

SHORT-TERMISM: AN INVESTIGATION OF SOME UK EVIDENCE

CAROL A PATRICK

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DEPARTMENT OF ECONOMICS

UNIVERSITY OF STIRLING

ABSTRACT

The aim of this thesis is to undertake an empirical investigation into the assertion that UK investors display short-term behaviour. The thesis starts by reviewing the existing literature which comprises a diverse set of explanations of the concept of short-termism. This survey results in, firstly, a more concise definition of short-termism and, secondly, a framework into which the various theories may be placed. The various approaches to short-termism are categorised into two effects: the numerator effect and the denominator effect. The former refers to the underestimation of future cash flows while the latter refers to those cases in which an excessively high discount rate is used. Both these effects result in the present value of a proposed project being reduced, therefore causing the project to be rejected when it might otherwise have been accepted.

Although the literature covers many different approaches to short-termism this thesis concentrates only on one aspect of short-termism, namely the denominator effect. Such an approach is advantageous in that it allows the consideration, and possible elimination, of a particular type of short-termism, thus giving direction to future research. By decomposing the discount rate into the following components: a time value of money, a liquidity premium, an equity risk premium and an exchange rate risk premium it becomes possible to distinguish between "true" short-termism and "general" short-termism. "True" short-termism refers to the existence of a high time value of money whilst "general" short-termism refers to the use of a high discount rate for whatever reason, whether it be a high time value of money, liquidity premium or equity risk premium.

A preliminary investigation into the existence of both types of short-termism is carried out by the comparison of international real rates of return and risk premia as a means of testing for differences in the behaviour of investors across countries. The results

of this investigation lend little support to the assertion that UK investors are short-termist, but suggest that if short-termism is present it is in the form of "true" short-termism. Following these results, further empirical analysis is carried out into the issue of "true" short-termism. A key feature of this analysis is the relaxation of the assumption of the rational expectations in both the interest rate and foreign exchange market. The effect of this is two-fold: firstly, ex post and ex ante rates need no longer only differ by a random error, and secondly, a non-zero exchange rate risk premium may exist. Therefore the thesis also derives an ex ante interest rate series and an exchange rate volatility series using the methodology of Mishkin(1984a,b) and a Generalised Autoregressive Conditional Heteroscedasticity framework respectively.

Throughout the thesis a parallel hypothesis is considered of whether a distinction could be drawn between investor behaviour in countries with capital market-based financial systems and those with bank-based financial systems. The thesis finds little support, given the assumptions made and dataset used, for the assertion that UK investors are more short-termist than elsewhere and no evidence to support a distinction between investor behaviour across countries.

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CHAPTER 1: INTRODUCTION

Short-termism, an increasingly topical issue, links the financial system, financial behaviour and economic performance. Those who focus on short-termism typically argue that myopic UK financial markets lead to underinvestment over the longer term, particularly in projects such as research and development, which in turn leads to poor economic performance. It is the purpose of this thesis to investigate the issue of short-termism in relation to the UK. The thesis will illustrate the diverse nature of the existing literature in this area with an important contribution of this work being to provide a categorisation of the various theories of short-termism. The aim of creating such a framework is to identify ways in which the issue of short-termism may be examined empirically.

As the motivation for much of the concern on short-termism is the UK's poor economic performance, the starting point of this thesis is to confirm that economic performance in the UK has been inferior relative to its major competitors.

Figure 1.1

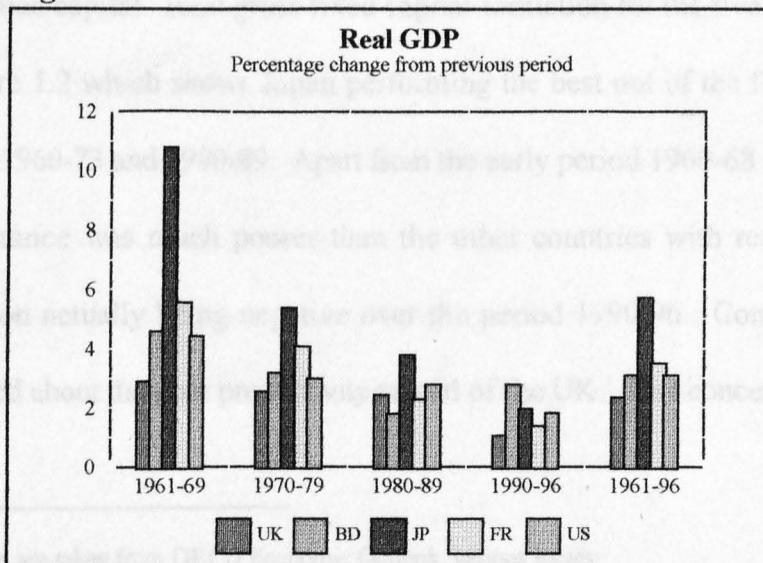
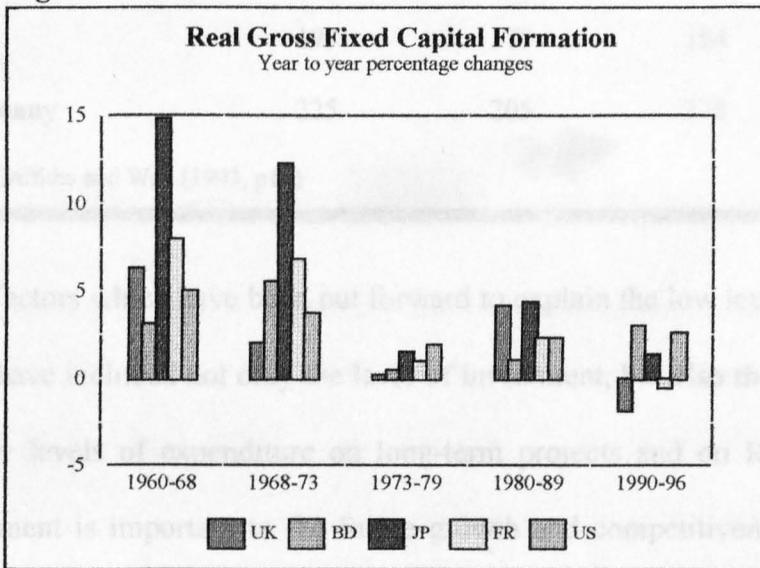


Figure 1.1¹ shows the percentage change in real GDP for five countries; UK, Germany (BD), Japan (JP), France (FR) and the US for the period 1960 to 1996. As can be seen, Japan performs the best in terms of real GDP in all decades apart from the first part of the 1990's. In contrast the UK produces the smallest change in real GDP in all periods except during the 1980's.

Figure 1.2



A key area for concern in the UK is the low level of investment, both in physical and human capital. Real gross fixed capital formation for the five countries can be seen in Figure 1.2 which shows Japan performing the best out of the five countries over the periods 1960-73 and 1980-89. Apart from the early period 1960-68 and 1980-89 the UK's performance was much poorer than the other countries with real gross fixed capital formation actually being negative over the period 1990-96. Concerns have also been expressed about the poor productivity record of the UK. This concern is supported by the

¹Figures are taken from OECD Economic Outlook, various issues.

data in Table 1.1 where index numbers are used to demonstrate the superior productivity levels in the US, Japan, France and W. Germany relative to the UK.

Table 1.1: Productivity (Output per Hour worked) In Manufacturing.

	1980	1984	1986
UK	100	100	100
US	273	262	267
Japan	196	177	176
France	193	179	184
W.Germany	225	205	178

Source: Griffiths and Wall (1993, p19)

Factors which have been put forward to explain the low levels of productivity in the UK have included not only the level of investment, but also the type of investment, with low levels of expenditure on long-term projects and on R&D. Research and Development is important to the future growth and competitiveness of the economy, however the nature of R&D is such that it is a very uncertain investment. At the outset of an R&D programme managers do not know when results will be achieved, and indeed if they will materialise at all. Table 1.2 shows the gross expenditure on R&D as a percentage of GDP in Germany, Japan and the UK.

From the figures shown in Table 1.2 it can be seen that during the time period 1972 -1988 the UK has spent a smaller proportion of GDP on Research and Development than Germany, and, although the UK figures are higher than in Japan in 1972, 1975 and 1981, Japan has seen much faster growth in R& D expenditure.

Table 1.2: Gross Expenditure on R&D as a Percentage of GDP.

	Germany	Japan	UK
1972	2.21 (49.4)	1.76 (26.6)	2.10 (NA)
1975	2.24 (47.4)	1.81 (27.5)	2.17 (55.0)
1981	2.42 (40.7)	2.14 (24.9)	2.41 (49.0)
1985	2.71 (36.7)	2.62 (19.1)	2.31 (43.4)
1988	2.83 (33.9)	2.72 (18.1)	2.20 (36.5)

Notes: Figures in parentheses denote the percentage of gross expenditure on R&D financed by the government.

Source: Eltis et al (1992, p6)

As shown in Eltis et al (1992), further comparisons between the UK and other countries can be made. For example, during the period 1967 to 1983 R&D financed by industry increased at an annual average rate of 1% in the UK, compared with 4% in the USA, over 5% in most major European countries and over 10% in Japan. Other qualitative differences between R&D expenditure in the UK and expenditure in Japan and Germany may also be identified. Firstly, over recent years R&D growth in the UK has been largely concentrated in the chemical and pharmaceutical industries whilst real expenditure on R&D fell in other sectors between 1985 and 1988 (see Foley 1990b). Also, in the UK government financed R&D constitutes a large part of total expenditure on R&D. This is in contrast to Japan where there is a very low reliance on government financed R&D. Further, about two-thirds of this expenditure in the UK is devoted to the defence and aerospace industries (see Eltis et al, 1992, p6).

Investment and R&D can only produce economic success if the management and

workforce have sufficient skills to exploit these resources (see Foley, 1990a). Davies and Caves (1987) argue that British managers do not always display such skills and are only marginally better qualified than the rest of the population. Not only do a lower percentage of 16-18 year-olds stay on in full-time education in the UK compared to Germany and Japan (see Eltis et al, 1992), but also less training is provided for those who go into full-time employment (see Foley, 1990a).

It can be seen, therefore, that the UK has displayed an inferior performance record compared to other major competitors, such as Germany and Japan. According to those advocating the existence of short-termism (Miles 1992, Dickerson et al 1993, Williams 1991, Hutton 1991), this poor performance has occurred as a result of underinvestment in the long term due to the short-sightedness on the part of investors. Lawson (1986) argued that the big institutional investors increasingly react to short-term pressures on investment performance and "are unwilling to countenance long term investment or a sufficient expenditure on research and development..." (cited in Foley 1990b).

Why should UK and US investors be short-termist but not Japanese and German investors? The existence of short-termism, it is often argued, arises from differences in financial systems with myopic investor behaviour occurring in economies with capital market-based, as opposed to bank-based, financial systems. The UK is usually grouped with the US as a capital-market-based system in which the securities markets play a highly active role and are the major source of finance for industrial companies, whilst the banking sector plays a subordinate role (see Vittas, 1986 and Mayer, 1987). The financial markets of Germany and Japan are usually described as being bank-based with the banking sector playing a major role in the financing of industry whilst securities

markets are less active and well developed². The classification of France, however, is not as clear cut due to the transition of the French capital markets from bank-based in the 1970's to capital-market based in the 1980's. The system is generally regarded as mixed though researchers such as Vittas (1986) group France with Germany and Japan as bank-based whilst others, such as Mayer (1987), favour the capital-market-based group. Although grouped in this way, it should be noted that there are still considerable differences between the members within each group. In order to examine the hypothesis that myopic behaviour may be associated with capital-market-based countries, a sample of countries will be chosen to reflect this notably the UK, US, Japan, Germany and France.

The thesis begins by surveying the literature on short-termism. Given the diverse nature of this literature and varying explanations of the concept of short-termism the aim of Chapter 2 will be two-fold: firstly, to provide a more concise definition of short-termism, and secondly, to provide a framework into which the various theories may be categorised. From this base a working definition will be obtained enabling empirical work to be undertaken. The chapter will also discuss the impact of differing financial systems on investment behaviour and their relevance to the short-termism debate. It should be noted here that due to the diverse nature of the approaches to short-termism the empirical investigations will necessarily only consider one aspect of short-termism. Such an approach is advantageous in that it allows the confirmation or elimination of the existence of this aspect of short-termism, thus providing scope for future research. Chapter 3 provides a preliminary investigation into the presence of short-termism in UK capital markets using the rate of return to investors across a sample of countries. A key part of

²Recent research has however questioned this classification of international financial systems. Corbett and Jenkinson (1997) produce data to show that only Japan is a purely bank-based system with Germany experiencing a large amount of internally generated finance.

this chapter will be the decomposition of the discount rate into its various components. The analysis will consider the time value of money, the liquidity premium and the equity risk premium received by investors in each of the countries. It will then look for any pattern in rates of return emerging between countries with bank-based financial systems and those with capital-market-based systems. In this chapter rational expectations will be assumed in both the interest rate and foreign exchange markets. In Chapter 4, the time value of money is considered further by analysing the Treasury bill rate in more detail. Rational expectations will no longer be assumed allowing an exchange rate risk premium to be introduced as a possible explanation for any international differences in real rates of return. As a result of the relaxation of the rational expectations assumption the chapter will also include the derivation of ex ante real interest rates and an ex ante exchange rate volatility variable. Finally, Chapter 5 will provide a summary and conclusion to the thesis.

CHAPTER 2: APPROACHES TO SHORT-TERMISM

D INTRODUCTION

A major problem in discussing the concept of short-termism seems to be the fact that there is little agreement on what short-termism actually means. Short-termism has been compared to monetarism in that the two concepts "have come to symbolise what is perceived as a multitude of sins loosely threaded together" (Ball 1991, p20).

The aim of this chapter therefore, is to offer a survey of the literature on short-termism. An important role of this chapter will be to develop a concise definition of short-termism from the diverse set of explanations provided so far in the literature. In particular the aim will be to create a definition of short-termism such that an empirical investigation into its existence in UK capital markets may be undertaken.

A useful starting point for analysing short-termism is the methodology by which the fundamental value of an asset is determined. The basic principle for estimating the fundamental value of an asset was developed by J B Williams (1938) in "The Theory of Investment Value". The proposal is that a potential investor will estimate and sum the expected future income stream, in the form of both dividends and capital appreciation, arising from the investment. In other words, the fundamental value of an asset is equal to the discounted present value of future cash flows. It has frequently been argued, and accepted, that a positive time value of money exists, i.e. people prefer to have money now rather than in the future, therefore these cash flows need to be expressed in present value terms as shown

in equation 2.1.

$$PV = \sum \frac{A_t}{(1+r)^t} \quad (2.1)$$

where PV is the present value of the asset, A_t is the future cash flow and r is the discount rate, that is, the opportunity cost of capital for equivalent income streams.

The discounting procedure is an important one which recognises that cash flows occurring at different times are not directly comparable and provides a method for evaluating such cash flows. However, a fundamental difficulty incurred when implementing this procedure is the choice of discount rate. The discount rate may be seen as the return an investor would require to receive from an investment and it is important to consider how such a rate is arrived at. The discount rate, r , may be broken down into two key components: a risk-free time value of money plus a premium for the risk associated with the project itself, hence

$$r = r_f + r_p \quad (2.2)$$

where r_f is the risk-free rate and r_p is the project risk premium. The first component, the risk-free rate, r_f is the opportunity cost of deferring liquidity until a future date, in other words, the investors' time value of money. The second component, the risk premium, r_p is required since investment appraisal necessarily involves forecasting future cash flows, yet, given the uncertain nature of the world, these projections may or may not turn out to be the same as the cash flows that actually arise. Keynes described this type of risk as the "involuntary disappointment of expectation" (1936, p144). Therefore, the risk premium is a payment, in addition to the basic discount rate r_f to reward the investor for taking on the risk involved in

the project.

II) APPROACHES TO SHORT-TERMISM

The literature in the area of short-termism provides a series of diverse explanations and therefore in order to summarise this literature it will be useful to categorise the various approaches. The categorisation to be used here will be based on the present value equation (equation 2.1), an approach already used by Miles (1992,1993), who divides the theories of short-termism into two broad categories:

1. theories based on an inappropriate valuation of companies by outsiders
2. theories not based on such an inappropriate valuation.

Theories in the first group are based on the way in which the present value is obtained and may, in turn, be broken down into two components: mis-calculation of expected cash flows, which Miles argues takes the form of systematic underestimation of long term cash flows; and secondly, the use of an inappropriately high discount rate given the level of risk involved in the project.

The former, i.e. the systematic underestimation of expected cash flows, operates on the numerators in equation 2.1, deflating the present value and therefore causing projects to be rejected when they may otherwise have been accepted. The systematically high discount rate, on the other hand, will influence the denominator and again will cause some long-term projects, through the production of a lower present value, to be rejected when they should have been accepted. Miles, using a sample of 477 non-financial firms in the UK between 1980 and

1989, obtains estimates suggesting the discount rates applied to cash flows accruing in six months time would have been more appropriately applied to those accruing in eleven months time. Miles also estimates that cash flows accruing six months into the future were underestimated by 5% relative to rational expectations, whilst cash flows accruing in 5 years were systematically underestimated by nearly 40%. The implication is that an inaccurate calculation of the company's worth is made by outsiders given the information available, i.e. the investor uses the available information but does not assess it in a rational way. The second interpretation of short-termism by Miles as underestimated future cash flows presents two limitations: firstly, it is not made clear why outsiders should be systematically underestimating future cash flows, and secondly it implies that it is possible to measure both the level of risk to be attached to each project and what the appropriate valuation actually is.

Although classification of the various theories is useful, Miles does not adequately explain what is included in each category, particularly the second i.e. theories which are not based on an inappropriate valuation of companies by outsiders. This category seems to draw together all remaining theories, but in general may be described as situations where market features make it difficult to arrive at an appropriate valuation.

In order to provide a more detailed and comprehensive classification of the literature an approach based on the present value equation (equation 2.1) will be adopted. Mathematically, the valuation placed on an investment using the present value method may be too low due to two reasons: either the denominator is too high or the numerator is too low. These outcomes will be referred to as the denominator effect and numerator effect respectively. The numerator effect may be described as a situation in which the numerator

terms (expected cash flows) are lower than would rationally be expected resulting in a lower present value. The denominator effect, on the other hand, refers to the undervaluation of present value arising due to the use of a high discount rate given the level of risk involved. This high discount rate may be the result of a high time value of money, as measured by the risk-free rate or a high risk premium. The aim of this chapter is to consider the nature of financial markets and examine the scope for the existence of short-termism in these markets. This will be carried out within the context of the present value equation, equation 2.1, in terms of the denominator and numerator effects described above. The existence of these effects will be considered with respect to equity markets, the banking sector, managers and the macroeconomic climate.

i) Equity Markets

The potential for the existence of short-termism through equity markets is of particular importance to countries such as the UK and US which are typically argued to place greater emphasis on equity as a source of finance than countries such as Germany and Japan (see Prevezer, 1994).

Where the functions of owner and entrepreneur are combined, the interests of both ownership and control coincide with the ultimate goal being the long-term survival of the firm. However, with the development of the limited liability company, there has been the separation of ownership and control and as a result the development of two groups, owners and managers, with potentially diverse interests. The concern is that, when evaluating a firm's

value, the focus of shareholders is on the short-term performance of the firm with emphasis placed on current profits and dividend payments. Meanwhile, the management needs to make plans which may be unlikely to reap returns for many years.

In the discussion of financial markets agency relationships are important. The shareholders, who are the owners or "principals" may be looking for high dividend payments. On the other hand, the manager or "agent" may have objectives such as the rate of growth of the firm due to their influence on remuneration, salary and job security. Therefore, problems were created in the capital markets which are known as principal-agent problems in today's terms, with shareholders being the principals and managers the agents. The problem arises for the shareholders of how they can constrain the behaviour of managers and how managers can be prevented from pursuing their own interests particularly where these conflict with the interests of the firm. So how does the conflict between shareholders and managers result in short-termism? The equity market is usually associated with short-termism under the following assumptions: firstly, that shareholders focus on the short-term performance of the company,¹ and secondly, that they have the ability to constrain the managers' behaviour such that they seek short-term gains from their investment, that is, there exists an effective market for corporate control.

