity market and thereby dominate international portfolios. Therefore, a portfolio that excludes these countries cannot be said to be a true international portfolio. Van den Honert and Affleck-Graves (1985) also found that the United States and the United Kingdom equities would provide risk reduction opportunities for the South African investor despite their relatively poor investment performance.

Cluster 6 is of particular importance to South African investors seeking international portfolio diversification. These countries are on average the furthest away from South African securities in figure 5.6,

indicating low or even negative correlation with domestic securities. This group, consisting of Switzerland, Japan, Finland, and Sweden offer the best diversification opportunities for South African investors and this is confirmed by the results in table 5.2. Germany and the Netherlands make up cluster 5, and probably reflects their high negative correlation with South African goldmining shares. From the above discussion it becomes clear that when the 8 foreign countries represented in cluster 4 to 6 are included in a South African investor's portfolio they would serve to reduce the risk within the portfolio and also maximize the expected return. These trends are confirmed by the composition of efficient ex post international portfolios available to South African investors (section 5.3.2).

5.7 The decision process and functional fixation of decision makers

Students of human behaviour have long observed the tendency of certain individuals to be fixated or stereotyped in their behaviour patterns. In particular, research into the learning process has been a popular activity for psychologists. Pavlov (1927) introduced the concept of classical conditioning : a stimulus which naturally elicits a certain response (as food elicits salivation) is paired with a neutral stimulus (e.g. a tone)

which, through repeated pairings, comes to elicit the same response as the original stimulus, or a response very similar to it. Skinner (1957) extended the concept of conditioning by showing that reinforcement increases the likelihood that the conditioned response will be repeated. The pioneering studies on conditioned behaviour were derived from animal experiments and have little relevance for the understanding of human learning behaviour. Estes (1967) has shown that the conditioning theories as developed in animal learning research imply a particular notion of reinforcement which cannot be transferred to human learning. In human learning, reinforcement does not have an automatic effect but rather serves to provide information to the subject, which the subject may employ to modify behaviour depending on the characteristics of the experimental situation.

A distinction between controlled and automatic responses is necessary to understand the decision making process. Controlled processes are important in decision making because, in many cases, we have to explore a number of options before we can make a decision. Furthermore, in a controlled process, past stereotypes or biases are not reflected in the decision making process. The controlled process is extremely flexible in that a decision is made after reviewing all possibilities and not just the variables that have influenced decisions in the past.

Since the controlled process requires mental effort, conflict may arise in the decision process. Wood (1983) has shown that in a controlled process individuals tend to differ in the strategies they adopt for decision making, depending on the difficulty of the decision, the number of available options, and the consequences of making a good or bad decision. For example, a decision maker will consciously decide whether to use a satisficing, quasi-satisficing, or a maximization strategy.

The automatic process or conditional response is also important in decision making. A major advantage of automatic responses is that we are not forced to expend much mental effort for routine decisions. A decision maker will be heavily taxed if he has to ponder every single decision that has to be made during the course of a day. Generally, we have a tendency to stick to a particular type of decision once it is made. Thus, we have a tendency to take the same route to work, shop at the same stores, maintaining the same circle of friends and the same rest/recreational pattern. The importance of automatic responses is that we would not be able to perform nearly as well as we do if we had to use controlled processes to make all our routine daily decisions. It is also clear that we would not be able to perform all the required skilled tasks if we were unable to automatize many of the routine aspects of responding to decisions. Generally, it is necessary to

have a complex blending of automatic and controlled processes in decision making.

The disadvantage of the automatic decision process is that we can get into a rut. If we do not evaluate our routine decisions occasionally, we are likely to maintain certain behaviour patterns that should be changed, such as where to shop, what to eat, choice of entertainment, and perhaps our relationship with others. Ornstein (1977) argues that too much of our behaviour is automatic and we can become like robots if we do not make our automatic behaviour conscious. Although it might be useful to periodically examine our "routine" decisions to determine if they should be altered, one can question the need to make many of our automatic processes controlled. It is efficient to expend as little mental effort as possible on some activities so that we have sufficient amount of unexpended capacity to perform those tasks that require mental effort. Kahneman and Tversky (1973) have shown that there is a strong tendency for most people to use "stereotypical" information instead of base-rate (scientific) information in decision making because they prefer to make clinical judgements rather than make use of statistical formulas. Elstein et al. (1978) have demonstrated that most people know very little about statistical theory, and therefore, prefer to use simple, additive models rather than complex statistical models.

The findings of researchers form a communications network between the researcher and a variety of interested parties seeking to utilize this available information. In order for the communication system to work effectively, the various phenomena must be coded according to a generally accepted system so that the receiver is able to decode the communication and receive the full and correct message. If there is no clearly established communication system between the sender and the receiver, there is the danger that the intended message may not be properly received. Experimental results have shown that subjects may employ coding strategies, depending upon the nature of the experimental task : some particularly simple ways to code experimental stimuli if the task is one of classification or generalization may be inappropriate if the task is one of identification or discrimination. Even if the coding is correctly done, there are a variety of reasons why the receiver may receive an incorrect message. One such reason for a correct message not being properly received is the phenomenon of "functional fixation". A functionally fixated decision maker attaches a specific semantic content to a given information process so that this person becomes unable to adapt to the changes in the underlying structures of the information process. For example, if investors are fixated or conditioned to evaluate a company's prospects according to the return on investment ("ROI") technique, they would assign the same weight to the "ROI" irrespective

of the change in the manner in which the variable is measured.

Functionally fixated users of information are considered unlikely to readily adapt to changes in methods of measuring variables which play an important role in making decisions. Functionally fixated behaviour is likely to lead to incorrect decisions because changes in variables are not recognised, with the result that the information is interpreted in the same way as before the change was affected. If the receiver of the information does not change his perception regarding the semantic content of the data and information, it is unlikely that he will make a differential response to changes in variables. Functionally fixated decision makers may well adapt to change over time. However, in the interim, decisions may be taken which are inconsistent with the required response to the revised signal.

The area of investments is dynamic and requires a continually changing set of variables that influence investment decisions. The use of financial statements in investment decisions suffers from a serious drawback because they do not provide specific information necessary to make appropriate investment decisions. The providers of financial statements must address themselves to audiences of interest covering a diversity of backgrounds. The users

of financial statements usually seek information that is beneficial in their decision making process. The heterogeneity of the decision process creates the need for a diverse set of information for various categories of users. The providers of financial statements usually prepare general purpose reports that will cater for a large audience of interest. This difference in orientation between users and providers has frequently resulted in claims that accounting information lacks usefulness for specific decision makers. Providers of financial statements are faced with the onerous task of providing a single set of general purpose statements that will serve all outside users; this complicates the decision process of users of such information in situations where specific information is lacking.

Several researchers have attempted to study investors' behaviour in order to acquire a better understanding of human information processing in situations requiring a change in the variables affecting investment decisions. In particular, researchers have specifically studied the role of functional fixation in investment decisions. The original functional fixation study by Ijiri et al. (1966) observed the behaviour of subjects trying to discover new responses to changed accounting variables after undergoing specific training relating to the changed circumstances. Ijiri et al. (1966) developed the following

hypothesis: "people who do not understand accounting well tend to neglect the fact that alternative methods may be used to prepare outputs". The results of the study showed clearly that users of accounting information made inadequate responses to the new variables influencing investment decisions. On the basis of their findings Ijiri et al. (1966) conclude that functional fixation does exist, and further suggest that as a result of this, changes in accounting may not achieve their intended purposes.

This emphasizes the importance of professional bodies and research institutions highlighting the importance of major developments in accounting and investment research to users of such information.

Ashton (1976) argues that previous functional fixation studies such as Elias (1973) and McIntyre (1973) emphasized the effects of accounting techniques on external reporting. He further argues that the effects of change in accounting techniques on decision makers had not been adequately explored. In the Ashton study the subjects were required to make pricing decisions for a standardized product. The two pricing systems used were the full absorption costing system and the direct costing system. After several trials, the information system relating to pricing was switched and the groups were told that there was a change in accounting system. In the control group there was no change in the basis of pricing. Ashton (1976)

showed that the majority of the subjects did not experience cognitive change consistent with the change in information system. Ashton (1976) concludes that his results "suggest that a large proportion of the subjects in the experimental groups failed to adjust significantly their decision process in response to an accounting change, thereby providing evidence of the existence of functional fixation in the accounting context".

The most widely mentioned research on functional fixation was undertaken by Abdel-Khalik and Keller (1979). Their basic premise is : if investors are functionally fixated with regard to the use of a given measure of accounting earnings, they will tend to ignore other accounting information which is not consistent with the existing measure of reported earnings. The accounting signal was a switch in the method of inventory valuation from first-in-first-out (FIFO) or from average cost to last-in-first-out (LIFO) for both accounting and tax purposes. A change in inventory valuation from FIFO to LIFO will be particularly pronounced in an inflationary period. A firm so switching to LIFO will show decreased earnings, but its net cash inflows will increase because of the lower tax liability associated with lower reported earnings. Furthermore, it is assumed that the amount saved in taxes by switching to LIFO are invested to earn positive returns. Therefore, for two identical firms, where one

switched to LIFO and the other continued to use FIFO, the former would show higher future earnings and cash flows than the latter which continues to value inventory on a FIFO basis. Therefore, the value of a firm which reported lower earnings in the year of change to LIFO should increase. However, if the investor is functionally fixated with regard to inventory valuation, the value of the firm switching to LIFO would decrease after the switch.

Abdel-Khalik and Keller (1979) designed an experiment to test the functional fixation hypothesis by asking various decision makers to select a portfolio from six firms in such a way that the expected return would be maximized. The decisions were related to the construction of portfolios in circumstances where several firms changed the method of stock valuation from FIFO to LIFO. In the post-experiment test, the analysts' indicated that they fully understood the impact of switching to LIFO on reported earnings and cash flows. Abdel-Khalik and Keller (1979) showed that in spite of this apparent understanding of the switch to LIFO, respondents generally preferred a firm using FIFO over an identical firm that had decided to switch to LIFO. It was also shown that firms that switched to LIFO had experienced an increase in cash flows of 5,6 million dollars or about 34 percent of its FIFO earnings. Yet, the decision makers continued to prefer firms that valued inventory on a FIFO basis, and their judgements were

consistent with fixation on reported earnings. The investigators also report that decision makers may be misled by the perception that a change to LIFO may be an attempt by management to eliminate paper profits. Therefore, the perception may be created that a firm that does not switch to LIFO does so because it does not have any paper profits. The investigators also suggest that analysts may perceive a change to LIFO as being influenced by the firm's inability to generate cash from conventional sources of income.

5.7.1 A survey to determine the efficiency of the allocation process of investment funds in South Africa.

This investigation is concerned with the study of investor's behaviour when there is a change in investment signal which would significantly affect the decision making process of the receivers of the signal (institutional portfolio managers). The investment signal is represented by the investment opportunities offered by foreign securities in addition to domestic investments. This study differs from the traditional EMH research which is mainly concerned with the relationship between the release of information and its impact on security prices. While numerous studies have been undertaken to determine the efficiency of the market in "impounding information", there have been very few studies to measure the efficiency of the market with respect to resource allocation of investment

funds. International portfolio diversification is concerned with the allocation of resources (domestic investment versus foreign investment), and therefore, falls outside the scope of traditional EMH studies. The main purpose of this investigation is to determine if portfolio managers in South Africa are efficient in their decisions to allocate funds between domestic and foreign securities.

In order to determine the efficiency of the allocation process for investment funds and to gain some insight into the reaction of portfolio managers when exchange control regulations are abolished, the following hypotheses were tested:

1. Institutional investors and portfolio managers of JSE stock broking firms generally have superior access to investment information, and are also able to process this information more efficiently than most other investors. Accordingly, this group of investors is in a position to outperform the market. Therefore, the majority of institutional investors/JSE portfolio managers would not regard the JSE as an efficient capital market.