The first assumption associated with short-termism is that it is shareholders themselves who are pursuing short-term gains, but is this a valid assumption to make? The reasoning behind this assumption will be made in terms of asymmetric information, imperfect

¹This focus on the short-term may be a reflection of the time value of money of shareholders themselves or alternatively may be the result of the way in which capital markets operate.

knowledge, speculative activity and the institutional investor.

a) Asymmetric Information

In an efficient market where information can flow freely between the principal and the agent the shareholders would use all the information available to assess the future income stream, to determine a discount rate and arrive at a present value figure for their investment. However the more limited is the availability of information, the harder it will become to reach the true valuation of a company's worth. One problem which may exist is that of asymmetric information. It is probable that the manager will have access to a greater volume of information than the shareholder, or potential shareholder, for example on profit levels etc (see Foley, 1990b). Being in control of the information, the manager has limited control over how much information to divulge to the markets; typically managers defend their decision to withhold information on the basis that it would give an advantage to their competitors (see Foley, 1990b). However the shareholders/ potential investors need some information on which to base their assessment of the firm and, as a result, the investors have to use 'signals' to make their investment decision, the most important of which are annual and interim results and dividend payments. Dividend payments can be raised by cutting investment whilst earnings can be increased by cutting longer term expenditures such as R&D. As a result of this emphasis on 'signals' by investors, managers are compelled to consider the short-term performance of the company so that it provides attractive 'signals' to investors, that is, managers are forced into using a higher discount rate than they might otherwise do, i.e. a

denominator effect is present.

A more specific use of the signalling type approach is the 'signal-jamming' model as described by Stein (1988,1989). Stein uses this model to show that even in a fully efficient market managers may behave myopically whenever stock prices appear in the managerial utility function. The stock market, it is assumed, uses current earnings as a signal of future earnings and hence to make a rational forecast of firm value. As a result managers will attempt to inflate current earnings to raise expectations of future earnings. In equilibrium, the market realises that earnings inflation has occurred and takes this into account when forecasting. The preferred co-operative equilibrium would be one in which there was no myopia on the part of the managers and no earnings adjustment on the part of investors. Unfortunately such a situation cannot be sustained as a Nash equilibrium. If the market conjectures zero managerial myopia, the managers will have an incentive to fool the market by boosting current earnings. Similarly, where the market expects all managers to behave myopically, if one manager does not do so then it would give the appearance of poor managerial performance since current earnings would be lower.

Morris (1994) identifies three inferences which may be drawn from the signal-jamming model. Firstly, the type of investment is important: where the investment is of a highly tangible nature, such as plant and machinery, the risks, payoffs etc are easier to determine than with intangible investment, such as R&D, where it is harder for investors to accurately assess cash flows. Secondly, the holding of shares by managers may worsen the situation by providing further disincentives for managers to undertake long-term investment. Finally, if managers are forced into myopic behaviour this will involve the use of excessively

high discount rates, therefore reducing investment below the profit-maximising optimum. If this is the case then an increase in investment will raise the value of the company creating a positive share-price response. Morris argues this should not be taken as being indicative that short-termism is not present. This argument helps to reconcile some of the existing evidence with the presence of short-termism. For example, McConnell and Muscarella (1985) find that the announcement of increased investment expenditure results in a positive share-price reaction, a result which Jensen (1986) argues implies that stock markets are not myopic. However, according to the arguments presented above it can be seen that a positive stock price response to the announcement of increased investment expenditure can occur even in the presence of short-termism.

According to Stein (1988) the extent of the difficulties occurring as a result of imperfect information flows will be affected by the degree of dispersion of a firm's shareholders. In the presence of highly dispersed shareholdings there is no incentive for each individual shareholder to seek out more information and, whilst theoretically the shareholders could seek information jointly, the impracticalities of doing so are likely to prevent this happening. In contrast, where shareholdings are more concentrated, large shareholders have a greater incentive to gain more information. The implication of this line of argument is that there is less pressure on firms to behave in a short-term manner where shareholders are more highly concentrated.

Recognising the problems created by signalling in financial markets, Foley (1990b) argues that this line of reasoning depends entirely on the existence of asymmetric information and that it has nothing to do with short-term behaviour. This argument is supported by Nickell

and Wadhvani (1987) who argue that, since the share price responds to information on dividends or earnings, investor behaviour cannot be described as irrational. However, whether rational or not the low investment valuation can be argued to be due to the functioning of capital markets. It is arguments such as this which have led to numerous calls for improved information flows in capital markets (see Williams, 1991, Ferguson, 1989 and Foley, 1990b).

Schleifer and Vishny (1990) also provide an explanation of how managers may encounter systematic pressure to act in a short-term manner in the presence of rational investors. Their model is based on the difference in expected arbitrage costs on long and short-term assets. The expected carrying cost of holding a \$1 investment until any mispricing is eliminated or reduced is higher for long-term arbitrage than short-term arbitrage. Arbitrage may involve two risks: the first is fundamental risk where the fundamental value of an asset may fall before the mispricing is reduced or eliminated. A second type of risk is "noise trader risk" (Bradford De Long et al, 1990) in which the mispricing may get worse before it is eliminated. These risks will be accentuated for assets where the share price correction takes longer, e.g. on long-term assets, since there is more time for bad news or pessimism to enter the market.

Outsiders do not know whether arbitrageurs are smart or not and so restrict the supply of funds to the arbitrageurs. In addition to this restriction in the supply of funds, a further credit constraint arises with long-term arbitrage in contrast to short-term arbitrage due to the "opportunity cost of having one's money tied up" (Schleifer and Vishny, 1990, p149). In order to persuade outsiders that he is smart and has the ability to earn abnormal returns, the arbitrageur will wish to perform well, both repeatedly and in the near future. This outcome

may be achieved by trading multiple short-term assets rather than a single long-term asset. The achievement of abnormal returns over the short-term becomes self-fulfilling: as short-term assets become more attractive trading in these assets becomes faster and less risky. The greater volume of trading in short-term assets will result in faster share price correction thereby reducing the risk to the arbitrageur. Conversely investment in long-term assets will become less attractive and the lower volume of trading will mean that share price correction will take longer. Therefore arbitrageurs will concentrate on the short-term which will in turn lead to short-term horizons for managers, i.e. leads to managers using a higher discount rate. Managerial shareholdings may make things worse with managers wishing to avoid long-term investment and so avoid capital losses. The short-term pressures of arbitrage mispricing may be alleviated by managers having majority control or sufficient insider control to render share price misvaluations irrelevant.

b) Imperfect Knowledge

Dickerson et al (1993) highlight the problems caused by the presence of imperfect knowledge and use as a starting point the concept that investment decisions may be seen as a dynamic game, in which the two key players are managers and shareholders and whose objectives do not necessarily coincide. Further, each group does not have perfect knowledge with respect to how the other will behave. The manager's primary objectives may include the rate of growth of the firm and job security. Rate of growth may be important since salaries and other forms of remuneration may be linked to the size or growth of the enterprise. The

size of the firm may also be important to the managers in terms of greater market power and managerial prestige associated with larger firms. The first objective, growth, is assumed to be achieved through direct retained profits. At the same time, however, dividends have to be maintained to satisfy shareholders and support a strong share price, which in turn helps to meet the second objective, job security, by reducing the takeover threat. The managers therefore face a dilemma: they can either reward themselves now at the expense of current investment and future profits or they can invest now in anticipation of future compensation². This choice is of course subject to the condition that they produce sufficient profits to satisfy the shareholders. The shareholders face a similar dilemma: they may seek higher dividend payments now at the expense of current investment or they could promote current investment to reap higher dividends in the future. The difficulties involved in the choices facing both shareholders and managers are compounded by the uncertainty surrounding the behaviour of the other group, i.e. each group has imperfect information on how the other group will behave. If the managers undertake current investment with a view to receiving benefits in the long-term they cannot be certain the shareholders will co-operate, i.e. managers cannot be sure the shareholders will not require an increased share of the profits through higher dividends. Consequently this removes the incentive for managers to invest over the long-term. The shareholders face a similar problem in that, if they do opt for higher current investment, they cannot be certain they will receive the higher future dividends, i.e. they are unsure of how much of the resulting profits will be used to compensate the managers in the form of

²This choice is further compounded by the 'signals' investment may send out to investors. For example where investment is invisible high investment will lead to high current costs and may be mistaken for low managerial effort. (See Laffont and Tirole, 1987)

pecuniary and non-pecuniary benefits. As a result long-term high trust relationships cannot be established. It should be noted that the dilemma facing the manager occurs whether or not the share is correctly priced and thus is not necessarily a result of market inefficiency.

Therefore the presence of imperfect knowledge results in the inability of the managers and shareholders to make precommitments and to form long-term contracts. As uncertainty increases the further into the future we look, the short-term is preferred to the long-term, hence resulting in a denominator effect.

As has been seen, the manager's actual behaviour is a function of two pressures: their own objective of growth maximisation and the shareholder's objective of profit maximisation. Which of these objectives dominates will depend on the ability shareholders have to enforce their wishes, which, in turn, will depend on the size of individual shareholders (see Morris, 1994). Where there is a high degree of dispersion amongst the shareholders there will be only a weak ability for the owners to constrain managers into behaving in their, the owners', interests. On the other hand a high level of concentration of shareholders will enable much more effective enforcement. Odagiri (1981) emphasises the importance of an effective takeover constraint. Evidence of this can be seen by comparing Japan and the US: in Japan higher salaries or status are rarely achieved through the labour market, i.e. by transferring from one job to another, and so managers look to other sources such as increased growth within a company. At the same time the lack of an effective takeover market makes enforcement costs high and so the growth objective dominates. It is perhaps paradoxical that, according to this theory, the high growth rates in countries such as Japan have therefore been achieved through the existence of weak, ineffective markets. In the US there is a flexible labour market and an

effective market for corporate control and consequently growth rates are much lower.³

c) Speculative Activity

The problems associated with imperfect knowledge and information flows may be accentuated by another feature of capital markets, that of speculative activity. The concern about speculation is not merely a modern one, but was expressed by Keynes (1936, chapter 12). Keynes identifies two distinct activities in financial markets: enterprise, the activity of forecasting the prospective yield of assets over their life and, speculation, the forecasting of the psychology of the market. Keynes maintained that the former, enterprise, by no means always dominates the latter, speculation. If a situation does develop in which speculative activity dominates then the market becomes based on individuals trying to determine the psychology of investors; i.e. rather than trying to anticipate what is going to happen in the borrowing sector itself, investors become involved in speculating on what they think other investors will be speculating.

³ Morris (1994) highlights an important implication of the Marris-Odagiri framework. In an outside-control setup there are two pressures on investment: managers wish to pursue growth policies whereas those controlling the firm pursue shorter-term objectives such as profitability. The result is that the two tend to offset each other therefore moving towards an optimal investment programme.

"Speculators may do no harm as bubbles on a steady stream of enterprise. But the position becomes serious when enterprise becomes the bubble on a whirlpool of speculation. When the capital development of a country becomes the by-product of the activities of a casino the job is likely to be ill-done."

(Keynes, 1936, p159)

Therefore problems arise when speculation becomes a more prevalent feature of the market than enterprise. Investors are more concerned with guessing what other people will be guessing the market's valuation of an investment will be, rather than using the present value equation to arrive at a valuation of the company's worth. Such behaviour introduces more noise into the system, thus accentuating the problems associated with information flow, i.e. accentuating short-term pressures.

Keynes' viewpoint of investment behaviour provides an interesting contrast to that perceived today,

"It is rare, one is told, for an American to invest, as many Englishmen still do, 'for income'; and he will not readily purchase an investment except in the hope of capital appreciation."

(Keynes, 1936, p159)

In other words, Keynes' American is more concerned with a favourable change in valuation than on the prospective yield of the investment.

So can the UK financial markets be described as a casino? Are investors speculators without loyalty, just moving funds around in hopeful anticipation of a capital appreciation, with no long term interests? The extent of speculation and volatility has, along with other

causes, led to questions about the efficiency of financial markets, which Ball (1991) describes as a fundamental part of the theoretical debate on short-termism.

Williams (1991), whilst having no argument with the working of the markets themselves, does question the way in which they respond to the arrival of information concerning the circumstances of firms in the stock market. Oxford Instruments Group plc, for example, in reply to a 40% drop in earnings per share in 1988, experienced a fall in their stock price from just over 550p to almost 160p despite receiving an order for their new product. In contrast, those supporting free market ideas argue that financial markets are only operating as they should (see Marsh, 1990 and Pickens, 1986). Speculation may be argued to have a role to play in financial markets as it is the speculator's task to identify investments which have been incorrectly priced. Through their dealing activities the speculators can disseminate information to the market helping prices to adjust quickly to their true value. This improvement in information flow may help to alleviate the short-term pressures caused by asymmetric information and imperfect knowledge as discussed above.

d) The Institutional Investor

An important development in the UK during the 1980's is the rise in the relative importance of the institutional investor whose presence accentuates some of the problems already mentioned. Although having funds to be invested for long periods, institutional investors are apparently reluctant to encourage long term investments and programmes such as R&D (see Henderson, 1993). They seem instead to invest for the short-term, continually

moving funds around to earn maximum returns. This behaviour is accentuated by the fact that institutional fund managers have their performance measured quarterly and their achievements are often presented in the form of league tables.

"It is increasingly recognised that there is a growing rift between the city and industry, caused by the propensity of institutional shareholders to behave, not as proprietors, but merely as paper shufflers"

(McInroy, 1990, p115)

McInroy then goes on in the same article to emphasise the damage caused by the managers moving funds around from one investment to the other,

"The whole system is like employing a gardener and remunerating him according to the number of plants he uproots weekly and replaces with new ones."

(McInroy, 1990, p115)

It has been suggested that a divergence between the company valuation of management and of institutional investors has arisen because of the latter's more short-term perspective (see Marsh, 1990). Their preoccupation with short-term profits can also affect the takeover market; as holders of a block of shares, institutional investors carry considerable weight and can yield more influence in the takeover market. Coupled with their preoccupation with short-term profits, this influence fuels takeover activity which can in itself create short-term pressures, as explained in the following section.

Further, the institutional investor, as a holder of block voting power, may increase the extent of agency problems. The institutional investor acts on behalf of the individual investor too, but again there is no reason to expect the two groups to be pursuing the same goals. It has

been argued that the interests of the institutional investor and the individual investor do not coincide. For example, one argument is that the two groups differ in their attitudes to takeover (see Ball, 1991). Now three groups exist and agency relationships may arise between the individual investor and the institutional investor or between the institutional investor and management. Is this increasing the scope for divergent valuation? Concerns have been expressed about the functioning of the institutional sector of the market for a number of reasons, but particularly for the frequency with which funds are moved around from one company to another and the emphasis placed on the performance tables of firms operating in the industry. The continual focus on portfolio return optimisation encourages the fund managers to acquire and dispose of holdings to gain from favourable price movements and to mitigate against unfavourable ones, thus emphasising short-term considerations (see Henderson, 1993). Ball (1991) however presents evidence which does not conform with this view. Using figures based on average trading and portfolio activity, Ball argues that a 'notional' share will be held on average for 10 years and that if there is a difference between turnover in the UK and that found elsewhere, it is in fact lower in the UK than in Germany and Japan.

In addition, as in the case of speculation, it is possible to argue that turnover actually improves market efficiency. Marsh (1990) identifies two types of turnover; liquidity-motivated turnover and information-motivated turnover. The provision of liquidity is a fundamental function of capital markets and a 'healthy sign of a well-functioning capital market' (Marsh, 1990, p35). Information-motivated turnover occurs when the investor identifies mis-priced shares and, where this mis-pricing is sufficiently large to cover any

dealing costs, initiates dealing activity in these shares.

" In itself, therefore, turnover is not detrimental to market efficiency, but is instead a very important part of the mechanism for keeping markets efficient."

(Marsh, 1990, p36)

Marsh advocates the view that the dealings of fund managers in general form an important mechanism which helps to keep the market efficient.

e) Corporate Control

The role of the market for corporate control in the issue of short-termism comprises two aspects: firstly, the existence of extensive takeover activity can in itself create short-termism by making the establishment of long-term relationships difficult, thus accentuating the problems in this area created by asymmetric information and imperfect knowledge. Secondly, the takeover market is important to the short-termism debate due to its role as a means of constraining managers to behave in shareholders interests which, as has been seen, may involve short-term pressures.

As previously discussed, a short-term perspective may arise out of imperfect knowledge on the part of both investors and managers with respect to the future behaviour of other groups within the firm. Dickerson et al (1993) point to the co-existence of principal-agent problems and the market for corporate control as a contributor to the presence of short-termist behaviour in the UK. They argue that the market for corporate control, or more specifically, an active takeover market can reduce the incentive for investors to create long-

term relationships by increasing the probability that these relationships will be broken in the future. In the event that these relationships do break down, they argue there is evidence to suggest that renegotiation of new contracts becomes even less efficient due to the breach of trust. Mayer (1993) cited in Dickerson et al (1993, p3) suggests that the problem arises principally from the control of ownership. Mayer argues that disparate forms of ownership in capital-market-based financial systems lead to an inability to make precommitments and this may have an adverse impact on the investment strategy of the firm.

So far the link between the choice of discount rate and equity markets has been based on the assumption that shareholders are able to constrain the managers to behave in their (the shareholders') interests. However, the assumption that shareholders can constrain managers is quite a strong one which has faced many criticisms. Asymmetric information may be one source of difficulties in that managers have more information available to them on the current performance of the firm, and therefore on their own performance, than the shareholders, thus making monitoring difficult. The managers also have at least some scope to decide on which information should be disclosed to their investors and so have an incentive to select information which depicts them in a favourable light (see Foley, 1990b). In addition, non-institutional investors are often small and far removed from the company therefore not imposing much pressure on the management (see Capie and Collins, 1992).

Despite these difficulties the takeover market provides one method by which pressure may be exerted on managerial behaviour. Poor performance on the part of managers will be reflected in the share price of the firm. If the share price of the firm falls this may leave it vulnerable to takeover which, if it occurs, can lead to the manager losing prestige, power or

could even result in dismissal (see Capie and Collins, 1992). This argument has become more prevalent during the 1980's due to the large increase in takeover activity during this period. The threat of takeover causes managers to keep one eye on what the share price is doing and to behave in such a way that the share price will be maintained at a high level to relieve the threat of takeover and to keep the cost of capital down. Williams (1991) expresses the fear that a manager with one eye on the fluctuations of the company stock price in this way cannot be focusing completely on the objective of obtaining true long term wealth for the shareholder. Since the functioning of the capital markets compels the manager to look for short-term results, this must mean that the manager discounts the future at a high rate in that he has a greater preference for projects which yield returns sooner rather than later.

In comparison with the UK, the level of acquisition activity in France and Germany is much lower and hostile takeovers virtually non-existent, with changes relating to industry restructuring rather than to corporate control as such (see Henderson, 1993). This finding is supported by Mayer and Alexander (1990) and Wass (1990) who find much more significant barriers to takeovers and mergers in many European economies relative to the US and UK.

The effectiveness of shareholders in constraining managers in the UK may be illustrated by the sharp contrast between the rate of change of R&D expenditure and that devoted to dividend payments. The dividend payout ratio (dividends relative to cash flow) has become very high since 1986 with dividend payments in the UK rising at a rate of six times faster than the increase in R&D expenditure (see Henderson, 1993). A key feature of these changes has been the reluctance of firms to reduce their dividend payments; shareholders have come to expect increases in dividend payments and so this is what occurs even though the

economic climate may dictate otherwise. In contrast, some sectors of industry, for example chemicals and pharmaceuticals, have been successful in persuading their shareholders of the merits of long-term investment projects such as R&D (see Williams, 1991). Indeed Foley (1990b) goes so far as to argue that having earned a reputation for the successful exploitation of R&D, the market has come to expect regular announcements of new programmes; if they are not forthcoming the share price could weaken.⁴

Short-termism in equity markets, it has been argued, can be based on two assumptions: firstly, shareholders have a short-term perspective and secondly they have the ability to constrain managerial behaviour. The existence of this short-term perspective and hence the use of a high discount rate can be attributed to the features of capital markets such as asymmetric information, imperfect knowledge, moral hazard and takeover activity. The difficulties which arise as a result of these features may be accentuated by the presence of speculative activity and institutional investors.

ii) Banking System

Another important component in the debate on short-termism is the banking system (see Hutton, 1991). Typically the UK banking system has been compared and contrasted to systems elsewhere and in particular to countries such as Germany and Japan. Those claiming

⁴ It has been noted, however, that it is necessary to consider what happens to the funds paid out as dividends; there is a possibility, often a strong one, that such funds will be reinvested. Recognising this possibility then raises the question of who are the best allocators of resources, managers or shareholders? (see Buckle and Thompson, 1992).

that the nature of the banking system leads to short-termism maintain that it is the contrast between the UK system and those elsewhere which contributes to the difference in the overall performance of industry across countries.

The differences in international banking systems have been considered by Vittas (1986) using a framework composed of the following criteria: the degree of closeness; the form of relationship between banks and firms; internal machinery for maintaining relationships and external machinery for maintaining relationships. The degree of closeness refers to the "frequency and level of contact between financial institutions and industrial companies, the interest taken in the affairs of industrial companies and the extent of influence exerted over company affairs", (Vittas, 1986, p4). Internal machinery for establishing and maintaining relationships includes branch management, specialist departments, industrial specialists and the appointment of account executives. The external machinery includes the exchange of staff, the appointment of retired bank managers as company directors, the use of non-executive directorships, the exercise of voting rights (including proxy rights), the use of independent analysts and credit rating agencies and finally, the use of planning committees and development agencies.

The UK banking system is often contrasted with those of Germany and Japan, the resultant argument being that the different systems contribute to relatively good economic performance in Germany and Japan and relatively poor economic performance in the UK. The German system is characterised by the following features: the existence of large universal banks; the use of a house bank; bank management often hold positions on supervisory boards and bank control of voting rights. A universal bank operates in both retail deposit taking and

also the financing of industry through avenues such as underwriting, brokerage and ownership of financial and corporate debt. The universal banking system is such that only "weak walls" exist between each banking activity, i.e. the banks can cover a wide range of activities. The relationship created by universal banking is further enhanced by the use of house banks by firms whereby an individual company will use one large bank for most of their financial needs. This house bank will also act as a lead bank whenever syndicated loans are required. A third feature of the German system is that bank management are widely represented on supervisory company boards (see Cable, 1985). Supervisory boards monitor corporate policies and the performance of management, but it is mainly through a supportive role, giving an element of protection (see Henderson, 1993). The bank can also own shares in the firm thus giving it further insight into the firm. Of considerable importance is the ability of German banks to act as proxies for shareholders who deposit their shares with them, thus giving them more opportunities to influence the firm's management.

Japan differs from other countries, not only in terms of the banking system itself, but also in the overall industrial structure. A key feature of the Japanese system is the existence of large industrial groups or "Keiretsu". In the Japanese banking system itself banks have diversified into a range of activities but unlike the German banks there is a large amount of segmentation in the banking market, with the banks being separated into several specialised areas. The Japanese system does however share some similarities with the German system in that banks are permitted to hold stocks of non-financial companies up to a limit of 5% with the main bank of a consortium acting as monitor and co-ordinator. The overall evidence from the Japanese system is that it embodies a very different attitude to the whole process of debt

provision than that experienced in the UK or indeed from systems elsewhere. Starting at the screening process there is a tendency on the part of Japanese banks to put more weight on the valuation of firms as going concerns and on current profitability rather than possible default risk. After the loan has been agreed, further links are established between the bank and the firm through the monitoring process. Important features of this role include quarterly presentations by the borrower to the bank, extensive visiting by the bank's personnel to the firm and even the exchange of personnel. It is not unusual for bank personnel to visit the firms on a weekly or more frequent basis (see Mayer, 1987). The level of contact between banks and industry is in general frequent and extensive, covering several levels of the company hierarchy. Bilateral consultation and exchange of information are widespread, as is multilateral consultation through national planning bodies. Information and advice are also exchanged, in addition to the direct issues in hand, on wider issues such as interest rate or exchange rate changes. Similar to the German house bank, Japanese firms use a main bank which acts as both bank and financial adviser and would be responsible for drawing up a rescue plan in times of trouble. In Japan considerable use is made of specialist research departments and bank staff often have a large amount of industrial and specialist knowledge. As with other Japanese contractual agreements a key feature is the sharing of risk between both parties; banks earn above normal loan charges during the boom years, but below normal charges during the downturn.

In the UK the key roles for commercial banks consist of deposit taking and short term commercial lending with long-term finance being catered for through the capital markets, though there is still an important role for investment bank underwriters. A key characteristic

of the UK banking sector is the short-term nature of its lending activities. Between 1985 and 1990 the National Westminster Bank trebled its UK lending but of the £31bn increase over half comprised loans of less than one year in duration. In contrast, the Deutsche Bank issues over half of its loans for four years or longer (see Hutton, 1991). The UK banking sector however, emphasises the importance of overdraft finance with overdrafts accounting for 56% of small firm debt in the UK compared to 14% in Germany (see Bank of England, 1994). The overdraft system carries the advantage that it is relatively simple to operate, with no need for a new account to be set up for each loan, and also incorporates a degree of flexibility in that firms can borrow the amount that suits them subject to the agreed limit. However, in reality, the overdrafts do have to be renegotiated on a regular basis where they may be reduced or severe conditions imposed. Although overdrafts are nominally short-term finance many businesses see them as a permanent source of finance and do not expect them to be withdrawn. The renegotiation or withdrawal of an overdraft may lead to misunderstanding and resentment between a firm and its bank (see HMSO, 1994). The overdraft system also presents difficulties for the banking sector itself; uncertainty is created since at any one time only half the agreed limits are actually taken up and therefore banks must hold low yielding assets in sufficient quantities to be able to meet any increases in overdraft usage (see Morgan, 1981).

Nevertheless, it is maintained that relations between firms and their banks in the UK have become much closer over the past decade or so due to an increasing reliance by firms on bank borrowing and the expansion of medium term loan facilities (see Vittas, 1986);

"The need to prevent the collapse of companies during the deep recession of recent years has forced financial institutions to play a more active part in the restructuring of companies in difficulty." (Vittas, 1986, p5)

In France and the US relationships between banks and firms are less close than in Germany and Japan but still involve frequent contact with banks maintaining a high degree of interest in company affairs. In both these countries consultation and information exchange between borrower and lender is extensive as are interlocking directorships. In France, whilst lead banks do exist, they adopt a different role to those in Germany and Japan in that French firms often appoint a different bank as lead bank for different loan syndicates rather than using the same bank. Industrial specialists are also an important part of the French banking system and the same is true of the US system. The exchange of staff between banks and firms is carried out less in France and the UK than the other three countries in the sample. However, former top treasury officials in France are often appointed to large banks and industrial companies which helps to improve relations between banks and industry. In the US by contrast, exchange of staff is commonplace. In the US and the UK the dissemination of information concerning firms is also carried out by stock-brokers (see Vittas, 1986).

Clearly then, different countries have different banking systems with differing degrees of closeness between banks and firms. The bank-based systems of Germany, Japan and France display the closest relationship whilst the UK exhibits the most distant relationship, more so even than its capital-market-based counterpart the US. The key question now is how do these differences in banking systems manifest themselves in short-termism? In assessing a project the problem facing a bank is to assess the quality of both the borrower and also the proposed

project. Similar to equity markets a key problem which arises in achieving this is that of asymmetric information. The asymmetry problem present is that the borrower has better information relating to the amount of risk and future cash flows than that available to the lender (see Diamond, 1984). Further problems may also arise due to the existence of moral hazard, that is the potential incentive borrowers have to misrepresent the true risks associated with the investment. Therefore the accuracy with which the present value of an investment is arrived at will depend on the information available to the assessor. To obtain further information concerning the riskiness of a project is both difficult and costly to the lender. These difficulties are further compounded by the public good aspects of information. Even though information may be seen as private in the sense that the acquirer does not have to pass on information to other interested parties, the nature of the information they have acquired may be deduced from the bank's actions. For example the granting of a bank loan to a particular company imparts positive signals to other potential investors. James (1987) and Slovin et al (1988) confirm that share prices rise after a loan agreement has been established.

The ease with which the lender may access the information required to arrive at the present value of an investment will differ across the various financial structures (see Driscoll, 1991). The difficulties created by asymmetric information may be alleviated by improved information flows which may, in turn, be brought about by the establishment of a close relationship between borrower and lender. The moral hazard problem may also be reduced by improved information flows through the reduction in opportunities for such behaviour. Therefore those systems creating close relationships between borrower and lender should alleviate asymmetric information and moral hazard problems to a greater extent.

Vittas (1986) argues that the relationship between banks and industry is closest in Japan where the 'back-drop' of the industrial group facilitates frequent and extensive contact. Relationships are also close in Germany due to the existence of universal banking, whereas relationships in France and the US are less close and are even more distant in the UK.

Within the universal banking system the firm uses the bank for a wide range of services thus enabling an on-going relationship to be established. The heavy dependency placed on bank finance by the firm results in a substantial flow of information concerning the corporate plans and performance of the firm. The use of one bank by a firm for many banking services reduces the information costs to the bank: the bank already has had to acquire information in relation to the other services provided and so the marginal cost of providing an additional service is relatively low. Monitoring costs are also lower as the bank is already undertaking some monitoring of the firm with respect to other loans and services. The relationship created by universal banking is further enhanced by the existence of the house or lead bank which has the additional effect of reducing competition in the banking market. The bank is willing to provide support during financial distress as the relationship between borrower and lender is not eroded by competition during more affluent times. Information flows are also enhanced in Germany through the use of proxy voting rights. In addition to informational advantages the bank can also benefit from a greater ability to constrain the behaviour of managers such that they behave in the shareholders interest (see Cable, 1985). The relationship is maintained by bank management holding positions on supervisory boards, again giving further insight into the firm.

Similar arguments can be presented for the Japanese banking system where the

existence of large industrial groups and the nature of the banking system itself serve to improve information flows. There is an on-going long-term relationship between banks and industry maintained by extensive contact and exchange of information between banks and firms, thereby reducing the marginal costs of providing further loans and monitoring existing ones. The use of specialist institutions and staff also enables a more accurate assessment of the risk involved in a particular project.

The literature surveyed has shown that the UK has not displayed the extensive relationship between banks and industry that has been established in the other four countries, particularly Germany and Japan. One contributor to, or result of, this distant relationship is the nature of the lending undertaken, i.e. the short-term nature of lending and the renegotiation difficulties encountered therein. The relationship between the banks and industry in the UK, therefore, is primarily a distant one involving mostly the monitoring, and implementation, of overdraft facilities with little bilateral consultation and exchange of information taking place. Vittas (1986) argues that the difficulties encountered in the exchange of information have been further compounded by the fragmentation of the banking market brought about by increased competition in the banking sector. This has been accompanied by the decline in the role of the lead bank and so has consequently led to problems of co-ordination especially during times of financial distress.

A second advantage accruing in bank-orientated systems is that agency costs which arise due to conflicting interests on the part of shareholders and debtholders can be held to a minimum (see Driscoll, 1991). These are a result of key features of bank-based systems: improved information flows, equity shareholdings by banks and bank management holding

positions on company boards. Given these features of bank-orientated financial systems, in particular the creation of a close relationship between the bank and the firm, it seems reasonable to expect that the monitoring and control of the bank's clients would be both easier and more effective. The advantages accruing in the bank-orientated systems are therefore, according to Driscoll, twofold; firstly, banks have more information about the firm and the project and secondly, agency costs which arise due to conflicting interests on the part of shareholders and debtholders can be held to a minimum. By moving towards a system where financial intermediaries are responsible for monitoring, agency costs can be reduced through the expertise and knowledge which is developed.

" Information asymmetries are likely to be lowest in situations where banks provide a substantial proportion of a firm's debt finance and at the same time have a large equity interest." (Driscoll, 1991, p7)

Therefore, the UK banking system encounters problems in investment appraisal which are similar to those encountered in equity markets, i.e. problems of asymmetric information, moral hazard and principal agent problems. The close relationship developed by bank-based systems such as those in Germany and Japan lead to improved information flows which, in turn, improve the accuracy with which the present value of a project can be calculated. The use of industrial specialists also facilitates more accurate risk assessment. Increasing the accuracy with which banks can appraise a project reduces the risk premium required by lender and therefore reduces the discount rate. In the UK, by contrast, the relationship between banks and firms is more distant resulting in poorer information flows. The greater difficulty in assessing risk results in a higher risk premium being required, hence producing a denominator

effect.

iii) Managers

The previous explanations put forward for the undervaluation of investments by managers have expressed the problem as one experienced by the managerial function of the firm, but yet initiated by some outside factor such as the working of financial markets. The set of theories presented in this section suggest that it is the managers themselves, rather than outside pressures, who create short-term problems i.e. managers either underestimate future returns or use an excessive discount rate. Marsh (1990, p52) identifies areas where short-term attitudes are initiated by the managers themselves and defines managerial short-termism as

" [T]he tendency for corporate managers to favour the short-term quite independently of any spur from the financial markets."

Marsh argues that it is the managers who are responsible for the level of long-term real investment in a firm and when making investment decisions will inevitably consider their own personal interests as well as those of the firm. Marsh cites the following criteria as being important influences on the decisions a manager will take: remuneration schemes; anticipated time horizon within present job/ company; project appraisal and intra-firm relationships.

As far as the above criteria are concerned, contrasts are typically drawn between the UK (and the US) and Japan. The UK and US are reported to use managerial schemes linking reward to short-term indicators such as accounting profit (see Quinn, 1981), whereas in Japan it is usual for firms to use company wide bonus schemes favouring long-term performance

(see Abegglen and Stalk, 1985). Rewards to managers in Japan are often based on long-term performance in the organisation with salaries determined by seniority, experience, and individual appraisal (see McMillan, 1985). The effects of long-term remuneration schemes are accentuated by the time horizon of managers within the firm. The level of mobility of managers between firms varies greatly across countries with Japan at one extreme being linked to "life-time" employment (see Odagiri, 1988) whilst the UK and US experience relatively high mobility. An approximate guideline to the level of mobility amongst US executives was given as "three years per job" and "five years per company" (see Harvard Business Review, 1988).

UK management are singled out further with respect to the methods used to carry out investment appraisal. Of particular concern is the extent to which the payback method is used with Barton et al (1989) finding that two-thirds of their respondents always used this method of investment appraisal. Using a payback criterion necessarily results in short-termism since it ignores all cash flows beyond the payback period. Even if a discounted cash flow technique is used, problems may still arise. Frequently expressed concerns are that discount rates used in investment appraisal are above those implied by capital markets (see Myers, 1984). Secondly, Hodder and Riggs (1985, p131) argue that the use of a discounted cash flow technique can still result in incorrect investment decisions being made due to managerial errors in dealing with risk and inflation,

"It is difficult to know how widespread such errors have been during recent years, but almost surely they explain in part the shift toward shorter-lived projects and myopic investment decisions in many businesses."

In contrast to the approach in the UK and US, Japanese companies employ more ad hoc methods of investment appraisal. Odagiri (1989) highlights the emphasis in Japanese firms on the contribution of the investment to corporate growth along with other criteria such as the effect on market share and on the firm's product portfolio (see Economic Planning Agency, 1982). The time value of money used by Japanese managers is often simply the prevailing interest rate (see Hodder, 1986), with the implication that the discount rate is, if anything, underestimated rather than overestimated.

The final area which Marsh argues may lead to managerial short-termism is that of intra-firm relationships, e.g. the relationship between head office and divisions. Barton et al (1989) found substantial differences in opinion between parent companies and divisions over a large number of investment issues. Concerns were often felt by the divisions about the knowledge and ability of managers to evaluate investment projects with senior management being far removed from the divisions and also carrying responsibility for a number of divisions covering many areas. A further finding of this study was that managers felt more constrained by internal financial constraints such as quick payback and capital rationing than by external financial constraints. Many of these problems have been attributed to the prevalence of the multidivisional structure of companies within the UK and US which, in contrast, is less common in Japan. A feature of Japanese firms is the larger amount of involvement and control by management (see Odagiri, 1988).

In summary, various scenarios have been described which may lead to short-term attitudes by managers, i.e. remuneration schemes, investment appraisal techniques, time horizons of managers within firms and intra-firm relationships. The presence of these factors

leads to an emphasis by managers on the short-term and hence to the use of a higher discount rate, i.e. a denominator effect exists. In addition, errors in dealing with risk and inflation introduce noise into the system which may increase the risk premium required by managers again creating a denominator effect.

iv) Macroeconomic Climate

Whilst not explicitly concurring with Marsh that it is managers who create problems of short-termism, Henderson (1993) and Eltis et al (1992) do point to one aspect of the UK economic environment which may make a satisfactory choice of the numerator and denominator difficult, that being the presence of economic volatility. The impact of economic stability was also cited as an important influence on investment in the government paper "Competitiveness: Helping Business to Win" (HMSO 1994), along with low inflation and interest rates. The macroeconomic climate that the UK firm experiences differs greatly from that experienced in other countries. Henderson (1993), for example, contrasts the stable economic environments of Germany and Japan with the unstable and unpredictable UK economy. The presence of economic volatility in an economy makes prediction of future cash flows, and therefore the calculation of the present value of an investment, difficult. This uncertainty may reasonably be expected to lead to a numerator effect: in the face of uncertainty managers have difficulty in forecasting future cash flows and hence may be conservative in their estimation of future cash flows.

Considering the problem of inflation in more detail, how can higher inflation be

associated with the undervaluation of future cash flows? Firstly, during times of accelerating inflation it is reasonable to expect that firms will begin to anticipate government deflationary policies within two to four years (see Eltis et al, 1992) thus giving managers a pessimistic view of the future. The macroeconomic environment in which the UK operates is one which fluctuates between slump, as experienced over the late 1980's and early 1990's, and prosperity accompanied by accelerating inflation. On the other hand, countries such as Germany and Japan have not faced such difficulties:

"Because Germany and Japan had far less inflation, fluctuations of GNP were less, so there was less stop-go that has made good long term decision making and planning difficult for British business." (Eltis et al, 1992, p15)

Even without the problems of stop-go a recent feature of the UK economy is the co-existence of inflation and recession. As a result firms have not been able to pass higher input prices onto the consumer and have faced severe financial difficulties. Firms have also been affected by higher effective tax rates resulting from inflationary pressures. The lack of indexation of tax depreciation allowances and stock appreciation have meant that the presence of inflation has increased the effective tax rate resulting in a reduction in the after-tax profitability of investment projects (see Marsh, 1990). Eltis et al go on to argue that lower inflation in Germany and Japan has led to lower nominal interest rates and, in general, companies in these countries have experienced a higher rate of return, with the average rate of return being 2 or 3 times that of the British levels. Together, the combination of greater macroeconomic stability and lower interest rates afford German and Japanese companies more 'breathing space' such that companies can borrow with a smaller risk of loss of ownership if

something goes wrong, and, at the same time, banks are more likely to receive full repayment. Eltis et al (1992) see this gap between profit rates and interest rates as a major contributor to the short-term perspective of managers in the UK. The combination of economic volatility and the financial tightness faced by UK firms has further served to be detrimental to investment by forcing senior management in the UK to concentrate more on financial issues, giving them less scope to focus on issues such as technology enhancement and skill development relative to their foreign counterparts.

The increased macroeconomic instability in the UK may bring about both denominator and numerator effects. Since uncertainty increases the further into the future a forecast is required, the effect of greater economic volatility is to create a preference for the shorter term where the outcome is more certain. This leads to an increase in the time value of money and hence a higher discount rate. A second denominator effect may be felt through the risk premium: the greater uncertainty leads to the need for a greater risk premium to compensate investors for taking on this additional risk. The increased economic instability can cause a numerator effect as the increased difficulty in assessing the future economic environment in turn makes forecasting future cash flows more difficult. This may cause investors to err on the cautious side therefore underestimating rather than overestimating future cash flows.

III) CONCLUSION

The expression short-termism has been used to cover a wide range of characteristics of both UK financial markets and the UK management sector. Short-termism has been the

subject of much debate including what short-termism actually is and how it is caused. A major shortcoming with the existing literature is the lack of clarity in the definition of short-termism, with many authors omitting completely to define short-termism. A characteristic feature of the literature, on all aspects of short-termism, is the diversity it displays; each paper seems to bring with it a different representation of short-termism, often concentrating on only one aspect of the financial system with a bias in the literature towards equity markets. The aim of this chapter has been to draw together the various approaches to provide a comprehensive explanation of the concept of short-termism. A key aim has been to develop a concise definition on which further, empirical work may be carried out.