2. Those institutional investors/JSE portfolio managers that do not believe in the efficiency of the JSE would be predisposed towards investing on the JSE despite the more favourable investment opportunities that would arise from international portfolio diversification.

3. As a result of exchange control, investors in South Africa are restricted to security investments on the JSE. The institutional investors/JSE portfolio managers are cognizant of the fact that investments on the JSE provide superior returns in comparison with other financial assets. Therefore, these investors would become conditioned and fixated towards investing on the JSE, and would tend to ignore investments in foreign securities as this would be inconsistent with their existing investment perceptions.

The postal survey questionnaire was conducted during April/May 1986, some nine months after the release of the final report of the De Kock Commission of Inquiry (which recommended the eventual abolition of exchange control in South Africa.) During this nine month period there has been sufficient informed commentary in the financial press and investment literature regarding the

benefits accruing to South African investors from international portfolio diversification. The respondents were institutional investors (insurance companies, unit trusts, and investment trusts listed on the JSE) as well as the portfolio managers of the JSE stock broking firms (who manage equity investments on behalf of clients). A copy of the questionnaire with a summary of the responses received is attached as an Appendix to this thesis.

A total of 79 questionnaires were sent to the different categories of respondents. Responses suitable for analysis were received from 41 respondents. This represents a very satisfactory response rate of 51,9 percent. Past experience with postal questionnaires suggest that an adequate response rate is likely to be received when the time required for completion is short and the subject matter should be of immediate interest to the respondents. Accordingly, the number of questions were restricted to five and it was estimated that not more than 30 minutes of the respondents' time would be required for completion. A postage paid, self addressed, return envelope was provided to facilitate the speedy return of the questionnaire. The interest of the respondents was confirmed by the fact that more than half of the completed questionnaires were received within a period of two weeks from despatching the questionnaire. Twelve of the respondents took up the offer of the summarized results of

the questionnaire mentioned in the letter of introduction.

Question 1 was divided into four parts and was designed to test hypothesis 1 and also to elicit the views of the respondents concerning the efficiencies of the NYSE and the LSE. Of the total response of 41, the majority of the respondents, namely 34 (82,9%) believed in the efficiency of the capital markets in general, but only 12 respondents (29,3%) regarded the JSE to be an efficient capital market. In reply to part 2 of question 1, a total of 29 respondents (70,7%) did not believe in the efficiency of the JSE in terms of the definition of the efficient capital markets and thereby confirming hypothesis 1. Part 3 of question 1 required the respondents to comment on the empirical evidence which suggests only the NYSE and the LSE conform to the definition of efficient capital markets. A total of 28 respondents (68,3%) agreed with this observation imputing efficiency to the NYSE and the LSE. The 28 respondents who believed in the efficiency of the worlds two largest stock exchanges were asked if they believed that South African investors could improve their portfolio performance by investing in inefficient foreign stock exchanges. These results are consistent with the respondents' perception of market efficiency because 25 respondents (89,3%) believed that South African investors could improve their portfolio performance by exploiting the inefficiencies of several smaller overseas stock exchanges.

Questions 2 and 5 were designed to determine if portfolio managers are efficient in their decisions to allocate investment funds and also to test hypotheses 2 and 3. The first part of question 2 asked the respondents their views regarding the De Kock Commissions' recommendation that exchange control over foreign equity investments by South African residents should be gradually dismantled. A total of 38 respondents (92,7%) believed that the removal of exchange control was in the best interests of South African investors. These results are hardly surprising because the dismantling of exchange control would lead to an improvement in portfolio performance. Ryan (1985) demonstrated that several large institutional investors have expressed enthusiasm for foreign security investments when the Commission's final report was released. In reply to part 2 of question 2, a total of 37 respondents (90,2%) indicated that they would seriously consider investments in foreign securities when the existing exchange control regulations are relaxed or abolished. This is further confirmation that institutional investors are fully aware of the fact that the inclusion of foreign securities to their existing portfolios will improve portfolio performance.

In part 3 of question 2, the 37 respondents favourably disposed towards foreign security investments were asked the period of time over which they would

consider the inclusion of foreign securities in their portfolios. Only 16 (39%) of the respondents indicated their willingness to acquire foreign securities in the short-term (a period up to 2 years). The other 25 respondents (61%) expressed a preference to make a long-term commitment (over a period of 5 years and more) to foreign security investments. Part 4 of question 2 asked the respondents what percentage of their total portfolio value they were prepared to invest in foreign securities. An arbitrary figure of 25 percent was chosen as meaningful investment in foreign securities. In view of the high fixed cost of investing in foreign securities (research, administration, etc.) and the need to reduce the high level of systematic risk of South African securities, a sufficiently large exposure to foreign securities is essential. A total of 31 respondents (75,8%) failed to meet the 25 percent cut-off point for meaningful investment in foreign securities. Furthermore, 22 of the respondents (53,7%) were only prepared to invest up to 10 percent of their total funds in foreign securities. These results further confirm the hesitancy of portfolio managers to invest in foreign securities despite clearly recognizing their investment merits.

As only 4 respondents (9,3%) had indicated that they would not consider investing in foreign securities, an analysis of their reasons for taking this decision cannot

be very reliable. Nevertheless, the perceived reasons for not investing is important in the evaluation of investment allocation decisions. The two most important reasons were: "liabilities to clients denominated in South African currency" (30,2%), and "average returns on the JSE are likely to be superior in the long-term" (27,9%) when ranking is done on a 5 point scale (5 points for first ranking and 1 point for fifth ranking). The other reasons reported were "the risk associated with exchange rate fluctuations" (18,6%), "lack of detailed knowledge of foreign securities" (14,0%), and "the lack of liquidity and investment flexibility" (9,3%). There is no justification to hold these views as arguments against foreign security investments. Investment literature has addressed each of these perceived "problems" and demonstrated that the benefits far outweigh the obstacles. Of particular interest is the high ranking (30,2%) given to "liabilities of clients denominated in South African currency". As taking cover against foreign exchange risk associated with foreign currency dealings is an established practice, it can be expected that portfolio managers would make suitable provisions to protect their investment in foreign securities. There is also no justification for assuming that the JSE would provide superior returns (on a risk-adjusted basis) in the long-term. These results suggest that certain unit trust, pension fund, insurance company, and JSE portfolio managers are taking a very

narrow view on foreign portfolio investments.

Question 5 was also designed to measure the commitment of institutional investors to foreign security investments. The respondents were asked if they were involved in any specific research into foreign securities so that they would be able to benefit immediately when exchange controls are relaxed or abolished. Only 13 respondents (31,7 percent) indicated that they were involved in any research related to foreign securities. Several of the respondents who were involved in researching foreign securities indicated that the nature of their investigation was exploratory and was aimed at familiarization of foreign securities rather than seeking specific securities as potential investment opportunities. The remaining 28 respondents (68,3%) indicated that they were not involved in researching foreign securities. As the majority of respondents are not researching foreign securities, the specific reasons for not pursuing research would be instructive. On a percentage first ranking basis, 60,1 percent of the respondents indicated that there was "little likelihood of exchange control being relaxed in the foreseeable future"; 15,4 percent of the respondents indicated that "the purchase of overseas expertise is a more efficient method of acquiring information on foreign securities", 12,6 percent of the respondents indicated that "research expenditure is not warranted in view of their

intended limited exposure to foreign securities", a further 8 percent preferred to "appoint foreign managers" and the remaining 3,9 percent indicated that "expertise to conduct research was lacking in South Africa". The same trend is obtained if the reasons are ranked on a point scale with 5 points for the first ranking and 1 point for the fifth ranking.

Question 3 asked the respondents to rank the specific investment benefits they considered important when considering foreign security investments. On a percentage first ranking basis, 40,8 percent ranked "reduction in portfolio risk" first, "portfolio protected against economico-political risk in South Africa" (22,2%) was ranked second, "improvement in portfolio risk" (11,1%) was ranked third, and "benefits from currency appreciation" (7,4%) was ranked fourth. The high ranking given to the improvement in risk-return characteristics of internationally diversified portfolios (81,5%) indicates that the large institutional investors are indeed aware of the overriding investment benefits accruing from foreign securities. The remaining reasons: "improved investment services to individual investors", "making local markets more efficient", and "access to foreign products and markets" make up the remaining 18,5 percent of the response to question 3 and can be considered as subsidiary benefits.

Question 4 further analyzes the benefits from international portfolio diversification by asking the respondents to identify indirect benefits (spin-offs) from such investments. On a percentage first ranking basis, only three reasons were chosen: "ease the burden of continually seeking additional investments in a market (JSE) with limited opportunities" (72,8%); "the creation of more efficient capital and equity markets in South Africa" (22,7%); and "skills acquired in foreign countries can be transferred to investments on the JSE" (4,5%). When ranking is done on a point scale the respective scores are: 25,9%, 22,3%, and 17,2% respectively. Furthermore, reasons such as: "a more efficient market for foreign exchange in South Africa" (15,7%); "the facilitation of overseas acquisitions and mergers" (13,5%) and "other reasons" (5,4%) also received responses when the point scale ranking was used.

An analysis of the ranking given to specific benefits outlined in questions 3 and 4 suggest that institutional portfolio managers in South Africa are fully cognizant of the benefits of investing in foreign securities. However, an analysis of their intentions to make foreign security investments when exchange control restrictions are removed (questions 2 and 5) reveal an inconsistency. While these portfolio managers are fully aware of the benefits arising from investing in foreign securities there is a distinct reluctance to make such investments (only 39 percent of the respondents are willing

to make investments within a period of 2 years). There also appears to be a very cautious approach to the size of the foreign portfolio holdings (only 24,3 percent of the respondents were willing to invest more than 25 percent of their portfolio value in foreign securities). Furthermore, there also appears to be a reluctance to pursue specific research into foreign securities (68,3 percent of the respondents are not researching foreign securities) despite the clear signal received from the authorities regarding the possibilities of relaxing exchange control regulations.

Several possible explanations could be offered to explain the disparity between the proper understanding of the benefits from foreign security investments and the reluctance to make significant investments in these securities. First, it can be suggested that institutional portfolio managers in South Africa are functionally fixated towards investing on the JSE as suggested by hypotheses 2 and 3. Second, South Africa is far removed from the major security markets where investments are to be made and this may have resulted in raising the level of caution. Third, South Africa is currently confronted with a massive outflow of funds as revealed by the Leitwiler proposals (an agreement between South Africa and its major creditors which provided a programme of debt repayments which were subject to a moratorium), and in these circumstances local portfolio managers may consider it imprudent to make

significant foreign investments and thereby contribute towards the outflow of capital from this country. Fourth, the majority of the respondents have rated the JSE as an inefficient market, and may erroneously believe that the various "hassles" involved in foreign security investments counteracts any improvement in portfolio performance.

The results of this survey has revealed some interesting observations on the investment behaviour of institutional portfolio managers in South Africa. It is difficult to draw broad generalizations from this study as the sample investigated was not large. It would appear that portfolio managers are inefficient in their role as allocators of investment funds. The evidence also seems to suggest that some informed professional investment managers are functionally fixated - unable to adapt readily to new information or changes in some measurement variables relating to portfolio performance. The findings also suggest that the communication channels between the sender and the receiver are in need of improvement. The sender, (the investment researcher) will need to provide a clearer coding link, and the receiver, (the portfolio manager) will have to develop a better understanding of the economic phenomena involved in the change of investment signal. In this research situation, it appears that the portfolio managers have sufficient access to the disclosure of facts (they are fully informed of the benefits emanating from

foreign security investments). However, there appears to be a failure in the decoding process (inadequate understanding of the underlying economic phenomena) which contributes to functional fixation in respect to the investment allocation decision.