In order to achieve this aim, emphasis has been placed on the way in which the present value of an investment is arrived at, i.e. the discounting of future expected cash flows to obtain a value of the investment in today's terms. By drawing all the approaches to short-termism together the meaning of short-termism becomes clearer and may be described as situations where the characteristics of financial markets, or the players themselves, lead to the value of long-term returns being understated either due the use of low numerator terms or a high discount rate. This definition results in two possible ways in which short-termism may manifest itself: the numerator effect and the denominator effect.

The numerator effect describes situations in which the numerator terms of the present value equation (equation 2.1) are lower than would rationally be expected, thus resulting in a lower present value for the investment project under consideration. The numerator effect can be interpreted as cases in which cash flows are unduly pessimistic. From the discussion presented here it can be seen that whilst the numerator effect may have an important impact

on investment projects carried out, it is difficult to explain why such an effect may exist. The main explanation given here is that in the presence of a large degree of uncertainty, due to, for example, an unstable economic environment, managers may err on the conservative side thus underestimating future cash flows. Alternatively managers, in times of high inflation, may anticipate deflationary government policies, again giving them perhaps a pessimistic outlook of future cash flows.

The denominator effect describes those situations in which a higher discount rate is used by investors. The use of a higher discount rate has the effect of reducing the present value of an investment. This chapter has presented many explanations as to why investors across different types of financial markets should use a high discount rate. In equity markets, for example, short-termism may arise due to the existence of asymmetric information, imperfect knowledge, speculative activity or the behaviour of institutional investors. In the banking sector asymmetric information between borrower and lender is again an important contributor to short-term behaviour. The nature of the banking system has been shown to have potentially important implications for investment. Managers may themselves be responsible for the existence of short-termism through the working practices they adopt and the investment appraisal techniques they use. Finally, the macroeconomic climate was also argued to have an important effect on investment. It should be noted that both the numerator and denominator effects may be the result of either a rational response to the functioning of the market or the result of irrational behaviour on the part of investors. For example, in the former case a higher discount rate may be required to cover for higher risk arising from market features such as asymmetric information, whilst in the latter investors may require a higher

discount rate without the corresponding risk differences.

This chapter has sought to place the existing literature on short-termism into a framework based on the discounting process. The various approaches to short-termism have been interpreted here as either a numerator effect or a denominator effect even though many of the studies do not explicitly link themselves with the discounting process. Where the discount rate is considered explicitly, as in Miles 1993, it is considered in terms of the discount rate as a whole. However, it has also been seen in this chapter that the discount rate is composed of the investor's time value of money and a risk premium. Whilst the outcome of a higher discount rate is the same, i.e. investments will be undervalued, it is also of interest to know why a higher discount rate is used. Therefore an important part of the remainder of this thesis will be to breakdown the discount rate into its various components and consider each as a potential cause of short-termism.

In addition to creating a framework in which to place the various definitions of short-termism this chapter has also emphasised the extent and importance of differences across international financial systems. A basic distinction was drawn between those countries using bank-based systems and those using capital-market-based systems where Germany and Japan were used as examples of the former and the UK and US as examples of the latter. The basic premise from the literature is that bank-based systems are much better able to create close, long-term relationships between banks and industry than capital-market-based systems. The existence of a close relationship enables any informational and monitoring difficulties that a lender may face to be reduced. The UK in contrast has traditionally been associated with an arms-length relationship between banks and industry accentuating problems such as

asymmetric information causing banks to concentrate on the short-term.

The discussion presented here has shown the extent of the concern with short-termism and has illustrated the extensive potential for such a phenomenon to exist. The following chapters will consider evidence as to whether short-termism does exist in UK financial markets, providing empirical support to the so far largely theoretical debate. In addition to this, a further hypothesis to be examined is whether or not any differences in investment behaviour may be linked to the type of financial system prevalent in a particular country. The assumptions made in the following chapters will necessarily narrow the scope of the tests into the existence of short-termism. These assumptions form an important part of the analysis and clarify the scope for further research.

CHAPTER 3: A PRELIMINARY INVESTIGATION OF SOME UK EVIDENCE

D) INTRODUCTION

As discussed in Chapter 2, there are many different ways in which short-termism may be said to arise and many explanations for its occurrence. The various approaches to short-termism were drawn together to provide a more concise definition of short-termism as a situation in which the value of long-term returns is understated either through the underestimation of future cash flows or the use of a high discount rate given the level of risk involved. These two effects were referred to as the numerator and denominator effects respectively.

The aim of this thesis is to carry out an empirical investigation into the issue of short-termism and so the next question to be considered is how the numerator and denominator effects can be used to achieve this aim. Whilst the numerator effect provides a legitimate explanation of short-termism, it is recognised here that the lack of clarity into why such an effect should arise and also the practical difficulties in identifying whether or not cash flows are unduly pessimistic,¹ result in this effect providing an unsatisfactory basis for investigation into whether or not UK investors display short-term behaviour. The denominator effect, on the other hand, has been explained by the presence of a number of factors, as described in

¹In practical terms the identification of 'rational' expected cash flows is extremely difficult. The estimates of future expected cash flows are subjective estimates on the part of managers and investors who are unlikely to produce concurrent estimates. Firstly, the two groups will not have the same information on which to base their decisions and even when they have access to similar information, differences may arise in their cash flow estimates due to differences in interpretation and judgement (see Marsh, 1990).

Chapter 2, such as asymmetric information, imperfect knowledge, speculative activity or the behaviour of institutional investors. Although it is extremely difficult to ascertain a discount rate that would be the "rational" rate for appraising a given project or investment, further insight into the issue of short-termism may be acquired by considering relative discount rates across countries. The comparison of international discount rates will allow us to assess whether discount rates used by UK investors are indicative of short-termist behaviour.² It is assumed that investors would not invest if they did not receive the return they required and hence the discount rate will be proxied by rates of return. The denominator effect, in contrast to the numerator effect, therefore provides a more directly testable hypothesis and so it is the denominator effect which will form the focus for the remainder of the thesis.

As has been argued in the preceding chapters, the restriction of this research to a certain strain of short-termism is necessary due to the diverse nature of the various approaches to short-termism. The denominator effect will be further restricted to specific factors as outlined in the following section. The interpretation of short-termism as a denominator effect in this way still covers a large number of instances where short-termism might arise, and hence, provides a useful contribution to the debate on whether or not UK investors are short-termist.

The basic premise to be examined, then, in assessing whether or not UK investors are short-termist is whether the required rate of return of UK investors is higher than that

²When interpreting the results from such a comparison, caution must be exercised as the differences in returns may be due to differing risk levels across countries. A point which needs to be made here is that even if the higher discount rate is justified by a higher risk level this still results in firms facing demands by investors for higher returns thus increasing their cost of capital.

experienced in other countries. Yet how does such a proposition fit in with theories on international interest rate parity? The concept of international interest rate parity arises through the International Fisher Effect which states that, assuming no transactions costs and no restrictions on capital movements, real interest rates will be equalised across countries. If interest parity conditions do hold such that real interest rates are equalised across countries, then clearly a phenomenon such as short-termism could not prevail in a particular country as higher interest rates would attract investment from overseas, thereby eliminating any interest rate differences.

Two conditions for real interest rates to be equalised across countries are that:

$$R_{t+1} - R_{t+1}^* = E_t(s_{t+1} - s_t) | I_t \quad (3.1)$$

$$E_t(p_{t+1} - p_{t+1}^* | I_t) = E_t(s_{t+1} - s_t) | I_t \quad (3.2)$$

where R and R^* are the domestic and foreign nominal interest rates respectively, s the spot exchange rate, I_t the information available at time period t , p and p^* are the domestic and foreign price levels respectively. The first condition required for real interest rate equalisation across countries, shown in equation (3.1), states that differences in nominal interest rates are equal to the anticipated rate of change in the exchange rate, that is, nominal interest rates are equalised by changes in the exchange rate. In order for real rates to be equal across countries a second condition that is required is the presence of Purchasing Power Parity, as shown in equation (3.2), which states that any differences in the price level between two countries will be equal to the anticipated change in the exchange rate. The presence of the Purchasing Power

Parity condition is necessary to ensure that real interest rates do not differ as a result of differing international inflation rates.

Many studies have been carried out examining the validity of this interest rate equality (Mishkin 1984b, Cumby and Mishkin (1986) Cumby and Obstfeld (1984) Merrick and Saunders (1986)). The results in general do not support interest rate equalisation, a result which appears to be robust across countries, interest rates and price deflators. Mark(1985) extends this analysis by adjusting interest rates for differences in national tax rates and still does not find evidence to support interest rate equalisation. Further questions have been raised about the distinction between ex ante expected rates and ex post realised rates, an issue which was addressed by Cumby and Mishkin (1986) whose study did not alter the basic results outlined above. The lack of evidence in favour of interest parity, therefore, allows for the possibility of interest rate differences to prevail as a result of short-termism and permits the use of interest rate differences as a measure of short-termism.

Short-termism, it has been argued, can be identified by the existence of a higher required rate of return, and so the assertion that UK investors are short-termist in their outlook will be tested by considering real interest rates across a sample of countries. This work will concentrate on equities, government bonds and Treasury bills, making use of the fundamental differences between these three types of finance. The composition of the rate of return on each of these types of investment will be used to draw inferences about investor behaviour in each country.

Treasury bills are short-term government debt and consequently suffer from little, if any, default risk. Due to the nature of these bills they are often referred to as risk-free

investments and hence provide an important insight into the time value of money exhibited by investors in each country. A comparison of equity and bond capital highlights their differing features and, as a result, the differing levels of risk associated with them. The other two types of finance, equities and bonds, give further information on investors' behaviour in other markets and also allow the consideration of comparative risk premia. This is an important inclusion as the denominator effect, as shown in equation 2.2, can manifest itself as either a higher risk-free rate or a higher risk premium. Equity capital represents a permanent loan to the company or project; as such equity holders become part-holders in the firm. The annual return to the investor, in the form of dividend payments, is not contractually arranged but is at the discretion of the management (and is dependent on the performance of the firm). In times of financial distress the shareholders are legally behind bondholders in the queue for funds and so may end up with little or no return to their investment. Bondholders, in contrast, are not seen as part-owners of the firm but are instead regarded as creditors of the company, having given a loan to be repaid at a later date. Due to the differences between bonds and equity the latter is argued to be a more risky investment. Given that equity is a riskier investment a higher rate of return will be required by investors.

The hypothesis to be examined in this chapter, therefore, is that short-termism, interpreted as a denominator effect, is present among UK investors. Due to the absence of an appropriate benchmark, the study will incorporate international comparisons of real rates of return to assess whether the discount rates used by UK investors are higher than those used elsewhere. This approach also facilitates the consideration of the influence of the differing international financial systems on economic performance. The analysis will draw on three

forms of finance: Treasury bills, equities and government bond finance utilising their differing features to calculate the time value of money and various risk premia.

The remainder of the chapter will be set out as follows: section II will discuss the components of the required rate of return of investors, III considers the methodology to be used, IV presents and discusses the results and finally V offers a conclusion.

II) COMPONENTS OF REQUIRED RATE OF RETURN

In Chapter 2 the rate of return was described as being composed of two components: the time value of money and a risk premium. Here the analysis is extended to consider additional components of the discount rate which are an inflation adjustment, a liquidity premium and an exchange rate risk premium. The rate of return required by an investor therefore may be composed of several elements;

- i) Time value of money
- ii) Inflation adjustment
- iii) Liquidity premium
- iv) Risk premium
- v) Exchange rate risk premium

The relevance and importance of each of the five key components of the required rate of return will vary according to the type of investment carried out, i.e. whether the investment is in equity, government bonds or Treasury bills.

i) The Time Value of Money (r_f)

This component, also referred to as the risk-free rate, covers the opportunity cost of deferring consumption until a future date. In other words, even when investors are certain that they will receive their investment back at the same real value and at the agreed time, a payment is still required to compensate them for delaying consumption. If a group of investors has a higher time value of money or is more "impatient" this will result in a higher required rate of return, *ceteris paribus*. This element of the overall required rate of return is particularly important to the issue of short-termism with the existence of a high time value of money implying investors place greater emphasis on payments received in the near future.

The time value of money is a fundamental part of the discount rate and will be present across all types of finance. This risk-free rate should theoretically be the same whether debt or equity finance is used. If the risk-free rate does differ across the two types of investment this suggests there are two types of investor: one who invests in equity and one who invests in debt, with different preferences regarding the time value of money.

ii) Inflation Adjustment (π^e)

In the absence of inflation, payments received in future time periods will have the same purchasing power as those received in the present time period and, therefore, the value to an investor of receiving £1 today or £1 in a year's time will differ only by the opportunity cost of delaying consumption as described above. However, if inflation is present the discount

rate used to appraise an investment will have to be adjusted to take into account the inflationary impact on future cash flows. For example, if a sum of £100 is borrowed at a rate of interest of 8% when expected inflation is 0%, in a year's time the borrower will have to pay back £108 in real terms. If, on the other hand, inflation is present at a rate of 2% the borrower still pays back £108 nominally, but in real terms this sum is not worth as much as under the scenario of zero inflation. (The value of the sum has been reduced by inflated prices meaning the lender can no longer purchase so much with the £108 as he could have done with zero inflation). The Fisher equation (Fisher, 1930) suggests that the inflation adjustment should take the following form:

$$(1+R_f) = (1+r_f)(1+\pi^e) \quad (3.3)$$

where R_f = inflation-adjusted discount rate, r_f = risk free required real rate of return, π^e = expected rate of inflation.³

So the inflation-adjusted risk-free discount rate is as follows;

$$R_f = (1+r_f)(1+\pi^e) - 1 \quad (3.4)$$

Using the example above;

$$\begin{aligned} (1+R_f) &= (1+0.08)(1+0.02) \\ &= 1.08 \times 1.02 \\ &= 1.1016 \\ R_f &= 1.1016 - 1 = 0.1016 \text{ or } 10.16\% \end{aligned}$$

³Since the cross product terms in this equation (i.e. $(r_f)(\pi^e)$) are quite small the Fisher Equation is often presented as $R_f = r_f + \pi^e$.

In the absence of rational expectations a further risk premium would be required to cover for errors in forecasting future inflation. When the investment is in bonds, uncertainty, and therefore risk, is introduced into the real value of interest payments. This risk cannot be isolated (using this methodology) but would be picked up by the liquidity premium i.e. the inflation risk would be part of the risk encountered by investors undertaking longer term investment. Theoretically the difficulties of inflation should not arise in the case of equities since as costs rise so do the firm's revenues thus maintaining the rate of return received by investors.⁴

iii) The Liquidity Premium (λ)

In addition to the risk-free rate, which rewards the investor for forgoing present consumption, the liquidity premium rewards the investor for holding assets which cannot be as readily used for cash. Generally short-term assets are regarded as being more liquid in the sense that they can be more readily converted into cash without the risk of a reduction in the capital value of the asset. If this is the case investors will require only a small liquidity premium (if any) on short-term assets. However, if borrowers want to induce investors to undertake longer-term investment they will need to pay a greater liquidity premium. The required rate of return will now be equal to $(1+r_f)(1+\lambda)$ and so the return required by investors will be higher for longer-term investments. Borrowers will be quite willing to pay such a

⁴If this does not hold as suggested by Marsh (1990) any reward required by investors in equities for inflation risk should be included in the equity risk premium.

premium in order to gain long-term funds, thus avoiding rollover risk associated with a series of short-term investments.

Using a similar approach as the inflation adjustment

$$(1+r_b) = (1+r_p)(1+\lambda) \quad (3.5)$$

where r_b = rate of return on bonds.

This premium is not so relevant to equity investments as they are not taken up for a specific time and may be sold at any point. In addition any developments to the firm, such as a new investment project, should be reflected in the share price.

iv) The Risk Premium (ρ)

As described previously in Chapter 2 the risk premium is a payment, in addition to the basic discount rate r_b , to compensate the investor for taking of risk involved in an investment.

Strictly speaking in economics, a distinction can be made between risk and uncertainty where risk, a statistical concept, refers to situations in which the possible outcomes may be assigned probabilities. For example, it is possible to calculate the probability that a six will be thrown on a fair die. Uncertainty, on the other hand, as described by Knight (1921) refers to a situation whereby it is no longer possible to assign such probabilities.

A large amount of the literature in the area of investment appraisal does not draw the above distinction between risk and uncertainty but rather the problems associated with the lack of certainty about the future are pulled together under the heading of risk, a term used in

literature on investment appraisal to describe, in fact, a situation somewhere between the usual meanings of risk and uncertainty. In practice, true probabilities for future cash flows cannot be found, particularly when considering projects such as a new project launch since empirical evidence is hard to find and experience of an identical nature is not available. Consequently, managers have to estimate what these probabilities might be, i.e. form some subjective valuation of probabilities. Pike (1992) argues that even in the case of a new project launch the manager is able to assess the risks involved using the information already available to him. Whilst the manager has no experience of the particular project s/he will have encountered similar projects and even if this is not so, he may draw on the general business knowledge of both himself and colleagues. According to Pike, it is this ability to estimate subjective probabilities that leads in practice to risk and uncertainty being treated as the same thing. Risk in these terms, therefore, lies somewhere between risk as a statistical concept and true uncertainty as outlined by Knight (1921). Whilst true probabilities cannot be assigned, as with risk, it is possible to form subjective probabilities on the basis of past, related experience, thus we are not dealing with true uncertainty. Therefore the phenomenon referred to as risk in investment appraisal often does not correspond to true statistical risk but rather to a concept which lies somewhere between risk and uncertainty. It may be argued, however, that the element of uncertainty encountered in investment appraisal lies closer to risk than true uncertainty and hence the term risk will be used.

The risk involved in an investment may arise for a number of reasons. Following a capital asset pricing model (CAPM) type approach two types of risk may be identified; specific and market risk. Specific, or unsystematic, risk is the risk associated with the issuer

of a particular security and may arise out of factors such as the competency or experience of managers or the financial leverage of the firm. Specific risk is diversifiable and as such will not be priced in an efficient market. Market, or systematic, risk on the other hand, is the risk attached to the cash flow accruing to an asset that results from the dependency of the cash flow on market conditions. This risk is present for all assets, though it will vary as the relationship between the particular cash flow and market conditions varies, and so is not diversifiable. The effect of the presence of systematic risk is to add a risk premium to the basic rate of return required by investors in the following way:

$$r_i = r_f + (r_m - r_f) \beta_i \quad (3.6)$$

where r_i is the return on asset i , r_f the return on the risk-free asset, r_m the return on the market portfolio and β_i the relative volatility of asset i 's earnings compared to the market average.⁵

As shown in the previous chapter the different financial systems have often been argued to result in different risk premiums, culminating in differing discount rates. In particular, it is often argued that the association of Japanese and German systems with close banking relationships enables improved monitoring and information flows and therefore lower

⁵It should be noted that whilst a risk-adjusted discount rate is commonly used in the determination of an asset's fundamental value some difficulties can still occur with this method. The major problem is how this model represents risk over time. If a risk premium is included in the discount rate then risk increases exponentially over time. This approach is only appropriate where it may be argued that the effects of risk in time period 1 will be compounded in future time periods. In practice, however, risk is often expected to decrease over time therefore compensating at least partially for any compounding of risk that may take place. Taking again the example of a new product launch the greatest risk is likely to be at the start of the project, when its success is unknown, and decline over time as sales figures are obtained. Similarly, with research and development the initial, basic research is more often associated with greater levels of risk (normally regarded as 'true' uncertainty) than later stages such as product development. However, risk is usually thought of to be increasing over time since the further into the future the investment stretches then the more uncertain forecasts become not only in terms of the project itself but also more generally such as forecasts of economic conditions. It is this latter assumption which will be made throughout this work.

risk premiums. In addition, the macroeconomic climate in these countries has reduced the amount of uncertainty in the business environment, so exerting downward pressure on the required risk premium. The risk premium to be considered here will be the premium required by investors to undertake equity investment, and consequently will only form part of the discount rate for this type of investment.

$$(1+r_2) = (1+r_f)(1+p) \quad (3.7)$$

v) The Exchange Rate Risk Premium (ϵ)

Similarly, the return to the investor may be affected by an exchange rate change. When carrying out international investment the return to a unit of domestic currency depends not only on the returns on the investment but also on the exchange rate between the domestic and foreign currency. For example, if the exchange rate between the foreign investor's country and the domestic country (the country in which investment is carried out) appreciates this would have the effect of increasing the value of the payment to the investor. For example, suppose the sterling-dollar exchange rate is currently 1:1, an interest payment from a UK bond of £10 would be worth \$10 to an American investor. However, if the exchange rate was to change to 1:2 (i.e. sterling appreciates) then the value of the same £10 payment would now be worth \$20 to the American investor. As a result, even though there has been no change in the payment itself there is uncertainty, arising from the unpredictability of movements in the exchange rate, regarding the actual payment the investor will receive. The existence of a premium to cover this risk gives another adjusted discount rate obtained in a similar manner

to the previous discount rates

$$(1+r_e) = (1+r_f)(1+\epsilon) \quad (3.8)$$

where r_e = exchange risk adjusted discount rate, ϵ = exchange rate risk premium.

For the American investor, therefore, the return on the investment is composed of two components: the risk-free rate offered by the bond and secondly, the risk of any possible variation in the sterling-dollar exchange rate. However, according to the International Fisher Effect, as described in Section I, in equilibrium the rate of return received by the two investors on the two riskless assets should be the same.

$$(1 + r_{(us)}) = [1 + r_{f, (uk)}] \frac{E_1}{E_0} \quad (3.9)$$

where E_1 = new exchange rate, E_0 = original exchange rate, $r_{(us)}$ = return to American investor, $r_{f, (uk)}$ = risk-free return on British bonds. I.e. in equilibrium the return on the UK asset, r_{uk} , is equal to the return on the American asset, r_{us} , plus the expected currency movement.

Under the assumption of rational expectations in the foreign exchange market, the expected currency movement should not cause problems to the investor since expected and actual exchange rates will only differ by a random error term with mean zero. The assumption that an exchange rate risk premium is not required by international investors as a result of the International Fisher Effect will be made here. This assumption will be relaxed in the following chapter allowing two hypotheses to be tested: firstly whether any differences in real interest rates may be attributed to an exchange rate risk premium, and secondly, whether the assumption of a zero exchange rate risk premium is a valid one to make.

vi) Total Adjusted Discount Rate (R*)

The adjusted discount rates calculated above deal only with one type of adjustment or premium at a time and so a total adjusted discount rate, R^* , is required, which may be formed from the individual discount rate components as follows;

$$\begin{aligned}(1+R^*) &= (1+r_f)(1+\pi)(1+\lambda)(1+\rho)(1+\epsilon) \\ R^* &= (1+r_f)(1+\pi)(1+\lambda)(1+\rho)(1+\epsilon) - 1\end{aligned}\tag{3.10}$$

or under the assumption of no exchange rate risk premium

$$R^* = (1+r_f)(1+\pi)(1+\lambda)(1+\rho) - 1\tag{3.11}$$

As has been seen above however not all of the components will be relevant to the total adjusted discount rate for all assets. For example, the discount rate on bonds will not include the equity risk premium, ρ , whilst the rate on equities will not include the liquidity premium, λ . It is these differences in the discount rate which will be employed as a means of looking for evidence of short-termism amongst UK investors.

III) LOOKING FOR EVIDENCE OF SHORT-TERMISM

The aim of this thesis is to look for evidence of short-termism as defined by the denominator effect. As a result of the decomposition of the discount rate into the above components, two further sub-divisions may be made within this definition. The first, or "true"

short-termism, captures scenarios in which a particular group of investors display a higher time value of money, i.e. they have a greater preference to receive rewards in the short-term than other groups. The presence of this type of short-termism will be reflected in the existence of a higher risk-free rate, r_f . "General" short-termism, on the other hand, will refer to the existence of a denominator effect resulting from any of the other components of the discount rate, e.g. the liquidity premium or equity risk premium. The first aim of this chapter will be to examine the evidence concerning the existence of "true" short-termism by establishing a measure of the time value of money in the UK, i.e. the estimation of r_f . The test for the presence of "true" short-termism in the UK will take the form of asking whether the time value of money of investors is significantly higher from that of investors elsewhere. The test for "general" short-termism will be concerned with asking whether any of the other components of the discount rate are significantly higher in the UK than elsewhere.

As discussed in Chapter 1, the countries to be used in the comparison with the UK will be Germany, Japan, France and US. These countries were chosen not only to provide a point of comparison for the UK but also because they allow a comparison to be made between the capital-market-based countries of the US and UK and the bank-based countries of Germany and Japan. France is also of interest here as a country in which the financial system lies somewhere between capital-market-based and bank-based. International comparisons, as has been mentioned above, are important not only for establishing whether or not the time value of money of a particular group of investors is higher than elsewhere, but also for examining the second hypothesis that differences exist in investors' behaviour linked to the type of financial system present in each country. The choice of countries in the sample reflects the

aims of this second hypothesis by including countries employing both capital-market-based and bank-based financial systems.

i) Test 1: Time Value of Money

The purpose of this first test is to test for the presence of "true" short-termism, i.e. to test whether investors in the UK have a higher time value of money than investors in the other countries studied. The basis of the test will be to compare the risk-free rate earned by investors in each of the five countries, that is by estimating r_f where r_f it will be remembered, is the rate of interest that can be earned with certainty in the market. In order to carry out the analysis an asset is required which provides a measure of the risk-free rate. In section II, equation 3.11, the total discount rate was described as being composed as follows:

$$R^* = (1+r_f)(1+\pi)(1+\lambda)(1+\rho) - 1$$

An appropriate asset to use as a proxy for the risk-free rate should only contain the element r_f and not the default or liquidity risks or the inflation adjustment. The default risk, ρ , can be eliminated by considering government stock on which the default risk is generally assumed to be equal to, or at least close to, zero and, as a result no risk premium is required by the investor. The next component of the discount rate to consider is the inflation rate adjustment. If we assume rational investors, the expected rate of inflation may be proxied by actual rates experienced in each country. For the rational investor actual inflation is equal to expected inflation plus a random forecast error (with zero mean). Under the assumption of

rational expectations therefore, the real required rate of return on government stock may be obtained by using the actual inflation rate and the nominal required rate of return in the following way:

$$r_f = (1+R_p)/(1+\pi) - 1$$

or equivalently in logs⁶

$$\ln r_f = \ln(1+R_p) - \ln(1+\pi) \quad (3.12)$$

where π = actual inflation rate, \ln = natural logarithms.

The real required rate of return, however, still contains two components, the risk-free rate and the liquidity premium, so how can the time value of money be obtained from this? The liquidity of short-term assets, as has been argued earlier in Section II, is much greater than it is for longer-term assets and so, by considering short-term government assets such as Treasury bills, only a very small liquidity premium will be required by investors which can be assumed to be the same across countries.

The risk-free rate, therefore, will be measured by using the rate Treasury bills in each country, or a rate on a proxy instrument as close as possible to Treasury bills⁷ and will be calculated as follows:

$$\ln r_f = \ln(1+r_{tb}) \quad (3.13)$$

⁶ Natural logarithms have been used to allow the continuous compounding of interest rates over time.

⁷ See Appendix for data description.

where r_{tb} = real Treasury bill rate.

ii) Test 2: The Liquidity Premium

Of key interest to this study is how investors in each country behave over the longer term and so the next step is to consider a longer investment horizon. In considering the estimation of r_f in the previous section Treasury bills were to be used so that the liquidity premium could be assumed to be equal to zero. The liquidity premium measures the reward each particular group of investors requires to induce them to invest in a long-term, risk-free (in terms of default risk) asset over a short-term, risk-free asset and so will be defined here as the difference between the long-term asset and the risk-free rate. Since we now have an estimation of r_f it becomes possible to evaluate the size of the liquidity premium required by investors in the various countries with the use of a longer term asset.

The liquidity premium, λ , will be obtained using the Treasury bill rate (r) and the yield on long-term government bonds. The yield on government bonds is used because this is a forward- looking measure and is representative of the internal rate of return of holding the bond to maturity, i.e. the discount rate used to calculate the present value of the bond.

The price of a bond at a particular point in time is the discounted value of all future income, i.e. coupon payments and redemption payments:

$$P_b = \frac{c_1}{(1+r)} + \frac{c_2}{(1+r)^2} + \dots + \frac{c_n}{(1+r)^n} \quad (3.14)$$

where P_b = bond price, $c_{1..n}$ = coupon payments, r = required rate of return/ discount rate

The yield to maturity of a bond shows the average yield of the bond per annum if held to maturity. It may be described as the single interest rate that equates the present value of the future payments to the bond's price, or r in the above equation. In other words the yield to maturity on a bond may be interpreted as the internal rate of return or rate of discount on that bond.

The yield on government bonds will therefore be used as a measure of the required rate of return of investors in long-term risk-free assets and will be compared with the risk-free rate on Treasury bills to obtain a liquidity premium. Recalling equation 3.4 the liquidity premium combines with the risk-free rate as follows

$$(1+r_b) = (1+r_f)(1+\lambda)$$

where r_b is the yield on long-term government bonds. This gives a liquidity premium, λ ,

$$(1+\lambda) = (1+r_b)/(1+r_f)$$

The liquidity premium will be calculated in logarithmic terms as the yield on long-term government bonds minus the risk-free rate,

$$\ln(1+\lambda) = \ln(1+r_b) - \ln(1+r_f) \tag{3.15}$$

The liquidity premium calculated in equation (3.14) is a nominal premium; as inflation increases, the purchasing power of this premium will be reduced. Using a similar methodology to that used to deflate the risk-free series, a real liquidity premium, λ^* , may be calculated as

$$\ln \lambda^* = \ln(1+\lambda) - \ln(1+\pi) \quad (3.16)$$

iii) Test 3: The Equity Risk Premium

A further potential cause of the denominator effect and hence of 'general' short-termism is the equity risk premium. This risk premium may be described as the rate of return investors expect to obtain from an equity investment in excess of that which they expect from a risk-free asset. It is the extra reward investors require to compensate them for the additional risk involved in equity investment rather than risk-free investment such as Treasury bills. The third test will therefore be to calculate and compare the size of the equity risk premium across the five countries.

Recalling equation 3.6

$$(1+r_e) = (1+r_f)(1+\rho)$$

from which a premium may be calculated as follows

$$\rho = (1+r_e) / (1+r_f) - 1$$

The equity risk premium will be calculated by comparing real rates of return on equity and the risk-free series from Test 1 as follows:

$$\ln(1+r_e) - \ln(1+r_f) \quad (3.17)$$

In a similar manner to the liquidity premium, the value of the equity premium will be eroded by the presence of inflation and so a real equity risk premium should be calculated as

$$\ln \rho^* = \ln(1+\rho) - \ln(1+\pi) \quad (3.18)$$

The calculations outlined above allow us to establish whether the equity risk premium is higher in the UK than elsewhere. The finding of a higher equity risk premium may indicate either a rational response by investors to higher risk levels, or the requirement by investors of a greater reward for a given risk level, compared to investors elsewhere. In order to try and ascertain which of these above explanations is correct, the price of risk will be calculated for each country. The price of risk may be calculated as the equity risk premium divided by the standard deviation of real equity returns.

$$\text{price of risk} = \frac{\ln(1+r_e) - \ln(1+r_f)}{\sigma_e} \quad (3.19)$$

Whilst it is of interest to know which is the correct explanation for the existence of a high risk premium, it should be noted that whichever of these explanations are valid, the outcome is the same; firms face a denominator effect and hence a greater discount rate which reduces the number of projects with a positive net present value.

IV) RESULTS

i) Test 1: The Time Value of Money

The purpose of Test 1 is to test for the presence of "true" short-termism, that is, to examine the assertion that certain groups of investors and, in particular UK investors, have a high time value of money. The basis of this test is to compare the risk-free rate earned by investors in each of five countries studied with the risk-free rate being measured by the Treasury bill rate or a rate on a proxy instrument as close as possible to Treasury bills.⁸

The results for Test 1 are presented in Tables 3.1a and 3.1b with the plots of the relevant series shown in Figures 3.1 & 3.2.⁹

Table 3.1a: Real Treasury Bill Returns (1975 to 1995:6)

	UK	BD	JP	FR	US
Mean	1.638	2.995	2.353	2.857	1.485
Standard Deviation	4.901	1.832	2.136	3.209	2.474

⁹See Appendix for a description of this data.

¹⁰See Appendix for Figures.

Table 3.1b: Testing for Difference Between Means (1975 to 1995:6)

	UK & Germany	UK & Japan	UK & France	UK & US
t-statistic	-4.060*	-2.093*	-3.258*	0.435

Notes: * denotes significance at the 5% level.

As can be seen in the Tables 3.1a and b, the mean real returns are highest in Germany and lowest in the US. The UK returns are relatively low compared to the other countries in the sample with only US returns being lower. The differences found between the UK mean returns and the mean returns elsewhere were all significant except between the UK and US. It does not appear to be possible to group the countries according to the type of financial system present in a country with France having the second highest returns, Japan the third and the UK the fourth highest. The UK and US, countries typically associated with short-termism, do however appear to have lower rates of return than elsewhere. The standard deviations of real returns do allow such a grouping to be made with the capital-market-based group showing a greater deviation in returns. The lowest standard deviation was found in German real returns which is perhaps surprising given the high mean returns experienced in that country. From the above results on the real rate of return, therefore, the real returns received on UK Treasury Bills (risk-free rate) are significantly lower than the other countries studied, thus providing no evidence to suggest the presence of short-termism amongst UK investors. From the plots of the real Treasury bill returns in Figures 3.1 and 3.2 it can be seen that the relationship between UK real rates and those of the other countries in the sample is not consistent: during the period 1975 to 1985 the UK real rate is much lower than elsewhere whereas over the period 1985 to

1995 the real rate is high relative to the other countries. As a result of these changes over time, the test was repeated using a subsample of the dataset from 1985 to 1995:6, the results of which are shown in Tables 3.2a and b.¹⁰

Table 3.2a: Real Treasury Bill Returns (1985 to 1995:6)

	UK	BD	JP	FR	US
Mean	4.544	3.810	3.163	5.377	2.055
Standard	1.243	1.156	1.207	1.280	1.339

Table 3.2b: Testing for Difference Between Means (1985 to 1995:6)

	UK & Germany	UK & Japan	UK & France	UK & US
t-statistic	4.837*	8.913*	-5.215*	15.233*

Notes: * denotes significance at the 5% level.

In the subsample 1985 to 1995:6 France now has the highest mean real return with the UK, in contrast to the full sample results, having the second highest. The US does not however follow the rest of the capital-market-based group and still displays the lowest mean return despite its returns series being the most volatile. Germany, on the other hand, has a high mean return given the level of volatility in returns. All these differences are significant

¹⁰T-tests were carried out to test for a difference between the means of the two subsamples and the second period was found to have significantly higher mean real Treasury bill rates than the first period across all countries.

at the 5% level.¹¹ Therefore, there is evidence to suggest that short-termist behaviour was present among UK and French investors during the period January 1985 to June 1995.

Although there is conflicting evidence regarding the presence of short-termism in the UK, depending on the time period under consideration, the lack of a consistent relationship can in itself support the hypothesis of no short-termism. The evidence suggests that investors do not consistently require a higher rate of return and, therefore, cannot be said to be consistently more short-termist than other investors.

In conclusion, the UK displays a relatively low time value of money over the period 1975 to June 1995 thus not supporting the hypothesis that the UK exhibits short-term behaviour. In the sub-period 1985 to June 1995, however, real rates of return were significantly higher in the UK than in the other countries, with the exception of France, and hence this may be taken as being representative of a high time value of money. This high time value of money in turn provides some support for the assertion that UK investors display short-term behaviour.

An alternative explanation for the observed pattern in real interest rates is the incorrect anticipation of inflation by UK investors. The high inflation rates experienced in the UK during the 1970s may reasonably have been underestimated by investors, leading to lower real interest rates. Following these high inflation rates, and the resultant low real rates of return, investors may have become cautious when estimating inflation, requiring longer periods of lower inflation before deflating their expectations accordingly. This overestimation of

¹¹These results hold when the sample period is extended to start in 1980 with the exception that the German mean return is now higher, but not significantly so, than that of UK, hence showing the influence of the period 1975 to 1980 in the full dataset from 1975 to 1995:6.

inflation would lead to higher real interest rates.

Some support for this explanation of the pattern of real interest rates in the UK may be seen by comparing UK and US real interest rates. The real interest rates received by US investors were generally higher than those received by UK investors during the 1970s and generally lower than UK investors during the 1980s (see Figure 3.2). This pattern in real interest rates may be linked to inflation levels over the relevant time periods. The lower inflation rates experienced in the US during the 1970s (see Figure 3.10) could result in US investors being less likely to underestimate inflation rates over this period and hence less likely to overestimate inflation during the 1980s. Even though the high real interest rates may be explained by the lagged adjustment of inflation expectations this will still result in firms facing a higher discount rate. That is, the denominator effect created by the incorrect anticipation of inflation produces the same influence on investment appraisal as a higher time value of money on the part of investors. The explanation of the higher real interest rates is important, however, for any policy aimed at reducing short-term pressures in the capital market. If the inflation expectations argument does correctly explain the pattern of real interest rates, then this implies policy should be aimed at macroeconomic stability rather than reducing investors' time value of money. The suggestion that the incorrect anticipation of inflation may explain the pattern of real interest rates questions the validity of the rational expectations assumption. Further research could usefully explore alternative theories of expectation formation. One approach to the difficulties encountered with the assumption of rational expectations will be presented in Chapter 4.

ii) Test 2: The Liquidity Premium

Test 1 gave a basic insight into the time value of money of investors by looking at the risk-free rate in the sample countries. In addition to this, it is also important, in the context of looking for evidence of short-termism, to consider how the investors in each country behave over the longer term. This test will be carried out using long-term government bonds. Of particular concern in this test is the premium investors require to undertake investment over the long-term rather than the short-term. Consequently, this test will compare international liquidity premiums where the liquidity premium is calculated as the excess return on a long-term government bond over the risk-free rate.

The relative yields on long-term bonds are of interest in themselves as a measure of the rate of return required by investors over the longer term and so the long-term government yields will be examined first before going on to consider the liquidity premium (see Tables 3.3a and b).

Table 3.3a: Real Bond Returns (1976:3 to 1995:6)

	UK	BD	JP	FR	US
i) 1976:3 to 1995:6					
Mean	3.041	4.095	3.176	4.074	3.392
Standard Deviation	3.078	1.289	1.767	2.173	2.814

Table 3.3b: Testing for Difference Between Means (1976:3 to 1995:6)

	UK & Germany	UK & Japan	UK & France	UK & US
t-statistic	-4.798*	0.575	-4.166*	-1.278

Notes: see Table 3.1b.

UK investors in long-term government bonds receive the lowest mean return on their investment whilst German investors receive the highest mean return. The UK mean return is significantly lower than the mean returns of France and Germany but is not significantly different from the others. From these results therefore, it can be seen that even over the long-term investors do not require higher returns than elsewhere and so this second test also finds no evidence to support the assertion that UK investors exhibit short-termism. In terms of the financial system present in each country no obvious grouping appeared with the lowest returns being in the UK and Japan which, as discussed in Chapter 2, have greatly differing financial systems. Further evidence against the importance of the financial system was that the difference in returns between the UK and Japan was not found to be significant.

From the plots of real bond returns in Figures 3.3 & 3.4, it can be seen that the returns from the early 1980s are in general higher than those of the over the earlier years in the sample and so the data for mean returns were again split into two sample periods as with the Treasury bill Data.¹² The results for this time period may be seen in Tables 3.4a and b.

¹²The means for the second subsample were found to be significantly higher than for the earlier subsample across all countries.

Table 3.4a: Real Bond Returns (1985 to 1995:6)

	UK	BD	JP	FR	US
Mean	4.283	4.494	3.531	5.592	4.434
Standard Deviation	1.711	1.390	0.908	0.672	1.167

Table 3.4b: Testing for Difference Between Means (1985 to 1995:6)

	UK & Germany	UK & Japan	UK & France	UK & US
t-statistic	-1.071	4.342*	-7.958*	-0.815

Notes: see Table 3.1b.