If portfolio managers' avoid opportunities to invest in foreign securities because of certain incorrect beliefs in the functioning of international security markets, then such beliefs will have major consequences for individual investors whose funds are administered by institutional investors (unit trusts, pension funds, insurance companies, investment trusts etc.). To the extent that there is a misallocation of funds (not deriving the full benefits of international portfolio diversification), the wealth of these investors will not be maximized. Furthermore, in view of the allocation role of investment funds in the economy, it can be said that the welfare of all South African citizens will be eroded by pursuing suboptimal investments i.e. investment funds continued to be invested in South Africa despite the greater rewards offered by foreign investments. Therefore, it is imperative that researchers in the field of investment management should improve the efficiency of the coding system (highlight the benefits of foreign security investments) to ensure that the investor understanding of

the process is improved (make the right investment allocation decisions).

5.8 Foreign disinvestment and its impact on the performance of South African portfolios

In recent years there has been a growing campaign to withdraw foreign capital from South Africa. The argument of the advocates of disinvestment is that the withdrawal of foreign capital will force the South African government to speed up reform and provide a more equitable political dispensation. Critics of disinvestment argue that the South African government is more likely to advance political reform during periods of economic prosperity and the absence of a threat of economic sanctions. To date, there has been no large scale disinvestment or economic sanctions against South Africa. Koenderman (1983) has demonstrated that economic sanctions against South Africa have not been effectively implemented because this country is a major supplier of strategically vital minerals to the Western countries.

Although the disinvestment campaign in the United Kingdom and the European countries is not strong or well organised, it is gaining rapid momentum in the United States of America. The disinvestment movement started as isolated campus campaigns at certain radical American

universities, but has now grown into a national movement that is enjoying the support of a wide spectrum of public opinion. The Economist (1985a) reports that various states, cities, universities, labour, and church authorities in the United States have divested themselves of securities held in companies that operate or have subsidiaries in South Africa. It is further reported that American banks have drastically reduced their direct lendings to the public sector in South Africa. Furthermore, the refusal by several major American banks to rollover short-term debt by South African borrowers precipitated a major foreign exchange crisis which led to a four-month moratorium on foreign loans, reimposition of exchange control on non-residents, and the reintroduction of the financial rand that came into effect on 2 September 1985.

Major militating factors against economic sanctions and disinvestment are the political reforms currently taking place in South Africa and the support of conservative governments in countries such as the United Kingdom, United States, and West Germany. Nevertheless, South Africa should not become complacent because of the minimal success attained by the disinvestment lobby. Economic pressure against South Africa will abate only if there is immediate and

substantial political reform in South Africa that offers tangible proof that the government is sincere in removing all forms of discrimination in this country. Minor political reforms initiated by the government are not likely to satisfy South Africa's overseas critics. In the final analysis overseas critics are likely to abandon economic pressure when all forms of discrimination is removed in South Africa. This is clearly illustrated by the international isolation of several sporting organizations despite the removal of all forms of discrimination relating to those organizations' sporting activities. It may be argued that political change has been slow because of the "constructive engagement" policy adopted by conservative governments in the major industrialized countries. However, the sanctions and disinvestment lobby may gain the upper hand in the event of radical leaders being elected in countries that exert strong political influence over South Africa.

The historical political situation in South Africa has played a major role in the disinvestment campaign against this country. During the 1960's and the 1970's South Africa experienced a period of relative prosperity which resulted in massive inflows of foreign capital to take advantage of the superior

investment returns offered in this country. However, by 1983 South Africa was experiencing a severe recession which resulted in substantial declines in profitability. In addition, the political situation in South Africa deteriorated further and this led to a further erosion of overseas confidence regarding their investments in this country. The abolition of exchange control over non-residents in February 1983 provided the necessary stimulus for foreign companies seeking to disinvest from South Africa. Gelb (1985) reports that during the first-half of 1983 there was a total disinvestment in the South African economy by foreign investors amounting to R1300 million. Net sales of JSE listed equities amounted to R720 million and the remainder represented the purchase of controlling interest in overseas companies selling out or reducing their investment in South Africa. The Economist (1985c) reported that more than 30 foreign multinational companies have divested all or part of their investments in South Africa since the abolition of exchange control over non-residents in 1983. It was further reported that companies disinvesting South African holdings included many household names such as Coca-Cola, Apple Computers, Helena Rubenstein, International Harvester, and Metal Box.

Despite the hardening of attitudes in the United States towards investing in South Africa,

investors from that country are still showing a strong preference for investing in high quality South African goldmining and mining house shares. The Economist (1985b) reports that despite the large investment outflow in 1983, an amount exceeding R1 billion was invested on the JSE by foreign investors in 1984. A large part of this massive investment inflow was by institutional investors and gold/precious metals investment funds from the United States. In the current period the performance of gold has been poor and gold shares are not attracting much attention from foreign investors. However, foreign investors are not selling off their holdings in South African goldmining shares. It would seem that foreign investors are holding on to their goldmining shares in the expectation of a rise in the gold price, a stronger rand and a possible increase in the dollar price of gold shares.

A recent major development in the disinvestment campaign against South Africa is the selective sanctions package signed by President Reagan in September 1985. In terms of this executive order the following sanctions were imposed against South Africa : a prohibition of bank loans to the South African government; a restriction on the sale of nuclear goods and the sale of computers and software to the South African government; and a prohibition on

the importation of Krugerrands. These sanctions are of limited scope and are unlikely to do any serious damage to the South African economy. Nevertheless, these measures can be expected to encourage the disinvestment lobby to take a more active stand against foreign investments in South Africa.

Several cities and states in the United States are considering passing legislation that would restrict public pension funds from investing in companies that have business associations with South Africa. Such actions would have potentially serious practical implications for the investment policies and practices of large pension funds. Wagner et al. (1984) have investigated the implications of such disinvestment on the performance of large pension funds who traditionally hold shares in companies that have business relations with South Africa. It was demonstrated that 229 companies in the Standard and Poor's 500 (often considered to be the "opportunity set" for institutional investors) have trading operations in South Africa. These 229 companies represent more than half of the total capitalization of Standard and Poor's 500, and represent 31 of the 50 largest companies in the United States.

Disinvestment of holdings in these 229

companies operating in South Africa represent a major challenge to the investment managers of large pension funds. These investment managers would have to construct from a reduced universe of smaller and generally riskier companies, portfolios that offer comparable risk-return characteristics to those offered by investments in larger companies operating in South Africa. To analyze the effect of disinvestment on portfolio performance, Wagner et al. (1984) constructed an "alternative investment universe" that is free of investment in South Africa. In total, the 152 companies that were replaced in the portfolios constructed were the largest available United States companies that did not operate in South Africa. The portfolio performance of companies operating in South Africa and the alternative investment universe were compared for the 5 year period ending June 1984.

Wagner et al. (1984) observed that during the study period the alternative investment universe outperformed the 152 company portfolio operating in South Africa. This is in line with recent observations that small firms tend to outperform large firms. Therefore, the higher return obtained by the replacement portfolio could be due to the small firm effect. However, it was shown that the replacement

portfolio has 8 percent more risk (measured by beta). Furthermore, the companies represented in the replacement universe are primarily domestic in nature, and are more susceptible to United States economic risk which cannot be diversifiable by earnings from foreign countries. Wagner et al. (1984) also demonstrated that a pension fund restricted to the replacement portfolio can be expected to incur higher trading and administrative costs as this portfolio will contain smaller, riskier, and less liquid companies. It was shown that disinvestment restrictions will have minimal practical effects on portfolios of 50 million dollars or less. However, larger investment funds would have to drastically restructure their investment portfolios in order to attain targeted risk/return objectives.

Brealey and Kaplanis (1986) analyzed the effect of a boycott of South African security investments on the welfare of boycotters (foreign investors disinvesting South African securities) and the rest (South African investors and foreigners not party to the boycott). It was demonstrated that an efficient boycott is one that succeeds in imposing a maximum welfare loss on the boycotted at a minimum cost to the boycotter. A boycott of South African securities is unlikely to be implemented by all

foreign investors because there is an incentive to free-ride and let the boycotters impose the welfare loss on themselves. These foreign investors that are not party to the boycott are therefore in the same position as South African investors who are boycotted. In order to measure the effect of a boycott of South African securities, a model of linear taxes on international investment (developed by Kaplanis (1985)) is used. This model assumes that the tax rate is sufficiently large so as to eliminate all foreign security investment in South Africa which is subject to this tax.

Brealey and Kaplanis (1986) demonstrate that in the absence of any barriers to investment in South Africa, both South African and foreign investors will maximize their wealth by holding market portfolios. A boycott of South African securities will result in a restructuring of portfolio holdings - South African investors increasing their exposure to local securities and foreign investors increasing their exposure in non-South African (foreign) securities. The welfare effects of a boycott of South African securities has twofold consequences. First, there is a loss of diversification resulting from the elimination of South African securities from the universe of investment alternatives. Second, there is

a one time change in security prices caused by selling South African securities and replacing them with other securities.

The welfare model developed by Brealey and Kaplanis demonstrates that a boycott of South African securities will reduce the welfare of both South African and foreign investors. It is further shown that the loss of diversification is shared evenly between the two groups of investors only if they are equally wealthy. In the event South African investors are less wealthy than foreign investors, the former will suffer a proportionately larger welfare loss. In the absence of exchange control, it can be expected that South African investors would hold internationally diversified portfolios to derive the advantages of geographical diversification. A boycott of South African securities is likely to result in local investors being obliged to acquire South African securities disinvested by foreigners. Therefore, South African investors are not likely to attain efficient (optimal) portfolios because of a larger holding of South African securities and a corresponding smaller holding of foreign securities. Furthermore, it can be expected that South Africa may retaliate by forbidding its residents from acquiring foreign securities, resulting in their inability to construct optimally diversified portfolios. Thus,

even with the absence of exchange control, South African investors can be expected to suffer a loss in diversification as a result of a boycott of South African securities.

At present, South African investors are subject to exchange control regulations, and are therefore confined to holding South African securities. A portfolio of South African securities cannot be regarded as efficient as foreign securities are excluded from the universe of available securities. In the event of a boycott of South African securities, investors in this country will have to take up all South African securities sold by foreign investors. However, the loss in welfare will be smaller than in the case where no exchange control existed. Because of exchange control there will be no change in the geographical composition of South African portfolios. Except for investments in De Beers and Sasol, foreign portfolio investors do not make any meaningful investment in South African industrial securities. Foreign investors are mainly interested in goldmining and strategic minerals equity shares of South Africa. A report by JSE brokers Davis Borkum Hare and Company (1983) revealed that on 30 June 1983 foreign shareholders held about 32 percent of the market capitalization of all South African mining shares. Therefore, in the event of a boycott of South African securities, local investors would be

obliged to acquire the predominantly goldmining and minerals related shares disinvested by foreign investors. Several industrial companies such as Barlows, Metal Box, AECI, and SAB have their shares listed on overseas exchanges and it can be expected that they would suffer the same fate as goldmining shares.

A boycott of South African securities can be expected to have a significant effect on the portfolio composition of institutional investors in South Africa. The shares disinvested by foreign investors are unlikely to be evenly distributed among all categories of South African investors. The institutional investors in foreign countries generally invest in high quality (expensive) South African goldmining and mining house shares. In the event of disinvestment it is unlikely that individual investors in South Africa would be in a position to acquire any meaningful quantities of high quality goldmining shares released by foreign investors. Therefore, local institutional investors can be expected to increase their exposure to South African mining shares by taking advantage of a fall in prices in the event of disinvestment. The institutional investors would improve the portfolio returns but would incur much higher risks associated with goldmining shares. Institutional investors, such as unit trusts, may face

additional problems related to the restrictions on the maximum percentage of their funds that can be invested in specific securities or certain categories of investment. In general, South African investors are likely to have their wealth reduced by a loss of diversification caused by holding a larger proportion of goldmining shares which cannot be considered optimal in terms of efficient portfolios. There is also the added cost of restructuring a portfolio that is inevitable as a result of foreign investors releasing large parcels of South African securities.