In the subsample starting January 1985 the UK still displays a relatively low mean return on long-term bonds, having the second lowest returns with the lowest occurring in Japan. The UK's mean bond return, compared to the full dataset, has increased relative to the other countries in the sample such that it is now significantly higher than Japan and no longer significantly lower than any other country except France.¹³ UK investors therefore receive the lowest real rate of return on government bonds over the full dataset and second lowest in the subsample from 1985 to June 1996. This again raises the question of whether real returns are low as a result of investor behaviour, or whether they are the result of incorrect anticipation of inflation.

Using government bond and Treasury bill series the liquidity premium was calculated

¹³With a starting point for the second period of 1980 the results are not changed substantially with France and Germany having significantly higher mean bond returns than UK and US at the 10% level, whilst Japanese mean bond returns are still lower than the UK but now not significantly so.

for each country both in nominal and real terms and the results are presented in Tables 3.5a and b.

Table 3.5a: Liquidity Premium (1976:3 to 1995:6)

	UK	BD	JP	FR	US
i) Nominal Liquidity Premium					
Mean	0.588	0.858	0.586	0.835	1.640
Standard Deviation	2.141	1.537	1.118	1.372	1.547
ii) Real Liquidity Premium					
Mean	-6.774	-2.307	-2.511	-5.354	-3.622
Standard Deviation	4.906	2.896	2.862	3.462	4.254

Table 3.5b: Testing for the Difference Between Means (1976:3 to 1995:6)

	UK & Germany	UK & Japan	UK & France	UK & US
i) Nominal Liquidity Premium				
t-statistic	-1.557	0.011	-1.474	-6.053*
ii) Real Liquidity Premium				
t-statistic	-11.919*	19.611*	-3.596*	-7.378*

The nominal liquidity premium is highest in the US, whilst the premium received by UK investors is the second lowest out of the five countries, but is only significantly lower than the liquidity premium received by US investors. The real liquidity premium is negative for all countries and lowest in the UK where the liquidity premium is significantly lower than the other four countries. The real liquidity premium is in general lower for the countries associated with capital-market-based financial systems. In summary, there is no evidence to suggest UK investors require a larger premium than elsewhere for investing over the longer

term and consequently no denominator effect has been identified.

iii) Test 3: The Equity Risk Premium

The final test is to compare the risk premium required by investors to be persuaded to invest in equity in each of the countries. The equity risk premium may be defined as the rate of return investors expect to obtain from equity in excess of that which they expect from the risk-free asset. The aim of the test is to ascertain whether UK investors require a higher premium for undertaking equity investment than elsewhere. In making international comparisons care must be taken when interpreting the results as any differences in returns may be due to differing risk levels across the countries. In addition to the mean equity returns of each country, volatility is also measured using standard deviation of returns to give an insight into the risk involved in equity investment in each of the five countries.

The mean, standard deviations and tests for the differences between means of the real equity returns and risk premium series for each country are presented in Tables 3.6a and b with plots of the real equity return series in Figures 3.5 to 3.8. The highest mean rate of return on equity was found to be that of the UK followed by France, US, Germany and Japan. This ranking of the mean returns allows a grouping of the countries according to financial systems with those of capital-market-based systems being higher and those of bank-based countries being lower. These differences however are not statistically significant at the 5% level.

Table 3.6a: Real Equity Returns (1975 to 1995:6)

	UK	BD	JP	FR	US
i) Real Equity Returns					
Mean	12.429	6.737	5.336	9.463	8.470
Standard Deviation	72.303	57.860	62.951	76.104	49.331
ii) Nominal Equity Risk Premium					
Mean	10.792	3.742	2.983	6.606	6.985
Standard Deviation	72.797	57.974	62.953	76.269	46.462
iii) Real Equity Risk Premium					
Mean	2.165	0.368	-0.682	-0.113	1.362
Standard Deviation	72.513	58.032	63.052	76.340	49.719

Table 3.6b: Testing for the Difference Between Means

	UK & Germany	UK & Japan	UK & France	UK & US
i) Real Equity Returns				
t-statistic	0.962	1.158	0.442	0.708
ii) Nominal Equity Risk Premium				
t-statistic	1.186	1.270	0.621	0.677
iii) Real Equity Risk Premium				
t-statistic	0.303	0.464	0.339	0.143

In relation to the volatility in equity returns Japan has a very low mean equity return whilst the US has a high mean return compared to its volatility in equity returns. Therefore, whilst the mean return on equity is higher in the UK than the other countries in the sample this

difference is not significant and so there is no evidence to support the assertion that UK investors in the equity market are more short-termist than investors in the other countries.¹⁴

The key part of this third test is a comparison of international equity risk premiums, the results of which are also presented in Tables 3.6a and b. The equity risk premium produces similar results to the equity returns in that there are no significant differences between the UK equity mean returns and mean returns elsewhere, for either nominal or real premiums. The UK, US and France display the highest nominal equity risk premium and Japan the lowest, however limited inferences can be drawn from these results due to the lack of significance. The real equity risk premium is also highest in the UK and US but France's premium is now lower than that of Germany, despite the French series being the most volatile. Even with relatively high inflation in the UK the real equity risk premium remains highest in the UK, though not significantly so.

Throughout the analysis of equity returns and premiums Japanese investors receive a low return given the standard deviation in the relevant series. In contrast the US investors receive a high mean return relative to the level of standard deviation. In the UK the mean returns to investors are higher but so is the level of volatility as measured by the standard deviation of returns, therefore suggesting that the higher mean return may be associated with higher risk. To examine this issue further the price of risk has been calculated as the return to an asset over a given period divided by the standard deviation in returns to that asset over the period. The results of this calculation are shown in Table 3.7a and b.

¹⁴From observation of the series in Figures 3.5 to 3.8 there is no clear split over time as with the other series so the sample was not divided into two sub-periods for further analysis.

Table 3.7a: Mean Price of Equity Risk (1975 to 1995:6)

	UK	BD	JP	FR	US
Mean	1.421	1.141	1.505	1.305	1.165

Table 3.7b: Testing for the Difference Between Means (1975 to 1995:6)

	UK & Germany	UK & Japan	UK & France	UK & US
t-statistic	0.515	-0.146	0.199	0.494

Table 3.7a shows that the mean price of risk has been relatively high in the UK compared to Germany, France and the US but is lower than that of Japan. These differences are not, however, statistically significant and so the inferences which can be drawn from these results are limited. The results shown in Tables 3.7a and 3.7b are perhaps surprising given previous observations. This discrepancy may possibly be explained by the method of calculation of the various measures: the results in the earlier tables are produced by monthly figures whilst the mean price of risk is based on daily data. It is possible that the daily data has a large amount of variance even though on a month to month basis there is little variation in returns.

V) CONCLUSION

To obtain a workable and testable definition, short-termism has been defined as the

use of a high discount rate. By decomposing the discount rate into its individual components it became possible to further divide this definition into "true" short-termism, where the investor has a high time value of money, and "general" short-termism, which refers to the use of a high discount rate resulting from any of the other components of the discount rate. On the basis of these definitions three tests were carried out: the first aimed at measuring the time value of money; the second at measuring the liquidity premium and the third at measuring the equity risk premium.

Test 1 is a test for the presence of "true" short-termism i.e. tests whether the risk-free rate is higher in the UK than elsewhere. On examination of the full dataset, 1975 to 1995, no evidence was found to suggest the presence of short-termism amongst UK investors. Indeed UK investors exhibited relatively low returns to the risk-free asset thereby suggesting the converse of short-term behaviour. These results were however found to be sensitive to the time period considered and the omission of the high inflation period of the late 1970s resulted in a relatively high real rate of return for UK investors, with only French investors receiving a higher return. Therefore, in contrast to the longer time period there is evidence to suggest the presence of "true" short-termism over this period. Although evidence of short-termism has been found, due to the conflict of results over time, UK investors cannot be said to be consistently short-termist in their investment behaviour. An alternative explanation for the pattern of real rates of return is a lagged adjustment on the part of investors with respect to inflation expectations. For example, during the 1970s it seems reasonable that investors did not expect such high inflation rates, therefore underestimating future inflation and resulting in lower real rates of return. During the 1980s however investors may have become cautious

and required much more persuasion to deflate their inflation expectations, hence overestimating inflation and requiring higher real rates of return. Whilst recognising this alternative explanation for the pattern of real interest rates, it was noted that whatever the reason for a real rate of return, firms still face a high discount rate. The reason behind a real rate of return is, however, important for policy decisions as it implies the emphasis of policy should be on macroeconomic stability. It was also noted that the problems encountered with inflation expectations do suggest difficulties with the rational expectations assumption. As a result the following chapter will carry out analysis into short-termism allowing the rational expectations assumption to be relaxed. Over the longer term UK investors receive relatively low returns requiring a low premium for investing over the longer term. The liquidity premium in the UK was not significantly different from those received in the other countries apart from the US whose returns were higher than those in the UK. In real terms the UK liquidity premium was significantly lower than in the other countries. The results produced by the comparison of international equity markets show that the returns are close in value. Although the returns in the UK were relatively higher than the other countries, any differences found either between the returns themselves or equity risk premiums were not statistically significant. Similar results were obtained by the comparison of the price of risk in equity markets across countries.

In summary, on the basis of these tests there is little evidence, given our assumptions, to suggest short-termism, as represented by a denominator effect, exists. If short-termism is present anywhere it is in the form of "true" short-termism as indicated by the presence of a high risk-free rate of return, or time value of money, and has occurred during the 1980s and

early 1990s.

With regards to the second hypothesis under consideration; whether or not differences exist between investors in countries with capital-market-based systems and those with bank-based systems, no discernible pattern could be identified. No pattern could be readily identified in risk-free rate of return except that when considering the full dataset the returns in the UK and the US were lower than the returns elsewhere. This relationship was not however maintained when using only the shorter time period 1985 to June 1996. The results obtained from the bond market were very mixed giving no further insight into the possible grouping of countries according to financial systems. In the equity market analysis, higher risk premiums were found, both in real and nominal terms, in capital-market-based financial systems, but these returns were not significantly higher than the other countries.

Given evidence to suggest "true" short-termism may exist, at least over the 1980s, further empirical examination of the time value of money of UK investors is required. The aim of the following chapter is to consider in more detail the Treasury bill rate of return in each country and look for any systematic differences. A key part of Chapter 4 will be to relax the assumption of a zero exchange risk premium, which has been made in the analysis so far, in order to ascertain whether any differences found in real rates of return are due to the presence of such a premium. In this chapter ex post interest rates have been used under the assumption of rational expectations. The following chapter will relax this assumption and so will introduce ex ante interest rates.

APPENDIX

A) DATA

i) Treasury Bill Data

In the United Kingdom, United States and France 3-month Treasury Bill rates were used. In Germany, where difficulties were encountered in obtaining Treasury Bill data the money market rate was used. Although there are short-term government bills in Japan, the interest rate on these bills is determined at an artificially low rate and therefore the market has been insignificant. The Japanese series will therefore be constructed using the call money rate until February 1977 and thereafter the Gensaki rate. All data was monthly and in the form of period averages.

ii) Government Bond Yield

Data for long-term government stocks were collected from Datastream and were as follows:

- i) United Kingdom- gross redemption yield on 20 year gilts.
- ii) Germany- yield on 2nd market public bonds, 7 to 15 years.
- iii) Japan- yield on government benchmark bonds, 8 to 10 years.
- iv) France- yield on government bonds on secondary market, over 7 years.
- v) United States- yield on treasury bonds, 10 years or more.

iii) Equity Market Data

Total return indices were collected from Datastream International for each country and were constructed of the price appreciation of stocks plus reinvested dividends.

B) FIGURES

Figure 3.1: Real Rate of Return on Treasury Bills- UK, Germany & Japan

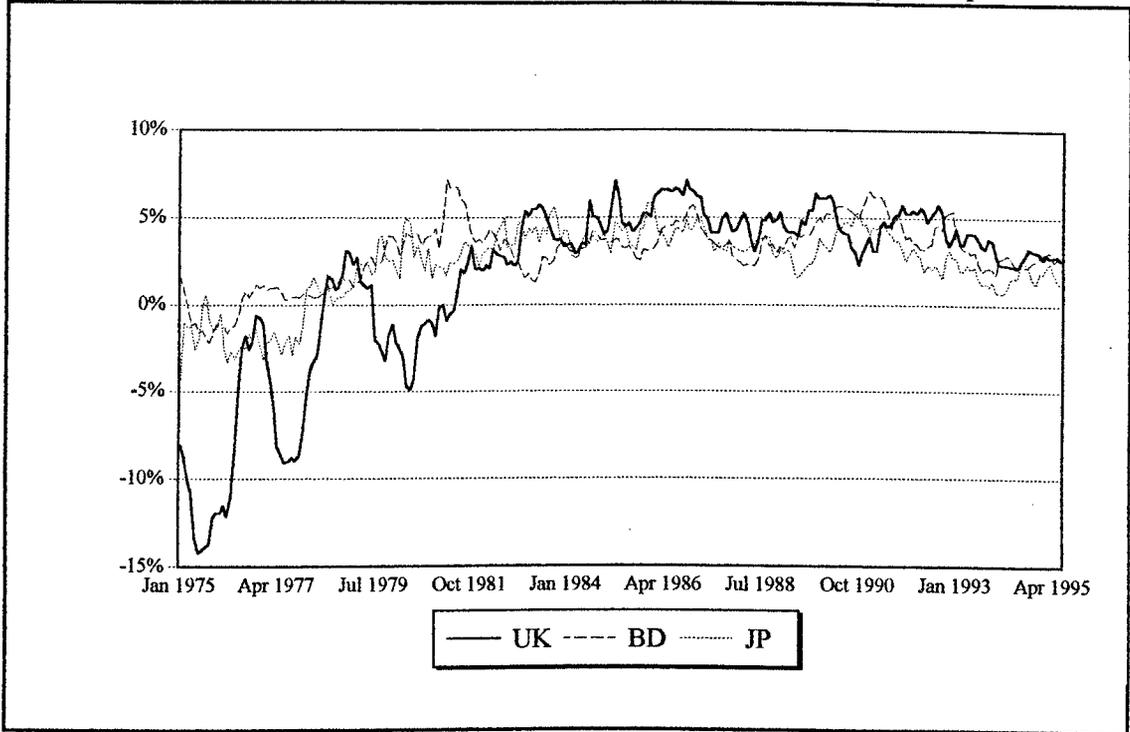
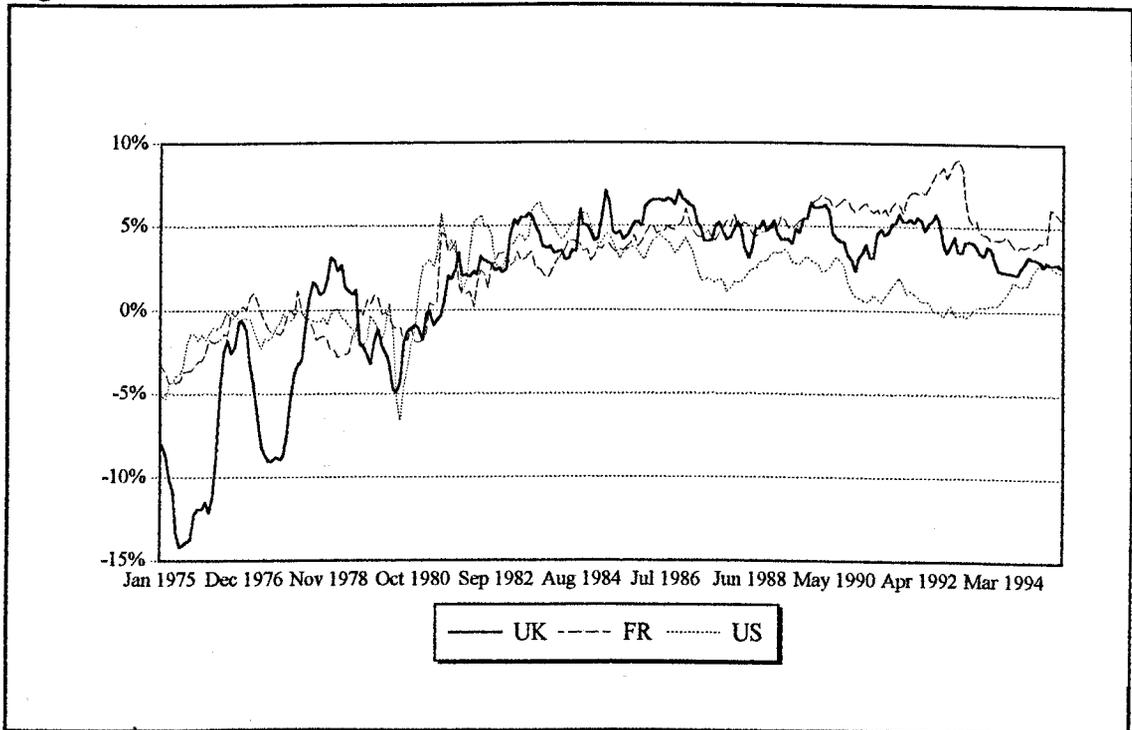
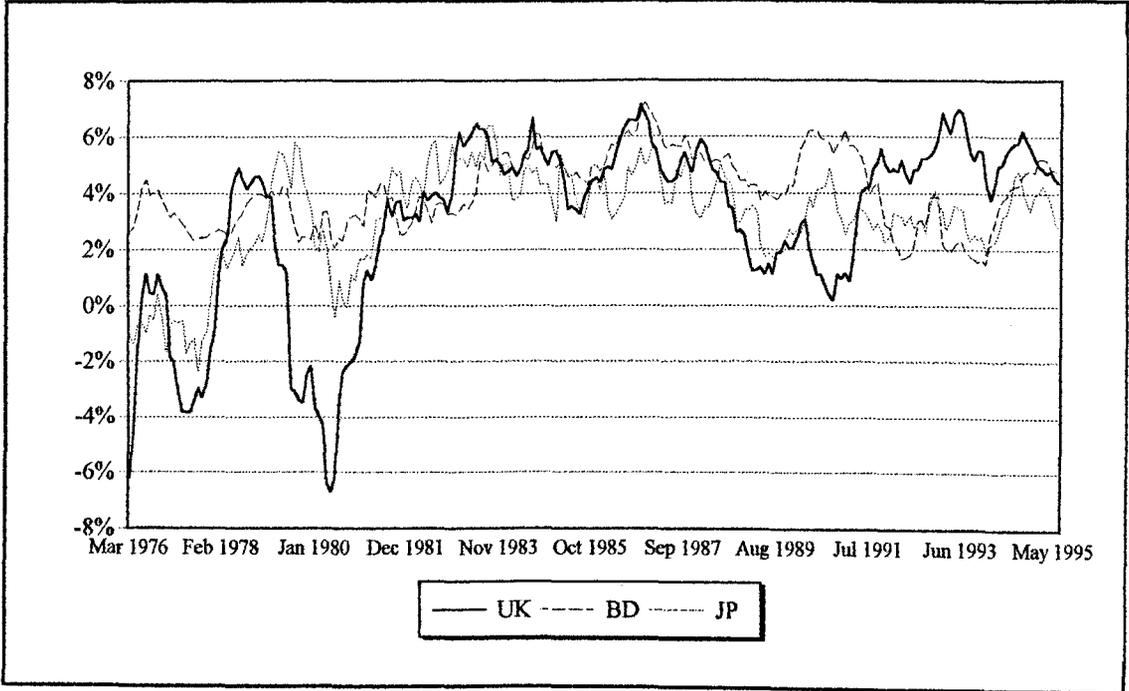


Figure 3.2: Real Rate of Return on Treasury Bills- UK, France & US.