In the absence of any boycott of South African securities, foreign investors can be expected to hold a world market portfolio. In the event of a disinvestment of South African securities, the forced sale will cause the relative prices of South African and foreign securities to change. Brealey and Kaplanis (1986) have shown that a tax on South African securities induces an increase in the return on foreign assets relative to South African assets. Foreign investors participating in the boycott would be obliged to sell their South African securities at prices below their current equilibrium levels. Furthermore, foreign investors will have to substitute more expensive foreign securities to replace the South African securities. Therefore, the welfare of the boycotting foreign investors is further diminished by

price changes associated with a forced sale of South African securities.

It has been shown in section 5.3.1 that South African goldmining shares are unique in their ability to possess countercyclical movements in relation to the major foreign stock exchanges. Therefore, as South African goldmining shares are eliminated from the investment universe it will become increasingly difficult for foreign investors to construct optimally diversified portfolios. There is the possibility of foreign investors acquiring gold shares in countries such as Australia, United States, and Canada. However, none of these countries are able to offer returns comparable to high quality South African goldmining shares. In addition, foreign goldmining shares have an insignificant market capitalization in comparison with their South African counterparts.

As a result of pressure from various activist groups, various institutional investors in the United States have shown a strong desire to seek alternatives to South African goldmining shares. Chambliss (1985) reports that in response to this, the Precious Metals Inc. in the United States has launched a closed end gold investment fund that will not hold any shares or gold bullion originating from South Africa. It is

further reported that although the 300 million dollar gold investment fund has been well received on the NYSE, it is unlikely to provide any serious competition to South African goldmining shares.

For the South African investor, the diversification and the price effect work in opposite directions. It has already been shown that South African investors will have their diversification eroded by a change in composition of South African securities acquired from foreign investors. However, a South African investor can be expected to benefit from foreign sales of South African securities. Since South African investors are already holding optimal portfolios (as determined by exchange control), they are unlikely to acquire large quantities of additional securities unless the price of these securities are lowered. Furthermore, the fall in the price of securities must more than compensate for the perceived loss of diversification. Therefore, South African investors must always benefit as a result of a disinvestment by foreign investors. This analysis suggests that a disinvestment of South African securities is likely to be ineffective because only foreign investors are likely to suffer a loss in welfare. Furthermore, foreign investors are unlikely to agree to sustaining a welfare loss which at the same time enriches South African investors.

A limitation of the Brealey and Kaplanis model was that a boycott of South African securities is the only friction to international capital movement i.e. the analysis is limited to investment in financial assets. However, it is unlikely that the disinvestment lobby would be satisfied with a mere disinvestment of South African securities. Foreign multinational companies are very visible by their presence in South Africa and are more vulnerable to pressure exerted by activist groups than foreign portfolio managers. Therefore, a trade boycott and a withdrawal of foreign multinational companies can be expected to accompany a disinvestment of South African securities. An escalation of a boycott of South Africa can therefore be expected to slowdown economic growth and cause much hardship such as rising unemployment and scarcities of essential goods and services. Therefore, an extended boycott of South Africa is likely to have adverse effects on the South African economy.

Spandau (1979) has analyzed the social, political, and economic consequences of a possible trade boycott against South Africa. Spandau (1979) showed that, in the event of a trade boycott being implemented specific industries would be extremely vulnerable. In particular, companies relying on foreign technology would be particularly hard hit, and

in the event of an oil embargo the transport industry would be particularly vulnerable. It was shown that in the early stages of an economic boycott the South African economy will actually be stimulated by import replacement and a drive towards self sufficiency. However, in the long-term, the lack of essential ingredients such as : foreign competition; technology; foreign capital; management and other skilled resources will have a detrimental effect on the economy. Therefore, in the long-term the profitability of South African companies can be expected to decline as the full impact of the trade boycott is felt by the South African economy. This analysis suggests that a programme of security disinvestment combined with a trade boycott is likely to stimulate the prices of South African securities, but will have a depressing effect on security prices as the inefficiencies and scarcities filter through the economy.

Malan (1981) has shown that despite the programme of import substitution the dependence of South Africa on foreign trade and capital has not decreased. It was further shown that foreign investment assumes added significance because of the accompanying inflow of highly developed technology and skills. The possible effects of disinvestment can be seen from the several estimates of foreign investment

in South Africa. Holman (1985) estimates that in 1982 the value of United Kingdom's direct and indirect investments in South Africa amounted to R22 billion, representing approximately 40 - 50 percent of total foreign investment in the Republic. Nöfke (1984) reports that the 350 large United States companies had more than R5,5 billion invested in South Africa. When bank loans and investment in equities are included the total United States investment in South Africa is over R25 billion. In recent years West Germany has also made large investments in the South African economy. These figures suggest that South Africa is highly dependent on foreign investment. Even in the event of a partial disinvestment, a high level of unemployment and a substantial decline in economic growth can be expected.

The reality of disinvestment is based on a trade-off between social conscience and the financial impact of withdrawing investments from South Africa. Despite the strong social conscience, the financial consequences of disinvestment have been high enough to prevent a massive outflow of foreign investment funds. For example, it has been reported that the state of Massachusetts incurred a loss of 11 million dollars when it sold securities of all United States companies operating in South Africa. Furthermore, it is reported that it will take up to 22 years for

Massachusetts to recover from the loss. The state of Wisconsin is also committed to selling off shares in corporations operating in South Africa. Harvey (1985) has estimated that it will cost Wisconsin a one-time cost of over 24 million dollars due to additional brokerage fees and the price discounts associated with disinvestment. In addition, there would be a recurring annual cost of over 50 million dollars due to reduced opportunities for investment selection.

The increased social conscience against apartheid has resulted in the lobby advocating disinvestment becoming increasingly vociferous and militant. Companies in the United Kingdom and the United States are facing a massive onslaught from radicals and pressure groups to reconsider investment links with South Africa. Some of the highly visible companies such as General Motors, Barclays Bank, and IBM are in a situation where their top executives are devoting a large percentage of their time to defending their investments in South Africa, even though their actual profits from investments in this country is not significant. This so called "hassle factor" may well become a major argument as the disinvestment debate gathers momentum.

The disinvestment of South African securities by foreign investors and the corresponding enlarged

security holdings by local institutional investors is likely to have far reaching consequences for the South African economy. The increased size of the institutional portfolio holdings in industrial companies is likely to contribute towards a change in control and structure of many South African companies. For instance, the recent disinvestment of Premier Milling has resulted in a change in ownership and the restructuring of the food industry in which the resultant Premier Milling / SAB group of companies operate. This restructuring has enabled the SAB/Premier Milling group to have a monopolistic/oligopolistic control over several industries in which they operate. The SAB/Premier Milling group is in turn controlled by the Anglo American Corporation (AAC). The AAC and its subsidiaries constitute the largest group of companies listed on the JSE. It is extremely unlikely that companies in the SAB/Premier Milling group will encounter new competitors in those industries in which they have gained market control as this will entail confrontation with the largest conglomerate in South Africa. Similarly, the disinvestment of Rennies has resulted in a restructuring and increased economic concentration in the shipping and hotel industries. Further restructuring and increased economic concentration in South Africa can be expected to take place as overseas companies sell off or reduce their stake in this country.

The conglomerate companies in South Africa are already in possession of an inordinately large share of the South African economy. The process of disinvestment of South African industrial companies is likely to result in a further increase in asset concentration in the hands of the conglomerates. A natural consequence of the domination of the South African economy by a few conglomerates is the large number of price cartels and monopolies/oligopolies in this country. The lack of competition and price cartels in industries such as newspapers, milk, paint, cement, cigarettes, and building materials has resulted in the price of goods and services being unrelated to the prevailing supply and demand characteristics in these industries. The Financial Mail (1986) reports that the high rate of inflation currently prevailing in South Africa is to a large extent influenced by economic concentration in the economy. The seriousness of economic concentration in South Africa can be reflected by the recent amendment to the Maintenance and Promotion of Competition Act of 1979, and has resulted in all forms of resale price maintenance, horizontal price collusion, and collusion of market sharing that is against the public interest being outlawed after 2 May 1986 (unless the Industries Minister grants an exemption). There is a tendency to measure the harmful effects of disinvestment in terms

of unemployment and slowdown in economic growth. Due consideration should also be given to the likelihood of disinvestment having an adverse effect on the long-term viability of the free enterprise system in South Africa.

5.9 Summary and conclusions

The results of this investigation indicate that a South African investor would have improved the risk-return characteristics of his investment by pursuing international diversification over the period 1969 - 83. First, the inclusion of foreign securities has resulted in superior portfolio returns when compared with the returns derived from exclusive investment in South African securities. Furthermore, the exchange gains from various foreign currencies have generally enhanced the attractiveness of investing in foreign securities from the standpoint of a South African investor. Secondly, the South African investor is able to accomplish significant risk reduction when countries such as Japan, Sweden, Switzerland, New Zealand, and Finland are included in international portfolios. South African goldmining shares feature prominently in ex post optimal portfolios available to South African investors, whereas local industrial shares are not included in any of the efficient frontiers available to local investors seeking international

portfolio diversification. While the currency factor is important, it was not a major element in the performance and risk components of international portfolios representing the 18 countries during the period 1969 - 83. It was observed that fluctuations in exchange rates did not have a material effect on total return even though the South African currency was generally devalued against other currencies during the study period. Furthermore, it was also shown that currency risk constitutes a small percentage of the total risk in an unweighted portfolio investment comprising the 18 selected countries. The importance of the currency factor is minimized due to low and possibly even negative correlations between security prices and exchange rate movements in the different countries.

The benefits from international diversification have also been demonstrated by low and even negative correlations between the returns of South African and foreign securities. South African goldmining shares offer unique opportunities for local investors seeking international diversification because on average these shares have negative correlations with foreign securities. The results of all three tests of stationarity show that inter-country correlation coefficients, in general, did not vary significantly during the period covered by the study. The degree of stability in the international correlation structure increases consistently and substantially as the

assumed investment horizon is lengthened. The increased potential utilization of ex post data for longer investment horizons suggests the following investment strategy : for short-term investment horizons a passive investment strategy is likely to be most profitable; for long-term investment horizons an active strategy can be expected to outperform a passive strategy.

The results suggest that the ex post inter-country correlation coefficients can be used to predict future gains from international portfolio diversification, but are reliable only for medium to long-term investment horizons. However, forecasting models and return-generating processes are likely to provide even better predictions of future international portfolio performance. The technique of multidimensional scaling has confirmed that the countries included in optimal portfolios do indeed provide significant risk reduction opportunities for the South African investor.

The result of the ex ante investment strategy shows that investors who are able to "buy the market" are able to derive substantial benefits from international portfolios. The ex ante strategy shows that the South African portfolio compares favourably with the international portfolio when differences in risk are ignored. However, on a risk-adjusted basis the international portfolio has a relative performance which is

3,0387 times that of the South African portfolio. An international portfolio containing goldmining shares is able to attain relatively high returns without attracting additional risk. By contrast, a South African investor holding goldmining shares bears a large element of risk which is not diversifiable because of exchange control. A collection of relatively smaller but consistently positive returns of the international portfolio was able to outperform the high risk South African portfolio which produced both large positive and negative returns. The results of this investigation support the hypothesis that predicts substantial benefits accruing to South African investors from acquiring foreign securities.

CHAPTER 6RECOMMENDATIONS AND SUGGESTED AREAS FOR FUTURE RESEARCH6.1 Introduction

This study has shown that international portfolio diversification is becoming very popular in the major industrialized countries such as the United States of America and the United Kingdom. Because of legislative prohibitions, South African investors are not able to take advantage of the substantial benefits that may accrue from investing in foreign securities. This study has investigated the potential benefits that may accrue from international portfolio diversification from the standpoint of a South African investor. The results show that substantial benefits are likely to be attained from these investments. Furthermore, it has been shown that the various problems likely to arise from investing in foreign securities may be exaggerated and that potential benefits far outweigh the problems encountered. The results of this investigation support the hypothesis regarding the extension permitting foreign security investment by South African investors. This chapter highlights the various recommendations and points out some areas for future research that has emerged from this investigation.

6.2 Recommendations for implementing international
portfolio diversification in South Africa.

- 6.2.1 Recommendation 1: The relative inefficiencies of the smaller overseas stock exchanges are likely to provide opportunities for South African investors to enhance their portfolio returns.

An evaluation of the efficiency of the various overseas stock exchanges has revealed that only the NYSE and the LSE can be considered to be efficient in terms of the EMH criteria. The majority of the markets outside the NYSE and the LSE show various degrees of inefficiency. The inefficiencies existing in these smaller stock exchanges may be exploited by South African investors who are able to detect special situations prevailing in these markets. However, there appears to be a trade-off between expected higher returns and the cost of inefficiency represented by loose disclosure requirements, thin markets, and discontinuity in trading. The large

institutional investors in South African have extensive research facilities and contacts with overseas countries, and appear to be well placed to exploit possible inefficiencies in foreign security markets. In particular, areas such as Hong Kong, Singapore, Brazil, and Korea have in recent years experienced high growth rates and also have relatively inefficient security markets. This suggests that these countries could be excellent candidates for investment. Although portfolio managers in developed Western countries are beginning to recognise the importance of investing in the fast developing countries, much greater attention should be devoted to these emerging security markets.

A major cause of inefficiency in the smaller overseas stock exchanges is that only a handful of securities are actively traded. This is probably due to the domination of the economy by a few large companies in the countries concerned. As a result, only the institutional favourites, which have high trading volumes, are efficiently priced (as is the case in South Africa). By actively researching the inefficiently priced securities in foreign countries, local investors should be able to improve their portfolio returns. However, inefficiently priced securities are unlikely to be detected by the traditional sources of information (income statements, press commentary, investment newsletters, etc). Portfolio

managers will have to seek information relating to : the geographical distribution and investment profile of shareholders; the volume of shares traded; the liquidity of shares; discontinuity in trading, etc. It is unlikely that this type of information can be readily and efficiently gathered in South Africa. The acquisition of overseas research facilities is probably the most effective method of obtaining information relating to any possible market inefficiencies in the less developed security markets. In the case of institutional investors, international investment divisions based in the major investment centres could serve as an important source of detecting market inefficiencies.

Recent evidence suggests that market returns show a tendency to be influenced by investment fads (gimmicks) which are often dominant factors in price determination. Furthermore, these gimmicks tend to originate in the developed markets (United States and the United Kingdom) and spread to other countries. In the past, certain categories of securities, such as conglomerates, hi-technology, bio-engineering, have been very popular on the various stock exchanges and have often outperformed the market. In addition, there is a tendency for investor attention to concentrate on certain countries during a given period. For instance, in the past, Brazil, Hong Kong, and Japan were the favoured countries by portfolio

managers of international securities. When sentiment in the price of gold is bullish there is a tendency for overseas investors to scramble for South African goldmining shares. In the current period, the politico-economic uncertainty in South Africa and the threat of future major labour disputes in the mining industry is causing a scramble for Australian, Canadian, and United States goldmining shares. Portfolio managers must pay attention to the popularity of certain investment categories and the investment appeal of certain countries in the portfolio allocation decisions. An early warning system could be provided by monitoring the investment strategies of the United States and United Kingdom institutional investors who normally set the investment trends. An early detection of emerging trends in international security investments could enhance the portfolio returns of local investors.

6.2.2 Recommendation 2 : In pursuing international portfolio diversification, South African investors should pay particular attention and exploit specific EMH anomalies, such as the January, small firm, neglected firm, and P/E effect in their portfolio selection process.

The results of this study has shown that although markets are generally efficient, not all information is quickly and efficiently impounded in security prices. The evidence suggests that security markets constitute a broad spectrum of efficiency, ranging from being hyperefficient at one end to seemingly inefficient at the other end. Therefore, while a market is generally efficient, investors may still earn abnormal returns by identifying and exploiting the pockets of inefficiency that may exist. In particular, astute investors can benefit by taking advantage of EMH anomalies such as January, small firm, neglected firm, and the P/E effect. The abnormal returns associated with the specific EMH anomalies appear to be associated with information deficiency. Therefore, South African investors have the opportunity to enhance their portfolio returns by actively researching and identifying those securities that have characteristics of identified EMH anomalies.

If local investors are going to benefit from the various EMH anomalies such as : January; small firm; neglected firm; and the P/E effect, they must be in a position to identify the existence of such pricing inefficiencies. Research findings have revealed that the EMH anomalies have several common features which are responsible for their inefficient pricing. First, securities belonging to this group represent small

companies whose risk measures are incomplete and misspecified. Second, these securities are infrequently traded and this results in an underestimation of risk and a corresponding overestimation of risk-adjusted returns. Third, these securities contain extreme amounts of unsystematic risk relative to the large companies which are usually followed by the institutional investors. Fourth, all four anomalies are related to a common variable called information deficiency that affects the investors' perceived risk. By compiling a check list of key attributes associated with EMH anomalies, investors would be in a position to identify securities suitable for investment. These securities should be subject to an in-depth investigation and evaluated against the portfolios' investment guidelines before the decision to invest is taken. Securities having characteristics of EMH anomalies usually belong to the second tier investment category and could also be identified by several publications (Fortune magazine, Business Week, Value Line Investment Survey) in the different countries.

6.2.3 Recommendation 3 : In the absence of conclusive evidence supporting either the CAPM or the APT, it is recommended that the combined CAPM - APT model be used to enhance international portfolio diversification.

To date there appears to be no conclusive evidence supporting either the single factor CAPM or the multifactor return-generating process advocated by the APT. Furthermore, the basic assumptions underlying the equilibrium pricing of both the CAPM and the APT are not inconsistent, and therefore, the two models may be combined. The combined CAPM-APT model will provide security pricing relationships which may be more powerful (make stronger predictions) and may yield insights which the individual models do not provide on their own. It is suggested that the combined CAPM-APT model may be better able to explain and predict the security pricing mechanism relating to international securities by taking into consideration differences in specific characteristics such as labour productivity, growth of the economy, interest rates, and money supply that exist in the different countries. The usefulness of the CAPM-APT model may be enhanced by the identification of international factors common to specific types of securities and national factors affecting only domestic securities.

6.2.4 Recommendation 4 : The benefits of investing in foreign securities far outweigh the problems. It is recommended that portfolio managers undertake a cost-benefit analysis in order not to be unduly influenced by the perceived obstacles to international portfolio diversification.

The foreign exchange risk may be exaggerated and may not constitute a major problem to portfolio managers. Firstly, investors can protect themselves against exchange risk fluctuations by use of spot and forward transactions enabling them to exchange one currency for another at a specific date and at a specific exchange ratio at minimal cost (hedging). Secondly, much of the foreign exchange risk may be diversifiable by holding a mix of currencies that are not closely related to each other or the domestic currency of the investor. Furthermore, the total risk of investing in foreign currencies is smaller than the sum total of the domestic security risk and foreign exchange risk.

The variations in accounting standards prevailing in different countries creates difficulties in the analysis and interpretation of published financial statements.

However, various international organisations are addressing this problem. The IASC is in the process of creating a comprehensive range of international accounting standards. Furthermore, the International Federation of Stock Exchanges has recommended that member exchanges institute compliance with international accounting standards proposed by the IASC. It is recommended that the primary/secondary financial statements proposed by the AISG be used by the reporting companies while additional international accounting standards are being compiled. The limitations of financial statements can be overcome by the use of investment advisory services (where available) in the respective domestic countries.

A major obstacle to international portfolio diversification is the "thin markets" and "poor liquidity" prevailing in the majority of the stock exchanges. The poor liquidity could result in an investor being locked into a particular investment and could result in substantial losses in the event of forced sales. Nevertheless, the poor liquidity and greater volatility of many smaller stock markets create opportunities for large potential benefits for those investors who are able to predict peaks or bottoms of the respective stock market cycles.

The high costs and administrative problems associated with investing in foreign securities can be minimized by investing in American Depository Receipts (ADR) offered by large United States banks. These banks will provide ADR owners with all administrative services and information related to owning foreign securities. The ADRs of some of the largest and best known securities are traded on the NYSE and the AMEX, and this may create arbitrage opportunities and may also enhance the liquidity and efficiency of the securities traded. It is recommended that those investors who do not have the expertise to invest directly in foreign securities should invest in mutual funds and investment companies that specialize in international securities.

The emerging trend towards the internationalization of brokerage firms in several countries (United States, United Kingdom, and Japan) is likely to stimulate foreign security diversification by removing some of the existing obstacles to such investment. First, international brokerage firms are committed to negotiable brokerage costs, and this is likely to result in a decline in the cost of investing in foreign securities (especially to institutional investors who normally prefer to take major positions in their investment targets). Second, the problems associated with the administration of foreign securities can also be expected to be substantially

reduced. The international brokers, with their vast resources, can be expected to provide a "package deal" on investments in the various countries where they operate (similar to the ADR services provided by the major banks in the United States), and this is likely to result in a major reduction in the costs associated with the administration of foreign securities. Third, international brokerage firms are usually involved in researching securities as part of their service to clients (for which an extra charge is made). The increase in research output generated by the international brokerage firms can be expected to improve the quality and quantity of information on foreign securities and also reduce the risks associated with these investments.

6.2.5 Recommendation 5: Efficient and market-related foreign exchange policies are likely to be more effective than the existing exchange controls and this will also facilitate foreign portfolio investments by South African residents. Representations should be made to the authorities with the objective of expediting the creation of

market-related foreign exchange policies in South Africa.

A market-related, flexible, unitary exchange rate would be in the best interests of South Africa. The reintroduction of the dual exchange rates following the declaration of the State of Emergency (September 1985) has been a major setback in the development of a market-related exchange rate policy in South Africa. The local foreign exchange market is small and considered inefficient by international standards. Therefore, operators in the foreign exchange market are paying much higher transaction costs than those prevailing in the developed countries. The higher foreign exchange costs and poor liquidity are major obstacles for investors in foreign securities. Therefore, it is recommended that the authorities should implement the creation of a larger and more efficient market for foreign exchange in South Africa. This may be achieved by less emphasis on regulation and a greater reliance on the operation of market forces. In particular, a market-related futures exchange rate will greatly facilitate international portfolio diversification for South African investors.

The reality of the South African economy being regulated by market forces, is most likely to be attained when the private sector takes an active stand in support of

the free enterprise system. Overseas experience has demonstrated that legislative amendments related to investment matters has the best chance of success when persistent pressure is exerted on the authorities to effect the necessary changes. A complicating factor in South Africa is that the investment community is not well organized and therefore not in a position to take a united stand on matters affecting their welfare. There are several representative organizations such as the Association of Unit Trusts, Life Offices Association (LOA), the Shareholders' Association, which act on behalf of certain categories of investors. However, there is no umbrella body that is representative of all investors in South Africa. As a result, no concerted effort towards the attainment of a market-related exchange rate policy in South Africa has been made. Furthermore, the legislative constraints precluding foreign security investments are unlikely to be removed unless the investment community in South Africa exerts pressure at the highest levels. Therefore, it is recommended that various organizations representing special investor groups create an umbrella body that will lobby for a better dispensation for all investors in South Africa, especially in matters concerning foreign security investments.

6.2.6 Recommendation 6 : The authorities should be approached to abolish exchange control for both residents and non-residents as soon as political and economic circumstances permit. The free flow of capital is likely to lead to more efficient capital and equity markets which in turn will lead to a better allocation of funds in the South African economy.