**Figure 3.3: Real Rate of Return on Long-term Government Bonds
- UK, Germany & Japan.**



**Figure 3.4: Real Rate of Return on Long-term Government Bonds
- UK, France & US.**

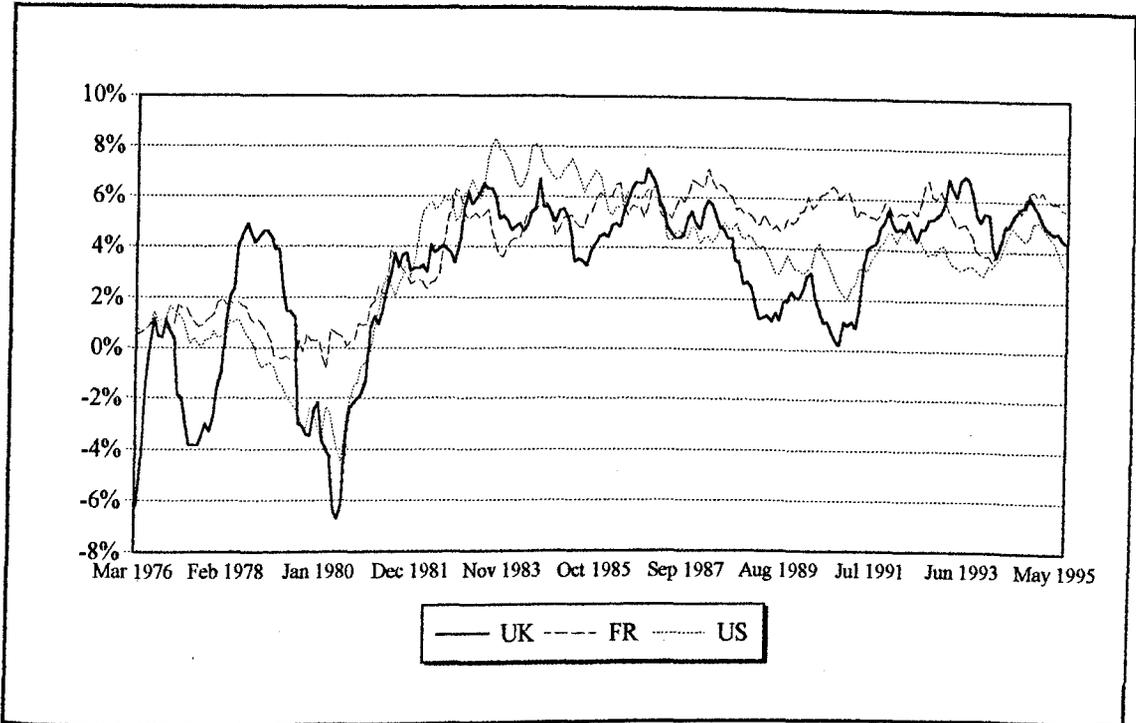


Figure 3.5: Real Rate of Return on Equity- UK & Germany.

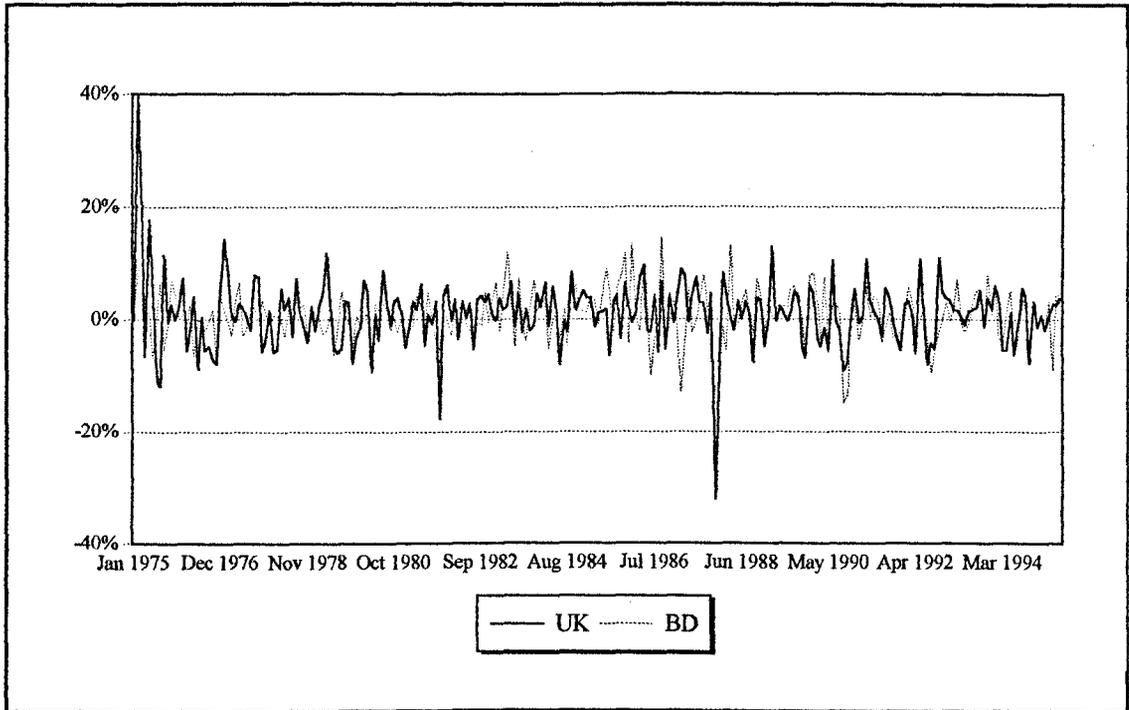


Figure 3.6: Real Rate of Return on Equity- UK & Japan.

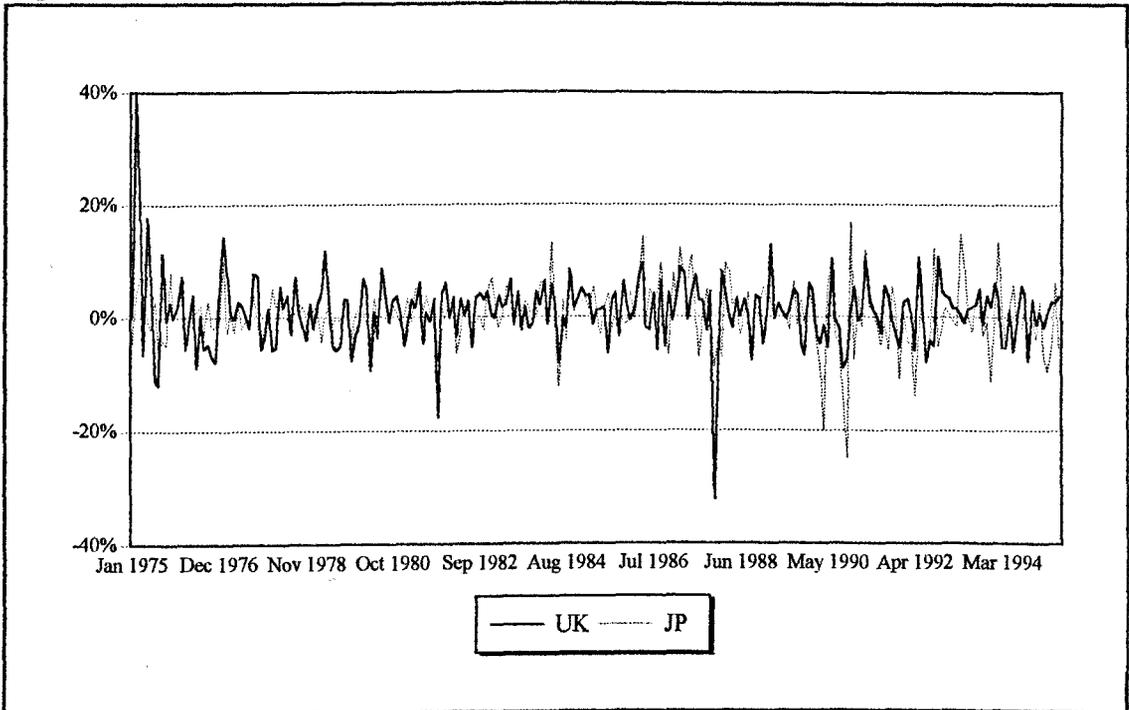


Figure 3.7: Real Rate of Return on Equity- UK & France.

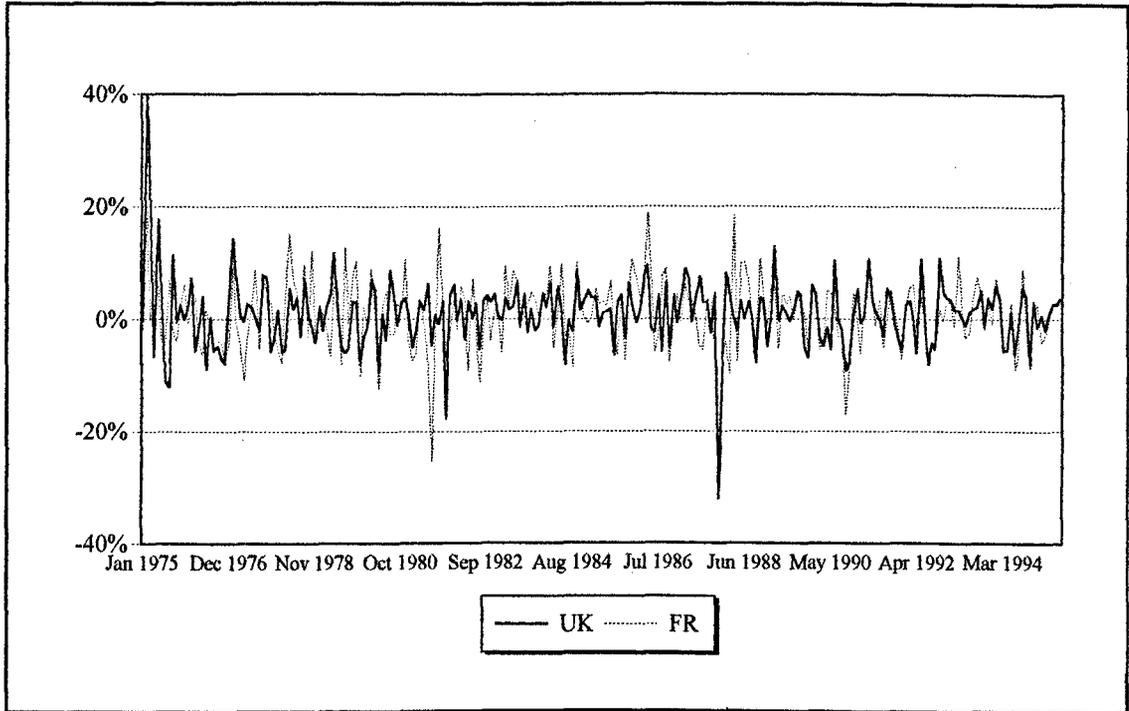


Figure 3.8: Real Rate of Return on Equity- UK & US.

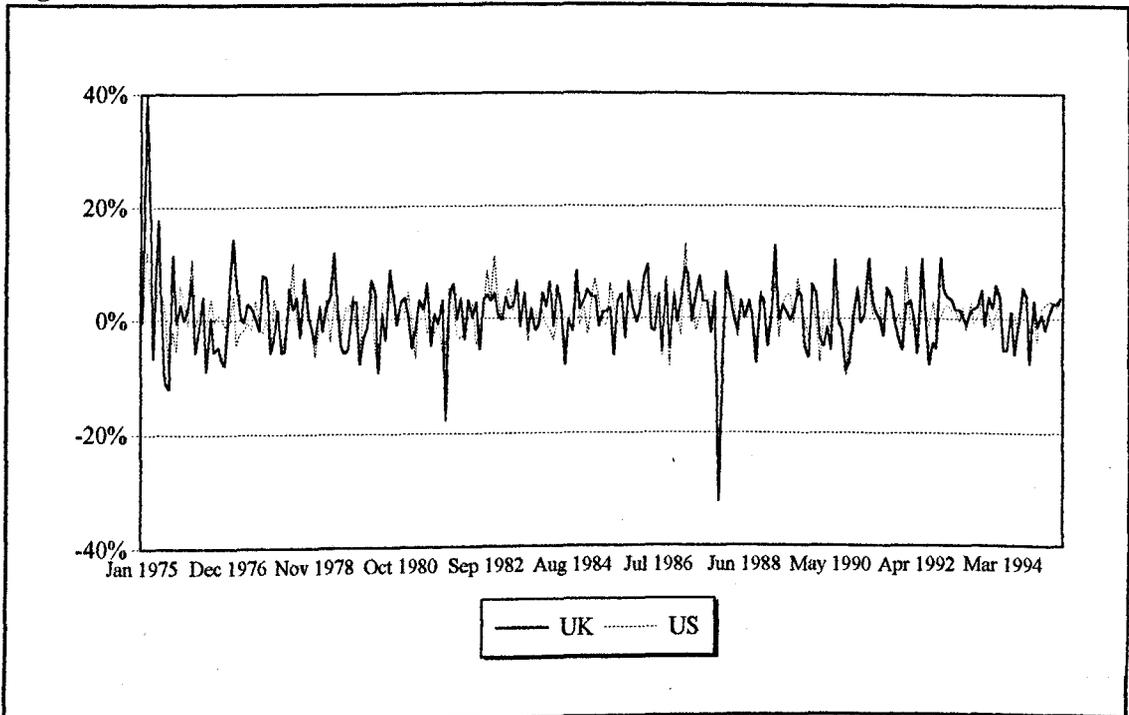


Figure 3.9: Inflation Rates- UK, Germany & Japan.

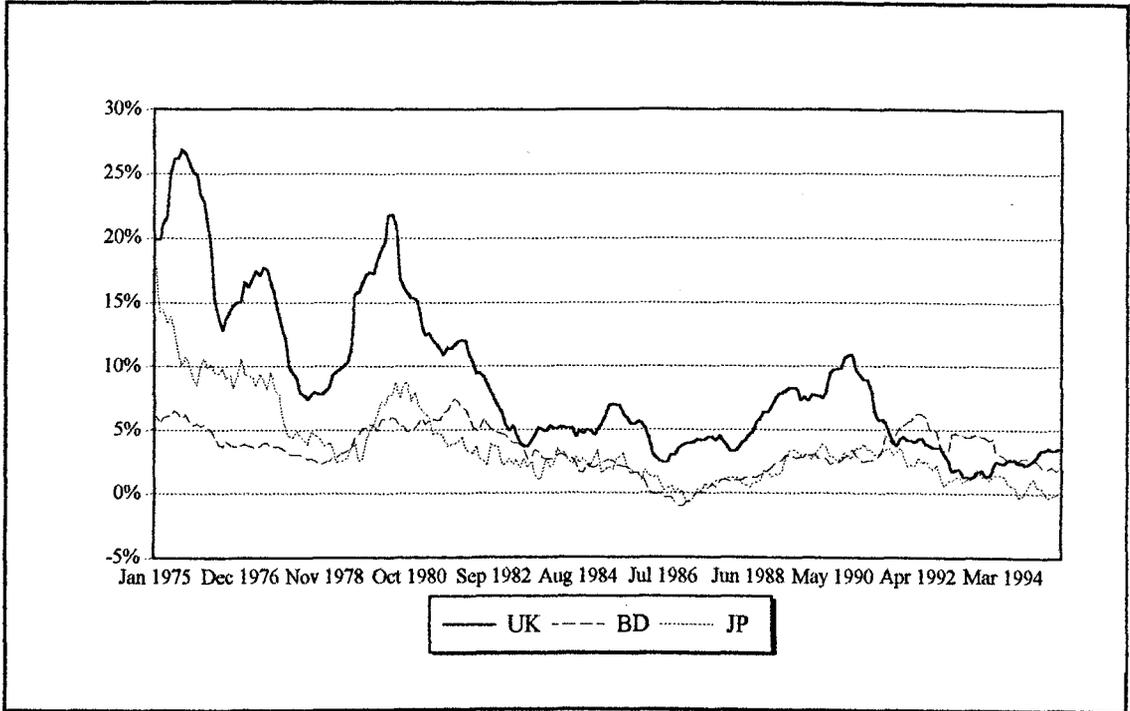
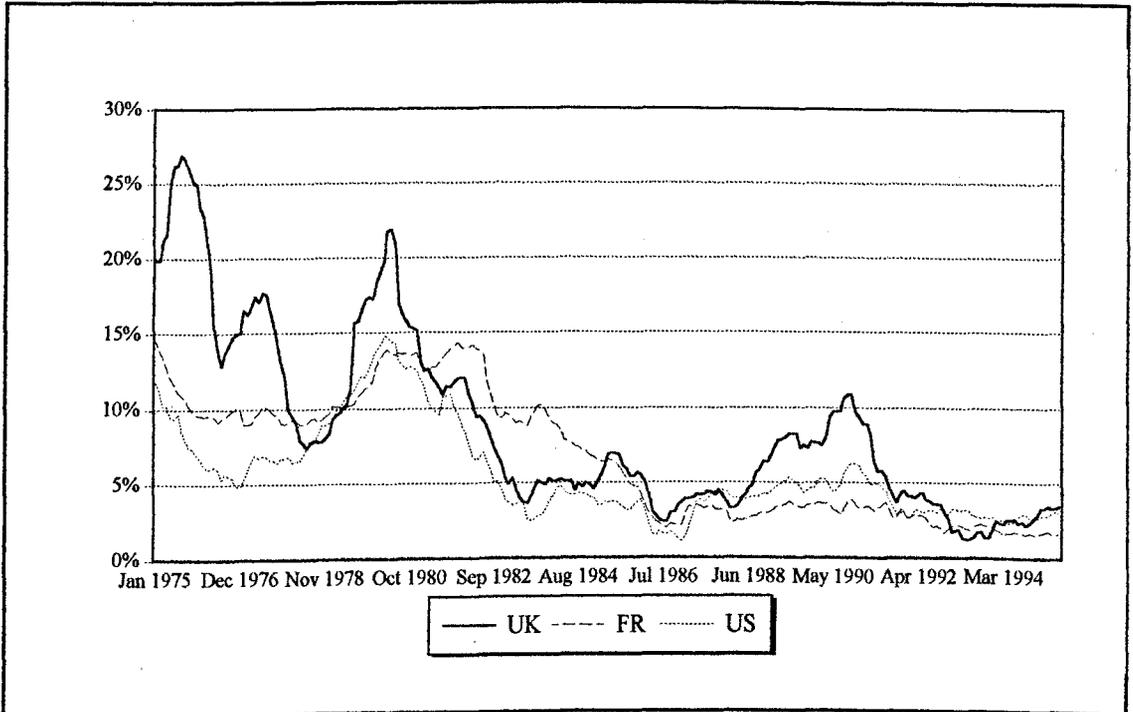


Figure 3.10: Inflation Rates- UK, France & US.



CHAPTER 4: FURTHER INVESTIGATION OF "TRUE" SHORT-TERMISM

D. INTRODUCTION

In the previous chapter evidence was found to suggest that if short-termism does exist it is in the form of "true" short-termism, as indicated by the presence of a higher risk-free real rate of return, rather than more general short-termism in the form of higher liquidity or equity risk premiums.

The aim of this chapter is to provide further empirical investigation into the potential presence of "true" short-termism in UK capital markets. This will involve considering the time value of money in more detail by further analysing international real interest rates and looking for any systematic differences across countries. The analysis will include relaxing the rational expectations assumption made in the previous chapter. The impact of this will be two-fold; firstly, the absence of rational expectations in the foreign exchange market will allow the existence of an exchange rate risk premium, and secondly, it will no longer be assumed that ex ante and ex post interest rates differ only by a random error. The exchange rate risk premium is of interest, not only as a possible explanation for international interest rate differences, but also as a component of the total discount rate, and is therefore a potential cause of "general" short-termism. In order to be able to relax the rational expectations assumption, the chapter will include the derivation of both ex ante real interest rates and ex ante exchange volatility using the methodology of Mishkin (1984a,b) and Generalised Autoregressive Conditional Heteroscedasticity models respectively.

The chapter will be organised as follows: section II will outline a method of testing for the presence of short-termism; section III outlines the econometric methodology to be used covering the measurement of ex ante real interest rates, exchange rate volatility and tests for evidence of short-termism. Section IV presents the empirical results and a discussion of these results with the final section, V, offering a summary and conclusion.