The De Kock Commission (1985) observed that the existing exchange control procedures are not effective in protecting the country's official reserves and are being circumvented, both legally and illegally. Several recommendations of the first and second interim reports of the De Kock Commission of Inquiry have already been implemented, and South Africa is well on the road towards a basically market-related economy. It is recommended that a progressive relaxation of exchange control relating to foreign portfolio investments by South African residents should be implemented. A gradual process of dismantling exchange controls for both residents and non-residents is appropriate in view of the country's limited exchange reserves and the possible disruptive effects of complete

abolition. Therefore, it is submitted that the authorities institute an orderly process of dismantling exchange controls in line with the strengthening of the economy and favourable political developments in the prevailing free market economy. It is submitted that expediting political reform in South Africa is most likely to restore overseas confidence in South Africa's future, and this in turn is likely to reduce the need for stringent exchange control regulations.

The abolition of prescribed investment requirements for institutional investors in South Africa is likely to create an efficient capital market where market-related long-term interest rates are likely to prevail. The abolition of prescribed investments and exchange control over foreign security investments is likely to result in equity prices on the JSE properly reflecting the underlying fundamentals of the South African economy. Depending on the state of the economy and the prospects of listed companies, investment funds can be expected to move between the JSE and various foreign equity markets. This will enable South African investors to reap the benefit of international portfolio diversification.

6.2.7 Recommendation 7 : Despite its limited influence on the risk-return characteristics of foreign securities, portfolio managers should pay particular attention to currency movements in the different countries because they play a decisive role in determining the composition of international portfolios.

The results of this study has shown that exchange gains from the various foreign currencies have generally improved the attractiveness of investing in foreign securities from the standpoint of a South African investor. However, the currency factor has not been a major component in the total return and total risk of international portfolios even though the South African rand was generally devalued against other currencies during the 1969 - 83 period. This is due to the low and possibly even negative correlations between security prices and exchange rate movements. Therefore, foreign securities that are attractive to a South African investor may not necessarily be desirable to an investor who has a different base currency.

The composition of optimal portfolios can be expected to vary from one country to another, depending on the domestic risk-return characteristics of securities as well as exchange rate movements in different countries. Therefore, South African investors should not be unduly influenced by the benefits of international portfolios seen from the standpoint of investors in foreign countries.

6.2.8 Recommendation 8 : The inclusion of foreign securities to South African goldmining shares would have significantly improved portfolio performance during the 1969 - 83 period. Therefore, South African investors should seriously consider the inclusion of selected foreign securities in their portfolios when exchange controls are relaxed.

South African industrial shares were not included in the ex post optimal international portfolios constructed from 18 countries during the 1969 - 83 period. Diversification among foreign securities as well as South African securities would have permitted investors to attain

higher rates of return and lower risk on their portfolios in comparison with corresponding investment in exclusively South African portfolios. South African goldmining shares become part of optimal portfolios by having both a very high rate of return and a very high risk level. However, because of the high correlation between goldmining and industrial shares, goldmining shares are less efficient to South African investors in comparison to foreign investors who hold more diversified portfolios.

The risk-return characteristics of a South African portfolio is dominated by goldmining shares. A South African investor holding goldmining shares bears a large element of risk which is not diversifiable because of exchange control restrictions. An international portfolio containing goldmining shares is able to diversify away virtually the entire risk in investing in these shares while also able to attain vastly superior results. As a result of exchange control regulations, South African portfolios tend to have relatively higher risks in comparison with a well diversified international portfolio. Without taking into consideration the actual risks associated with the two portfolios, the South African portfolio compares favourably with the international portfolio. However, on the basis of risk-adjusted performance, the international portfolio is shown to be far superior to its South African counterpart.

Only when a South African investor diversifies his portfolio to include countries such as Japan, Sweden, Switzerland, New Zealand, and Finland is significant improvement in portfolio performance (reduction in risk) attained. International portfolios will enable South African investors to benefit from the high growth rates experienced by countries such as Japan, Hong Kong, Singapore, and Brazil. South African goldmining shares offer unique opportunities for local investors seeking international portfolio diversification, because, on average, these shares have negative correlations with foreign securities. The results also suggest that even relatively low return foreign securities may materially reduce the risk of an internationally diversified portfolio held by South African investors.

6.2.9 Recommendation 9 : South African investors are likely to derive substantial benefits from internationally diversified portfolios. Therefore, portfolio managers and other interested parties should approach the authorities for the relaxation of exchange control relating to foreign portfolio investments.

The inter-country correlation coefficients of the different countries investigated were substantially less than 1 and mostly negative in relation to South African goldmining shares. The various tests of stationarity show that the correlation coefficients of returns, in general, have been fairly stable over the period covered by this study (1969 - 83). In addition, foreign securities would have improved the risk-return characteristics of internationally diversified portfolios. It was also demonstrated that problems associated with dealing in foreign securities can be overcome quite easily and that the benefits far outweigh the problems encountered. To date, there has been little success in developing a stochastic process to predict ex ante gains from foreign securities. Nevertheless, stable ex post inter-country correlations can be used to predict gains beyond those available by pursuing a naive strategy.

It is unlikely that any South African investor will actually attain a point on the efficient frontiers constructed from ex post data. The "buy the market" approach is an ex ante strategy which avoids the influence of events that have already taken place in a given period. On average, during the 1969 - 83 period, the ex ante selection procedure would have provided fairly large returns to a South African investor pursuing international portfolio diversification. The results of the ex ante

selection procedure suggests that the international portfolio has a relative performance which is 3,0387 times that of the South African portfolio when the actual risks associated with the two portfolios are taken into consideration. These results support the hypothesis predicting substantial gains from foreign security diversification from the standpoint of a South African investor. In view of the public welfare implications of foreign security diversification, representations should be made to the authorities with the view to expediting exchange control reform in South Africa.

6.2.10 Recommendation 10: Given the stability of correlation coefficients, the probability of success with international security diversification is highly correlated with the length of the investment horizon. Portfolio managers should pay particular attention to the relative stability in correlation structures between different countries when deciding on investment strategies.

The degree of stability in international correlation structures appears to increase consistently and substantially as the assumed investment horizon is lengthened. The increased potential utilization of ex post data for longer investment periods suggests the following investment strategy: for short-term investment horizons a passive investment strategy is likely to be profitable; for a long-term investment period an active strategy can be expected to outperform a passive strategy. Furthermore, stable correlation structures may serve as surrogates for forecasting models to provide investors with reliable estimates of future international price structures. Portfolio managers should take note of the empirical evidence which suggests that at least 6 foreign securities should be included in the composition of optimal portfolios so that the estimation risk inherent in the use of the mean-variance model may be eliminated.

6.2.11 Recommendation 11: Institutional investors in South Africa have a tendency to be functionally fixated with regard to their investment decisions, and this could lead to a misallocation of investment funds in South Africa. Therefore, it is recommended that the

communication process between the senders and receivers of investment signals be improved so that correct investment decisions can be made.

The survey questionnaire directed at institutional investors showed that the majority of respondents did not experience a cognitive change consistent with the change in investment allocation decision related to the eventual abolition of exchange control in South Africa. The survey also confirmed three hypotheses that were tested. First, that the majority of institutional investors/JSE portfolio managers do not regard the JSE as an efficient capital market. Second, that as a result of the perceived inefficiency of the JSE, these investors tend to be predisposed towards investing on the JSE. Third, arising from exchange control and favourable historical returns provided by the JSE, the investors have become functionally fixated with investing on the JSE.

There appears to be an inconsistency between the perception of overriding investment benefits accruing from foreign securities and the erroneous decision relating to the allocation of funds for such investments. The hesitancy to invest in foreign securities when exchange controls are relaxed or abolished has been measured in several ways : First, the majority of the respondents (61%)

expressed a preference to make a long-term commitment (over a period of 5 years and more) to foreign security investments. Second, the majority of the respondents (53,7%) were only prepared to invest up to 10 percent of their total funds in foreign securities. Third, only (31,7%) of the respondents indicated that they were involved in any research related to foreign securities.

The high ranking given to the improvement in risk-return characteristics as reasons for acquiring foreign securities indicates that the large institutional investors are aware of the overriding investment benefits accruing from foreign investments. Nevertheless, the portfolio managers demonstrated a distinct reluctance to make investment decisions in favour of foreign securities. Several reasons are responsible for portfolio managers' making inappropriate investment decisions in response to a change in the signal relating to the allocation of funds. However, the evidence strongly supports the functional fixation hypothesis as a likely explanation for the inappropriate investment allocation decision. The fixation in the investment allocation decision of portfolio managers is likely to have major consequences for investors in South Africa. The incorrect perceptions of security investments is likely to lead to a misallocation of investment funds. A misallocation of investment funds could result in the wealth of investors not being maximized. Suboptimal

investment decisions are also likely to cause a reduction in the welfare of all South African citizens.

In view of the importance of the investment allocation decision, the communication channels between the sender and the receiver of investment information should be improved. The sender, the investment researcher should improve the efficiency of the coding system so that the semantic content of the message is consistently received by the receiver (portfolio manager). Furthermore, portfolio managers should improve their understanding of the decoding process (proper understanding of the underlying economic phenomena) in respect of the investment allocation function. The improvement in the communication channels could be achieved by highlighting the research findings related to international portfolio diversification. Publications such as "The Investment Analysts Journal" could devote special editions to give a comprehensive cover on issues related to foreign security investments. Research at local universities and other institutions could devote greater attention to research in the field of international portfolio diversification from the standpoint of South African investors. Finally, institutional investors should devote greater attention to research into foreign securities which would enable them to make correct allocation decisions and derive immediate portfolio benefits when exchange controls are relaxed or abolished.

6.2.12 Recommendation 12: South African investors

should accord due consideration to the possibility of an imposition of a trade boycott and disinvestment of local securities by foreign investors. In such an eventuality, institutional investors in particular will have to restructure their investment portfolios to attain the targeted risk/return objectives and also the attainment of efficient portfolios.

Legislative authorities in South Africa should monitor any possible changes in economic concentration arising from the increased holdings of institutional investors. In the event of any significant restructuring and increased asset concentration, more effective legislation to combat price collusion and restrictive

trade practices may have to be considered.

The deteriorating politico-economic situation in South Africa has resulted in a partial disinvestment by foreign companies operating in South Africa. There is also a distinct possibility of foreign portfolio managers disinvesting large quantities of South African equities. The welfare effects of a boycott of South African securities consists of two factors for local investors. First, there is a loss of diversification resulting from local investors being obliged to acquire the more risky goldmining shares disinvested by foreign investors. Second, a widespread disinvestment of South African securities can be expected to cause a substantial reduction in the price of these securities. Furthermore, the fall in price of South African securities must more than compensate for the perceived loss of diversification of local investors. Therefore, South African investors are expected to benefit as a result of disinvestment by foreign investors. By way of contrast, foreign investors can be expected to suffer a loss in welfare by incurring both a loss of diversification and maybe a one time capital loss through disinvesting South African securities.

Foreign investors have mainly invested in the equity capital of South African goldmining and strategic

minerals. In the event of a boycott of South African securities, local investors would be obliged to acquire the predominantly goldmining and minerals related shares disinvested by foreign investors. Because of the high values of the goldmining shares disinvested by foreign investors, South African institutional investors can be expected to increase their portfolio holdings in these securities. Institutional investors can thus be expected to improve their portfolio returns but would incur much higher risks associated with goldmining shares. These institutional investors may have to significantly restructure their investment portfolios in order to attain the targeted risk/return objectives. Although industrial companies are not likely to be major targets of foreign disinvestment, several large South African companies have their shares listed on overseas exchanges and these companies can also be expected to suffer the same fate as goldmining shares. South African investors holding shares in these companies can be expected to make further adjustment to their portfolio holdings.

Institutional investors, such as unit trusts, may also face additional problems related to restrictions on the maximum percentage of their funds that can be invested in specific securities or certain categories of investment. These investors would have to restructure their portfolio composition in order to comply with legislative

restrictions. The restructuring of institutional portfolios can also be expected to cause further price adjustments on the different sectors of the JSE. Portfolio managers would have to keep a watchful eye on the market to take advantage of weakness in the price of certain sectors that are under disinvestment selling pressures. This scenario suggests that investors in South Africa could face pressures to restructure their holdings in order to attain efficient portfolios.

The disinvestment of South African industrial securities by foreign investors and the corresponding enlarged industrial security holdings by local institutional investors is likely to have far reaching consequences for the South African economy. The increased size of the institutional portfolio holdings in industrial companies whose shares are sold by foreign investors is likely to contribute towards a restructuring and increased economic concentration in the South African economy. The increase in asset concentration of companies controlled by conglomerates is likely to increase the tendency towards price cartels, and monopolies/oligopolies in this country. The reduction in competition in the affected industries is likely to increase the inflationary pressures in the local economy. The increased economic concentration will make it necessary to make further amendments to the Maintenance and Promotion of Competition Act so that the various forms of price collusion and restrictive trade practices can be effectively controlled.

16.3 Areas for future research

Compared with advances in the more developed countries, international portfolio diversification has been a neglected area of study in South Africa. This is probably influenced by the constraints of exchange control regulations which preclude South African investors from undertaking foreign portfolio investments. This is unsatisfactory because portfolio managers and other interested parties have not been alerted to the benefits possible from foreign security investments. The lack of local studies has resulted in a large gap in the knowledge of the subject and an undue reliance has been placed on overseas findings. It is suggested that local investors will be better served if the various factors influencing the acquisition of foreign securities are studied under South African conditions. This represents a fruitful area of investigation by future researchers.

There are several international portfolios that fall outside the exchange control regulations (securities acquired before 1961 and controlling interest in foreign companies acquired with the permission of the Reserve Bank). Several large insurance companies and listed companies such as Old Mutual, Anglo American Corporation, Barlow Rand, Liberty Life fall into this category. These institutions can be expected to have developed sufficient

expertise in various aspects of foreign security investments. Future researchers would do well to study how these organizations select and manage their foreign portfolios. Because of the strategic nature of these investments, it is unlikely that these organizations would provide sensitive information on their actual foreign portfolio holdings. However, these organizations could be approached to provide information concerning : portfolio objectives; organization structure; the information system dealing with inputs and outputs; evaluation of portfolio performance. In addition, the financial press provides extensive coverage on foreign security investments by South African companies and regular follow-up reports on the relative merits of these investments. Researchers could integrate their findings and provide illustrations of successful and unsuccessful examples (case studies) of South African based international portfolios. Such an approach will greatly extend and improve the knowledge of foreign security diversification under South African conditions.

Several areas relating to foreign portfolio investments have not been discussed in detail or have been ignored because they are beyond the scope of this study. The main purpose of this study is to demonstrate that South African investors are expected to benefit by investing in foreign securities. The various problems association with

foreign security investments (foreign exchange risk, availability of investment information, liquidity of investment, high transaction costs) have been identified and their possible solutions from the standpoint of South African investors has been suggested. The problems identified are those that are traditionally discussed in the literature on the subject. There are several other problem areas which are mentioned in passing or are ignored by researchers because they are not of overriding importance. Nevertheless, these problem areas need to be studied because they could be of vital importance to portfolio managers and other interested parties. Those aspects not covered in this study should be considered as areas for future research and are highlighted in the ensuing discussion.

6.3.1 A need for follow-up studies on the possible benefits to South African investors from international portfolio diversification

The current investigation has shown conclusively that South African investors would have improved the risk-return characteristics of their portfolios significantly by investing in equity shares of 18 selected countries. However, the inclusion of these 18 countries in

international portfolios does not exhaust all benefits that could be obtained from foreign securities. Several countries, such as Hong Kong, Singapore, Brazil, and Taiwan have in recent years attained very high rates of growth, and would therefore appear to be excellent candidates for inclusion in foreign security portfolios. However, the risk-return characteristics of these countries' securities are not readily available. Therefore, these countries have not been included in the current investigation. The exclusion of these countries in this study tend to understate the real benefits from foreign securities that are available to South African investors.

It is recommended that follow-up studies on international portfolio diversification from the standpoint of South African investors should be undertaken. Further studies should preferably include a longer investment horizon (say 25 years) as well as a larger sample (say 30 countries). The enlarged sample should preferably include those countries that are experiencing rapid growth in their economies at the time of the study. Follow-up studies will create a pool of reference material that will be of invaluable assistance to local portfolio managers when implementing a programme of foreign security investments. Furthermore, the various follow-up studies can serve to highlight the need to abolish the existing exchange control regulations that prohibit foreign

portfolio investments. The sheer weight of evidence in favour of foreign security investments may well provide the necessary impetus to stimulate the authorities to expedite the desired reform.

6.3.2 A need to develop more sophisticated measures for the stability of inter-country correlation coefficients as well as developing forecasting models to predict ex ante benefits from international portfolios

This study has clearly shown that the stability of correlation coefficients between the different countries is of paramount importance in constructing optimal international portfolios based on ex post data. Furthermore, the investment strategy to be pursued is largely influenced by the degree of stability that exists between the different countries. The study of stability of correlation structures has been somewhat neglected by empirical researchers. There is an urgent need to develop more sophisticated statistical and mathematical models that are able to capture the degree of stability of correlation structures. Ideally, statistical techniques should provide information on the estimation risk related to the composition of optimal international portfolios using ex post data. Algorithms could be provided to eliminate estimation size by choosing approximate sample size and the number of observations necessary to obtain stable

correlation structures for selecting international portfolios.

The empirical evidence has shown that the degree of stability of correlation coefficients increases as the assumed investment horizon increases. The high degree of stability observed for longer investment periods suggests the possible existence of random "noise" in the historical data that impedes the flow of certain international factors in the short-term but nevertheless produces a degree of stability over time. These results are exploratory and there appears to be lack of knowledge regarding the factors that are responsible for determining the stability of correlation structures over time. Future research should therefore be directed at identifying the significant factors and their inter-relationships in determining inter-period correlation stability.

Tests of correlation stability justify the use of ex post data but do not imply that one can estimate ex ante returns from portfolio diversification. The ideal situation would be to identify the stochastic process underlying ex ante returns. To date, no accurate forecasting model for obtaining ex ante returns has been developed. The empirical evidence suggests ex ante return forecasting models for international securities holds more possibilities than relying on historically oriented stable

correlation structures (ex post data). Therefore, developing a stochastic process to generate ex ante returns remains a highly fertile field for future research. Such a development will create a scientific basis for selecting international portfolios and this in turn will stimulate portfolio managers to take a closer look at the possibilities offered by international securities.

6.3.3 A need to identify possible inefficiencies existing in overseas securities' markets, with particular reference to the various EMH anomalies that have been identified on the NYSE.

The majority of the stock markets reviewed in this study show characteristics of inefficiency. Recent evidence suggests that even the NYSE cannot be considered to be a truly efficient capital market. The possibilities of benefitting from the inefficiencies of the smaller security markets are enormous, provided portfolio managers are able to identify specific departures from random pricing. Unfortunately, there is insufficient published information relating to the level of efficiency prevailing in the majority of the foreign stock exchanges. Many of the existing EMH studies are dated and need to be updated in the light of recent developments in the capital markets. The lack of computerized share price data may have contributed to this state of affairs. However, in

recent years there has been a great improvement in the availability of computer based data on equity share prices. Therefore, a study of the relative efficiencies of the smaller stock exchanges may prove to be a fruitful area for future research.

Up to date information on the level of efficiency of stock exchanges in countries such as Japan, Hong Kong, Singapore, Korea, and Brazil will be of great assistance to portfolio managers and others involved in foreign security investments. On the NYSE, several EMH anomalies, such as the January, small firm, neglected firm, and the P/E effects have been found to persist over time. It is submitted that the potential for investors benefitting from these anomalies are even greater in the relatively inefficient, smaller stock exchanges. Therefore, it is suggested that investigations of the known EMH anomalies as well as the identification of new areas of inefficiencies be undertaken to increase the possible benefits from investing in foreign securities. The traditional EMH studies at universities have concentrated on testing general market efficiencies from a historical perspective. The existence of various identified EMH anomalies suggests that a useful area of investigation would be to test the efficiency of security markets with respect to specific investment strategies (P/E effect, small firm effect etc.) The effectiveness of specific investment strategies is

likely to be more useful to practitioners than general studies of market efficiency.

6.3.4 A need to develop financial control models for foreign security investments

Foreign securities represent investments in more than one socio-economic environment, and therefore additional complexities and problems are added to the financial control system monitoring such investments. In the management of an international portfolio, a number of variables in the conventional control model for domestic securities need to be modified and others may have to be added. Research in the area of foreign security investments is sadly lacking, and providing guidelines and models for financial controls which will enable managers to attain their investment objectives is a priority. Imdieke and Smith (1975) report similar problems faced in the management control systems for international companies that operate in several countries. They also report that because of the differences in the nature of the environmental forces that influence the international company, it is important that the specific objectives for international companies should be different from those of domestic companies.

Recognizing that foreign securities are different from domestic securities, a control model for the former should incorporate normative guidelines which could be of assistance to portfolio managers. First, a clear set of portfolio objectives should be formulated after carefully considering the investment opportunities on a worldwide basis. Second, the differences in socio-economic environments in the different countries imply the existence of additional risks due to factors such as : political uncertainty, inflation differential, fluctuations in currency; liquidity of investment. These risks should be quantified so that the risk premium can be added in arriving at a minimum investment required rate of return. Third, a control system will need to develop early warning systems to minimize losses arising from adverse socio-political developments and exchange rate fluctuations. Fourth, the control model should incorporate the impact of inflation on the values of foreign securities. However, the model should recognize that each company has its own rate of inflation and that it is misleading to use the average rate for the particular country. Fifth, the standards used to evaluate foreign securities should consider the many environmental differences such as : political risk; investment opportunities; size of investment; strength of the foreign currency; the desire to earn currency of the specific country; and other factors that differ from evaluating domestic investments.

From the preceding discussion it is clear that conventional control models for domestic securities will have to be substantially modified to accommodate the number of variables that are unique to foreign securities. Investment literature reveals that the current practice of portfolio managers is to adjust for the different variables affecting foreign securities in an arbitrary and inconsistent manner. The variety of approaches to the financial control of foreign security investments creates uncertainty and confusion among practitioners and could lead to suboptimum portfolio performance. The investment merits of a foreign security may be unduly influenced by the inappropriateness or bias in the financial control system in use. To date, there has been no comprehensive models that identify the appropriate variables and informational inputs and outputs that should be included in an effective control system for foreign securities. This presents a challenging area for future researchers as they could make a major contribution towards the scientific evaluation of foreign security investments.

6.4 Conclusion

Many portfolio managers have preconceived ideas that the obstacles associated with acquiring foreign securities severely prohibit investment opportunities. In recent years, major developments in the international capital markets have removed most of the perceived

obstacles. Nevertheless, many traditional portfolio managers have avoided foreign securities despite clear evidence indicating their superiority over domestic securities. On the basis of ex post data, the inclusion of foreign securities results in substantial benefits to South African investors. Furthermore, a South African investor who has no knowledge of future security prices and who adopts the strategy of "buying the market" would have also attained substantial benefits from an internationally diversified portfolio. The South African portfolio provided returns that were comparable to those of an internationally diversified portfolio. However, the risk of an internationally diversified portfolio was substantially lower than its South African counterpart. Therefore, on a risk-adjusted basis, the internationally diversified portfolio has a relative performance that is vastly superior to the South African portfolio. Therefore, South African investors are incurring severe penalties through the existing local exchange control regulations. The findings of this study and those of van den Honert (1984) constitute persuasive evidence justifying amendments to the exchange control regulations.

In the developed countries, several portfolio managers have embarked on internationally diversified portfolios on an aggressive basis. However, these portfolio managers have concentrated on the securities

markets of the developed countries of Western Europe and the the United States. By contrast, the relatively underdeveloped emerging markets have so far attracted very little investor attention. Errunza (1983) has shown that the emerging markets are comparable to many European markets in terms of size, turnover and efficiency and that diversification into these markets can offer substantial investment benefits. It was further demonstrated that the emerging markets of Hong Kong, Singapore, Brazil, and Korea are currently experiencing economic growth reminiscent of Japan during the early post-war period. This has resulted in these countries producing vastly superior performances relative to those obtained in the highly developed countries. Furthermore, the correlations between the emerging markets are low in comparison to the correlations displayed by the developed markets. Friedland (1985) has shown that the benefits of diversification among the developed countries has been eroded in recent years. This suggests that portfolio managers should explore the investment opportunities offered in the emerging countries.

The results of this investigation clearly support the view that South African investors should consider the inclusion of foreign securities in their portfolios when exchange control regulations are partially relaxed or removed. A major deficiency of this study is that much of the empirical evidence is based on ex post data which may not be a good proxy for expected future returns.

Therefore, the results of this investigation are exploratory and further evidence is required. Nevertheless, the evidence suggests that diversification benefits from international portfolios available to South African investors is large enough for practitioners to allocate resources to explore these possibilities. It is suggested that institutional investors undertake research into international portfolio diversification under local conditions. Local research should take into consideration the relative efficiencies of the different security markets, EMH anomalies and other special situations, as well as investment opportunities of the emerging markets. The availability of local research into foreign security investments will enable institutional investors to derive immediate benefits when exchange control regulations are abolished or relaxed.

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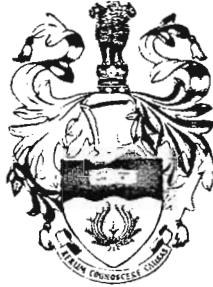
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GRADUATE SCHOOL OF BUSINESS

April 1986

Dear Sir

I am a senior lecturer in finance at the Graduate School of Business at the University of Durban-Westville. I am at the moment working on the final stages of my D. COMM. thesis in the Department of Accountancy at the same university. My co-supervisors are Prof. D. Konar (UD-W) and Prof. D. B. Van der Schyf (UNISA).

My field of study is : "An investigation to determine the possible benefits that may accrue to South African investors pursuing international investment diversification".

The empirical work for the thesis has already been completed. However, a survey of the likely reaction of the institutional investors to the recommendations of the final report of the De Kock Commission of Inquiry relating to overseas portfolio investments will greatly enhance my empirical findings.

If your company/institution is interested in the results of my empirical work a copy of the research findings will be made available free of charge on request.

All information will be treated in the strictest confidence. Neither the name of the company nor details provided will be mentioned in the thesis. Only the analyzed results of the survey will be included in the thesis. A letter from my co-supervisor, Prof. D. Konar, Acting Head of the department of Accountancy is attached and confirms the confidentiality of the information to be supplied.

A postage paid addressed envelope is supplied for the return of the completed survey. A speedy return of the completed survey will be appreciated.

If you require further information regarding the survey please contact me at the university by post or telephone 820-2419 (Durban).

Thanking you,

Yours sincerely,

Narendra Bhana

.....
 NARENDRA BHANA



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DEPARTMENT OF ACCOUNTANCY

April 1986

TO WHOM IT MAY CONCERN

I confirm that Mr NARENDRA BHANA is registered in this department as a D. COMM. student and his field of study is "An investigation to determine the possible benefits that may accrue to South African investors pursuing international investment diversification".

I am also a co-supervisor of Mr Bhana's studies. Mr Bhana will be addressing a questionnaire to selected institutional investors in South Africa as part of his research. I confirm that all information supplied will be treated in the strictest of confidence and neither the name of the company/institution nor the details provided will be mentioned in his thesis. Only the analyzed results of the survey and the resultant conclusions which are drawn from the survey will be included in the thesis.

Thanking you in advance for your co-operation.

D. Konar

.....
PROFESSOR D. KONAR
ACTING HEAD,
DEPT. OF ACCOUNTANCY

A QUESTIONNAIRE TO DETERMINE THE VIEWS OF INSTITUTIONAL INVESTORS ON
THE RECOMMENDATION OF THE DE KOCK COMMISSION OF INQUIRY RELATING TO THE
ABOLITION OF EXCHANGE CONTROL RELATING TO OVERSEAS PORTFOLIO INVESTMENTS

QUESTIONNAIRE NUMBER : _____

Question 1

The concept of "efficient capital markets" implies that at a given point in time the prices of securities fully reflect all publicly available information concerning the securities.

- 1.1 Do you consider that stock exchanges in general can be regarded as efficient in terms of the above definition of efficient capital markets?

(Please mark with "X" in the appropriate square)

Yes	No
34 (82,9%)	7 (17,1%)

- 1.2 Do you consider the Johannesburg Stock Exchange to be efficient in terms of the above definition of efficient capital markets?

Yes	No
12 (29,3%)	29 (70,7%)

- 1.3 Empirical evidence suggests that other than the two largest stock exchanges, namely, the New York Stock Exchange and the London Stock Exchange all other stock exchanges show characteristics of market inefficiency. Do you agree with this observation?

Yes	No
28 (68,3%)	13 (31,7%)

- 1.4 If your answer to the above question (1.3) is yes then do you believe that investing in inefficient foreign stock exchanges is likely to improve the portfolio performance of South African investors?

Yes	No
25 (89,3%)	3 (10,7%)

Question 2

- 2.1 The De Kock Commission of Inquiry into Monetary System and Monetary Policy in South Africa recommended a gradual process of dismantling exchange control over foreign equity investments by South African residents. Do you consider this to be in the best interests of South African investors?

Yes	No
38 (92,7%)	3 (7,3%)

- 2.2 Assume that exchange control over foreign equity investments is abolished by the authorities. With regard to the portfolio you are associated with, would you consider making investments in foreign securities?

Yes	No
37 (90,2%)	4 (9,8%)

- 2.3.1 If your answer to question 2.2 is yes then over what period would you implement the acquisition of foreign securities?

Immediately	over a period of 2 years	over a period of 5 years	over a period greater than 5 years
7 (17%)	9 (22%)	12 (29,3%)	13 (31,7%)

2.3.2 When you decide to make foreign equity investments what percentage of your total portfolio value would you be prepared to invest in foreign securities (assuming that there are no limitations to funds invested abroad).

1 - 10%	11 - 25%	26 - 40%	41 - 50%	more than 50%
22 (53,7%)	9 (22%)	4 (9,7%)	4 (9,7%)	2 (4,9%)

2.3.3 If your answer to question 2.2 is no (i.e. you are not prepared to make foreign equity investments) then indicate one or more of the following reasons why you have decided against foreign equity investments. Please rank the relative importance of the various factors for not investing in foreign securities i.e.

1 = most important

2 = second most important etc.

Reason	Ranking	First ranking	Point scale
Foreign securities are riskier because detailed knowledge of securities (published financial reports, prices, P/E ratios, media coverage etc.) is not readily obtained in South Africa.	4	0	14,0%
Foreign securities are riskier because of exchange rate fluctuations of the currencies in which these investments are denominated.	3	0	18,6%
The average returns on the Johannesburg Stock Exchange are likely to be superior to the average returns provided by foreign securities.	2	33,3%	27,9%
The greater distance and slower communication between South Africa and foreign stock exchanges increases the time required to deal in foreign securities. This relative lack of liquidity and investment flexibility increases the risk of investing in foreign securities.	5	0	9,3%

Reason	Ranking	First ranking	Point scale
Our liabilities to clients (unit trust investors, pension fund holders, prospective insurance claimants etc.) are denominated in South African rands. Therefore, it is not appropriate to make investments in securities denominated in foreign currencies.	1	66,6%	30,2%
other (please specify)			
(i)			
(ii)			

Question 3

Assuming that exchange control over foreign equity investments is completely or partially abolished by the authorities in South Africa. What are the specific investment benefits (if any) that are likely to be derived from foreign equity investments.

Please rank the relative importance of the various benefits in order of importance i.e.

1 = most important

2 = second most important etc.

Reason	Ranking	First ranking	Point scale
Portfolio returns are likely to be improved (higher yields) as a result of international portfolio diversification.	3	11,1%	18,3%
The portfolio risk is likely to be reduced because of the counter cyclical movements in the equity prices on the different stock exchanges.	1	40,8%	24,6%

Reason	Ranking	First ranking	Poin scal
An international exposure will make institutional portfolios more attractive to individual investors who generally do not have the expertise to invest in foreign securities. Therefore, the demand for the investment services provided by institutional investors can be expected to increase.	6	3,7%	11,0%
In the event of a major economic-political change in South Africa our portfolios are likely to be protected by not having all funds invested in South Africa.	2	22,2%	19,8%
Astute investors are likely to obtain significant foreign exchange gains by tilting their portfolios towards securities of those countries whose currency is likely to appreciate against the South African rand.	4	7,4%	13,8%
other (please specify) broader knowledge of foreign (i) markets will make local markets more efficient.	5	14,8%	12,5%
(ii) gain access to products/markets and growth opportunities in foreign countries.			

Question 4

What other benefits not directly related to portfolio performance (spin-offs) are likely to arise from investing in foreign equities.

Please rank the relative importance of the various benefits in the order of importance i.e.

1 = most important

2 = second most important

Reason	Ranking	First ranking	Point scale
By acquiring strategic holdings in certain foreign equities acquisitions and mergers of overseas companies could be facilitated.	5	0	13,5%
An exposure to the more sophisticated investment environment in countries such as the United States and the United Kingdom may enable the skills so acquired to be transferred to investments on the Johannesburg Stock Exchange.	3	4,5%	17,2%
Depending on the state of the economies in the different countries investment funds can be expected to move freely between the JSE and various foreign equity markets. This can be expected to create a more efficient capital and equity market in South Africa.	2	22,7%	22,3%
The greater volume of foreign exchange required to service security transactions can be expected to result in a more efficient market for foreign exchange in South Africa.	4	0	15,7%
There is a limited range of investment opportunities in South Africa, and institutional investors are constantly confronted with the task of investing vast sums of investment funds in a narrow range of investment mediums. Being able to invest in foreign securities will ease the burden of continually seeking additional investments in a market with limited opportunities.	1	72,8%	25,9%
other (please specify)			
(i)	6	0	5,4%
(ii)			

If there are more than 2 other reasons please specify on a separate page.

Question 5

The De Kock Commission has recommended that at some stage in the future institutional investors should be allowed to invest in foreign securities. Is the portfolio with which you are associated pursuing any specific research into foreign securities so that you would be able to benefit immediately when exchange controls relating to overseas portfolio investments are abolished or partially relaxed.

Yes	No
13 (31,7%)	28 (68,3%)

If your answer to the above question is no could you provide specific reasons for not pursuing research into foreign securities.

Please rank the relative importance of the various reasons in order of importance i.e.

1 = most important

2 = second most important etc.

Reason	Ranking	First ranking	Point scale
(i) No serious likelihood of this recommendation being implemented in the foreseeable future.	1	60,1%	46,7%
(ii) The purchase of overseas expertise is a more efficient method of acquiring information on foreign securities.	2	15,4%	21,3%
(iii) Expense not warranted in view of a limited exposure to foreign securities is expected.	3	12,6%	20,1%
(iv) Prefer the appointment of foreign managers as they would have greater expertise relating to foreign securities.	4	8,0%	7,3%
(v) Limited number of local researchers who have expertise to conduct research into foreign securities.	5	3,9%	4,6%