II) TESTING FOR EVIDENCE OF SHORT-TERMISM

Having found some evidence in the previous chapter to suggest that real risk-free rates of return are not equal across countries it will be useful to try and explain why such differences exist. One explanation, as discussed in Chapter 3, is that the time value of money of investors differs from country to country. An alternative explanation which may be put forward is the existence of an exchange rate risk premium. Frankel and McArthur (1988) argue that almost all studies testing parity conditions assume investors form rational expectations of future exchange rates such that expected and actual exchange rates differ by only a random expectational error with mean zero, as was assumed in Chapter 3. Using this methodology previous studies, such as Cumby and Obstfeld (1984), generally reject the hypothesis that the nominal interest differential is an unbiased estimator of exchange rate changes and interpret these findings as a rejection of Uncovered Interest Parity. Frankel and McArthur go on to offer the exchange risk premium as a prime candidate to explain international inequalities in expected real rates of return. The exchange risk premium is required whenever foreign and domestic assets are not perfect substitutes, assuming risk

averse investors.

In Chapter 3, the discount rate was decomposed into its various components, namely the time value of money, the inflation adjustment, the liquidity premium, the risk premium and the exchange rate risk premium. On the assumption of rational expectations in the foreign exchange market, and hence a zero exchange rate risk premium, the rate of return on Treasury bills was argued to be equal to the time value of money of investors i.e. the risk-free rate. However, if an exchange rate risk premium is present then this will be reflected in the rate of return on Treasury bills. This Chapter aims to develop the preceding analysis by decomposing the return to Treasury bills into the following components: a basic required rate of return α , exchange rate risk χ and a residual term ϵ .¹ The basic rate of return refers to the investors' time value of money, that is, how much investors require as a reward in return for forgoing present consumption.

Real rates of return on Treasury bills will be compared using the following model

$$r_{it} = \alpha_{it} + \beta \chi_{it} + \epsilon_{it} \quad (4.1)$$

where r_{it} is the rate of return on Treasury bills for country i in time period t . The null hypothesis to be tested is that the basic rate of return, α , required by investors is the same for each country: any departures from this, i.e. significantly different α_i values, may be interpreted as behavioural differences on the part of investors and, in particular a higher α_i may be interpreted as evidence of "true" short-termism. Use of the formulation in equation 4.1 also allows the hypothesis of whether or not an exchange rate risk premium exists to be tested.

¹It is assumed here that default risk and inflation risk are close to or equal to zero as explained in Chapter 3.

This chapter will therefore test for the presence of short-termism in UK capital markets by firstly decomposing the discount rate into two components : the basic required rate of return of investors and an exchange rate risk premium. Following this decomposition the components will be compared across countries with a higher basic rate of return being indicative of "true" short-termism whilst a higher exchange rate risk premium is indicative of "general" short-termism.

III) ECONOMETRIC METHODOLOGY

i) Measuring Real Interest Rates

From the Fisher equation (1930), also known as closed interest parity, it is hypothesised that real interest rates can be separated into two components as shown in equation (4.2) below;

$$R_t = r_t + \pi_t^e \quad (4.2)$$

where R_t denotes the nominal rate of interest on an asset, r_t is the real rate of interest and π_t^e the expected inflation rate, where $\pi_t^e = E(\pi_t | I_{t-1})$. E_t is the mathematical expectations operator and I_t is the information set. In other words, the real return can be described as the nominal interest rate less expected inflation. The relationship above can be distinguished from the ex post formulation

$$r_{pt} = R_t - \pi_t \quad (4.3)$$

or

$$r_{pt} = r_t - \epsilon_t \quad (4.4)$$

where r_{pt} = ex post real rate of return, π_t = the actual inflation rate and ϵ_t = the forecast error for inflation ($\pi_t - \pi_t^e$).

Real rates of return can therefore be expressed in two ways: ex ante or ex post, both of which will be used in this chapter. The ex post real rates of return will be the same Treasury bill series used in the previous chapter. Ex ante real interest rates are also of interest here as these show the rate of return investors can expect from an investment and, consequently, may give an insight into the investors' required rate of return. Unfortunately, in contrast to ex post real rates, ex ante real interest rates are not directly observable. Mishkin (1984a,b) and Cumby and Mishkin (1986) suggest an econometric methodology to overcome these difficulties and this methodology will be used here to estimate ex ante real interest rates².

²An alternative approach would be to form inflation expectations using survey data and to subtract this from the nominal interest rate (see Lahiri & Zaporowski (1988), Peek and Wilcox (1983), Makin & Tanzi (1979) Levi & Makin (1979)). The inflation expectation could be extracted from series such as the Carlson and Parkin series, Livingston series for the US and the Barclays Bank Quarterly series for the UK. There are a number of drawbacks associated with this approach both in theoretical and practical terms. Mishkin (1981) argues that the behaviour of market expectations may not reflect the average expectations of the participants in that market. The rationality of market expectations is not based on the belief that all, most, or even the average market participant is rational but rather arises from market expectations being driven to the rational expectations equilibrium by the elimination of unexploited profit opportunities. On a more practical level Mishkin argues there is little incentive for the survey respondents to answer accurately. Furthermore Copeland and Levin (1992) highlight the difficulty of matching survey data dates with events in the markets, making it almost impossible for the information set on which expectations are actually conditioned to be isolated, and also question the accuracy of such an approach.

A key assumption in this methodology is the rationality of inflation expectations in the bond market. This assumption, and the associated assumption of efficient financial markets has been supported by a large amount of evidence, including tests of rationality of inflation forecasts in the bond market (Mishkin 1983). The assumption of rational expectations is a necessary and sufficient condition for the rationality of ex ante real interest rates and further implies that the ex ante real interest rate is equal to the expected ex post real interest rate,

$$r_t = E(r_{pt} | \Phi_{t-1}) \quad (4.5)$$

where r_t = real rate determined at time t-1 and Φ_{t-1} is the information available at time t-1.

Similarly, expected inflation is equal to the expectation of actual inflation given the information available at time t-1 and implies the inflation forecast error is zero,

$$\begin{aligned} \pi_t^e &= E(\pi_t | \Phi_{t-1}) \\ E(\epsilon_t | \Phi_{t-1}) &= 0 \end{aligned} \quad (4.6)$$

The set of all available information Φ_{t-1} is difficult to observe but this may be overcome by the use of a subset of the information set, denoted X_{t-1} , which includes observable variables correlated with the ex ante real interest rate. If the real rate is correlated with variables, X_{t-1} , a linear projection of r_t given the subset of available information X_{t-1} can be used

$$P(r_t | X_{t-1}) = X_{t-1} \beta \quad (4.7)$$

with the projection equation for r_t

$$r_t = X_{t-1}\beta + u_t \quad (4.8)$$

where $u_t = r_t - P(r_t|X_{t-1})$ and β = vector of coefficients; $P(u_t|X_{t-1}) = 0$ by the law of iterated projections and so u_t is orthogonal to X_{t-1} .

The assumption of rational expectations also implies that the forecast error of inflation ϵ_t is uncorrelated with any information available at time t , including X_{t-1} and therefore, ϵ_t is orthogonal to X_{t-1} , allowing consistent estimates by OLS.

Although r_t is not observable, ex ante real interest rates may still be estimated by using observable ex post real rates as follows (obtained by substituting (4.8) in to (4.4)).

$$r_{pt} = X_{t-1}\beta + u_t - e_t \quad (4.9)$$

Ex ante real interest rates are estimated by the fitted values of the OLS regression³

$$\hat{r} = X_{t-1}\hat{\beta}_{ols} \quad (4.10)$$

The contrast between results achieved using ex post and ex ante measures is important as it allows an assessment to be made of the validity of the rational expectations assumption made in the previous chapter.

³Whilst this methodology avoids problems encountered in other approaches, such as the use of survey data, it should be noted however that some concerns have been expressed about the use of such an approach. Firstly, the information set used to create the ex ante interest rate series will not necessarily be the same as that available to the market at the time. This is particularly true when the information set includes data from the whole sample period to model expectations held at earlier dates (Copeland and Levin, 1992). Secondly, Summers (1993, p212-3) argues that the error term is likely to be correlated with expected inflation because expected inflation and short-term interest rates respond to the same underlying economic forces. A key part of future work would be to develop a methodology overcoming these difficulties.

Choice of Variables for the Information set X_{t-1}

The regressions carried out by Mishkin (1984a) are composed of four lags of the domestic inflation rate, one lag of domestic money growth (M1), the nominal euro rate and a fourth order time polynomial. Mishkin identifies several advantages of the time variable. The time variable may be thought of as a proxy for the smoothly moving (low frequency) component of economic variables that are related to real rates. This variable has been found to have significant explanatory power, while using up few degrees of freedom. Cumby & Mishkin (1986) include a constant term, time trend, nominal interest rate and three lags of inflation in their subset of information X_{t-1} . Money growth variables were also considered as part of the information set but were found to add no significant explanatory power and were consequently omitted from the final regression. A similar methodology was used by Mark (1985) in a study of interest rate differentials with the following used as components of X_{t-1} : current and past real interest differentials and rates of monetary growth and inflation at home and abroad. Current and past interest differentials are likely to provide information about future differentials and the inflation rates represent one component of the real interest differential. In the event that liquidity effects are present, the behaviour of monetary variables may be important. Mark (op. cit) also includes a linear time trend and twelve seasonal dummies. In a study of real interest rates themselves rather than differentials, Blundell-Wignall and Browne (1991) include the following variables in the subset of information: a constant term, a time trend, current nominal interest rates, three lags of inflation, one period lagged values of money and output growth.

ii) Exchange Rate Volatility

It has been stated that a key development of this chapter will be to relax the assumption of rational expectations in the foreign exchange market, i.e. a zero exchange rate risk premium will no longer be assumed. By introducing exchange rate volatility it will be possible to establish how much of the risk-free rate, if any, can be attributed to rewards for exchange rate risk.

a) Ex Ante Measure of Exchange Rate Volatility

To estimate exchange rate volatility the variance in exchange rates will be used and of particular interest will be the ex ante variance. The reason ex ante exchange rate volatility is preferable is that it captures the uncertainty facing an investor. It is an investor's expectations of future risk which are important rather than the past (although these past realisations are likely to influence future expectations). It is the expectation of future volatility in a returns series, i.e. the risk, which will determine the size of the premium investors will require: assuming risk averse investors, the greater the risk, the larger the premium required.

In general, financial markets are characterised by the following features: volatile returns; time-varying volatility of returns and the clustering of this volatility over time. Such features have been found to exist in foreign exchange markets with Mussa (1979) describing

time-varying volatility as an empirical regularity of exchange rate behaviour. According to Mandelbrot (1963, p418):

"[L]arge changes [in speculative asset prices] tend to be followed by large changes...of either sign...and small changes tend to be followed by small changes...."

The evidence of research into the nature of exchange rate returns is that the conditional distribution of returns cannot be assumed to be constant over time, thus suggesting that traditional econometric techniques may not be valid. In traditional econometric time series models the conditional variance of a series is assumed to be constant. This has important implications in the analysis of financial markets where the variance forms a fundamental part of finance models: if the variance of a series remains constant then this must imply constant risk, and therefore, a constant risk premium. Clearly then, only when this assumption may be said to be valid for financial markets will the traditional models be valid. The assumption of constant conditional variance has been questioned by Perry (1982), Pindyck (1984) and Poterba and Summers (1986). Hsieh (1988) considers daily exchange rate data finding that the conditional distributions of nominal returns are changing through time. This result is also supported by Milhoj (1987), Diebold (1988), Diebold and Nerlove (1989) and Mussa (1979)

"[F]or many exchange rates, there appear to be periods of quiescence in which day-to-day and week-to-week movements are very small, and periods of turbulence in which day-to-day movements are large."

(Mussa, 1979, p11-12)

Concerns have also been expressed about two further assumptions which are often required to be made: firstly that returns are independent and secondly, that the process

generating the returns series is linear in which the parameters are independent of past realisations of the process. Neftci (1984) argued that there was no reason to assume that these two conditions held given the workings of speculative markets, which suggest that non-linearities and inter-temporal dependence in returns series are to be expected. Akgiray(1989) also presents evidence which is not consistent with the assumptions of independence and linearity. Conditionally heteroscedastic residuals have been found in both time series and structural models of spot exchange rates (see Cumby and Obstfeld, 1984, Domovitz and Hakkio, 1985, Hsieh, 1989, Engle, Ito and Lin, 1990).

Further problems may arise involving the assumption of conditional normality. There is evidence to suggest exchange rate returns are leptokurtotic especially in the case of daily or weekly data (see McCurdy and Morgan, 1987, Milhoj, 1987, Hsieh, 1989, Baillie and Bollerslev, 1989, Friedman and Vandersteel, 1982).

In summary, exchange rate movements may be described in terms of contiguous periods of volatility and stability together with leptokurtotic distributions (Bollerslev et al 1992). Given these features of foreign exchange movements, many researchers have modelled exchange rate returns using autoregressive conditional heteroscedasticity (ARCH) models, a survey of which is given in Bollerslev et al (1992). The ARCH model is a non-linear approach which may be considered to be appropriately applied to financial markets on the assumption of a non-linear dependence between risk and return.

In the ARCH model as outlined by Engle (1982), the conditional variance is no longer assumed to be constant as in traditional time series models but is, instead, modelled as a function of past squared errors.

$$y_t = \lambda_0 + \epsilon_t \quad (4.11)$$

$$\epsilon_t / \Omega_{t-1} \sim N(0, h_t) \quad (4.12)$$

$$h_t = \gamma_0 + \sum_{i=1}^p \gamma_i \epsilon_{t-i}^2 \quad (4.13)$$

where y_t = return on asset, ϵ_t = disturbance term (white noise), h_t = conditional variance, Ω_{t-1} = information available at time (t-1). This model however does require certain restrictions to hold: firstly to ensure stability of the autoregressive process γ_1 has to be restricted such that $0 < \gamma_1 < 1$ and secondly, to ensure non-negative conditional variance, γ_0 and γ_i have to be assumed to be positive. It is assumed that the distribution of y_t , conditional on information at time t-1, is normal with mean λ_0 and variance h_t . Any shock to the process will affect the residual term ϵ_t which will in turn affect the conditional variance, so that if the residual term increases then the variance h_t will increase also. The extent of the impact of the residual term on variance will depend on the size of γ_i ; the larger γ_i the longer the effect of the shock will persist.

However the ARCH model does present some disadvantages in that its lag structure lacks flexibility which has led to the development of Generalised Autoregressive Conditional Heteroscedasticity (GARCH) models (Bollerslev 1986). In these models the conditional variance is expressed as a function not only of past squared errors, but also of past conditional variances.

GARCH Model

$$h_t = \gamma_0 + \sum_{i=1}^p \gamma_i \epsilon_{t-i}^2 + \sum_{j=1}^q \lambda_j h_{t-j} \quad (4.14)$$

where $p > 0$, $q \geq 0$ and the following conditions are met $\gamma_0, \gamma_i, \lambda_j \geq 0$, $i=1..p, j=1..q$.

Given the nature of financial markets as described above the inclusion of past realised variances in the conditional variance is particularly relevant where the stability of the market varies over time. The conditional variance of the series $\{y_t\}$ increases as past disturbances and/or past conditional variance increases and decreases as they decrease.

The GARCH-M Model (GARCH in mean)

The basic ARCH framework has been extended by Engle, Lilien and Robins (1987) so that the mean equation (eqn (4.11)) of a series depends on its own conditional variance h_t .

$$y_t = \lambda_0 + \phi h_t + \epsilon_t \quad (4.15)$$

Including h_t as a regressor implies that any change in the conditional variance, h_t , will be captured by the conditional mean of the return series $\{y_t\}$. Such an extension is of particular importance for financial markets due to the relationship between risk and return. Engle, Lilien and Robins assume that the risk premium is an increasing function of the

conditional variance, h_t . This implies that the greater the conditional variance of returns, the greater will be the compensation required to induce the agent to hold the long-term asset.

Therefore, the exchange rate risk faced by investors will be measured by fitting a GARCH model to exchange rate data⁴ and extracting the conditional variance, h_t .

b) Ex Post Measure of Exchange Rate Volatility

GARCH estimates of the variance of exchange returns and hence the risk involved in these returns have been calculated for the UK, Japan and France. This methodology, however, was not appropriate for the other countries under consideration, namely Germany and the US, where no evidence of ARCH effects was found (see Table 4.6). These countries, it will be remembered, are of particular interest for international comparison as they are good examples of a bank-based and capital-market-based system respectively. In order to overcome these difficulties and also to provide a contrast to the ex ante figures already estimated a measure of ex post volatility in exchange returns will also be used.

The ex post volatility will be measured by the variance in exchange returns during each month from March 1975 to June 1995. The variance of monthly exchange returns will be calculated using daily observations.⁵

⁴Monthly observations on effective exchange rate series for five countries, UK, Japan, Germany, France and the US, were collected for the period January 1975 to June 1995 from Datastream International. The effective exchange rate series was selected as a means of providing a comparison between investing in the UK and investing overseas generally.

⁵The effective exchange rate data used above was unfortunately not available on a daily basis so an alternative exchange rate dataset was collected which consisted of Bank of England trade-weighted indices.

iii) Testing for Evidence of Short-Termism

The basis of the test for evidence of short-termism will be to compare the composition of the Treasury bill rate earned by investors in each of the countries studied. The Treasury bill rate it will be remembered from equation (4.1) can be described as follows:

$$r_u = \alpha_u + \beta \chi_u + \epsilon_u$$

This means that, for an individual country, the Treasury bill rate will be equal to the basic required rate of return, α , an exchange rate risk premium, χ , and a residual term, ϵ . Of particular importance to the issue of short-termism is the basic return required by investors in each country. The component α , through international arbitrage and in the absence of "true" short-termism, should be equal across all countries, and consequently, any difference between the constant terms obtained for each country will be an indication of country specific differences in investor behaviour. The exchange rate volatility variable will provide an important insight into whether an exchange risk premium exists, and if so, to what extent it explains real interest differentials between countries. The exchange rate risk will be proxied by the volatility estimates obtained from GARCH models and also an ex post measure will be used.

IV) RESULTS

i) Ex Ante Real Interest Rates

The estimation results⁶ of equation 4.9 can be seen in Tables 4.1-4.5. The X_{t-1} variables used for the UK consist of two lags of inflation, three lags of the nominal treasury bill rate and a fourth-order time polynomial. As can be seen in Table 4.1 all coefficients are significant except the third lag of the nominal interest rate. Whilst this variable is not significant its inclusion in the regression equation reduces autocorrelation in the residuals. Other variables were also considered such as seasonal dummies, money supply growth (M0) and further lags of inflation and Treasury bills, none of which however improved the explanatory power of the equation.

The corresponding estimates for the Japanese data are presented in Table 4.2. The subset of information is here composed of two lags of inflation, one lag of the nominal interest rate and a fourth order time polynomial in time with all variables being significant at the 5% level. Again other variables were also considered such as money growth (M1) and seasonal dummies, but were not found to improve the explanatory power of the equation.

Table 4.3 presents the results for Germany which required a very small information set comprising only one lag of inflation and one lag of the nominal Treasury bill rate. These variables and the constant term were all found to be significant at the 5% level. The

⁶These estimations were carried out using RATS. This is true of all estimations throughout this thesis unless otherwise stated.

introduction of further lags and variables, noticeably the fourth order time polynomial resulted in autocorrelated errors.

The estimation of real rates of return for France and the US required much greater information sets mainly to overcome autocorrelation problems, the results of which may be seen in Tables 4.4 and 4.5. The information set for France incorporates lagged inflation, a fourth-order time polynomial, lagged real Treasury bill rates, lagged nominal Treasury bill rates and the growth in money supply M1. Of these variables, however, only the time variable, the second lag of the real and nominal Treasury bill rates were found to be significant. As can be seen from the Ljung-Box Q statistic, 52.412, there is evidence that autocorrelation still remains. Further lags of the explanatory variables were not significant and their inclusion did not remove the autocorrelation. The US information set comprised of lagged values of the inflation, real Treasury bill rate and nominal Treasury bill rate series and a fourth-order time polynomial. Again it was not possible to remove all the autocorrelation by the inclusion of further lags which resulted only in insignificant coefficients.

In summary, the key variables in the information sets were previous inflation rates, previous real Treasury bill rates and previous nominal Treasury bill rates. Also of importance was the fourth-order time polynomial used as a proxy for slow moving economic variables. This variable was found to be significant for all countries except Germany. The effect of the inclusion of a money supply variable, and hence the importance of liquidity effects, was considered for all countries. This variable was not however significant for any of the countries but was included in the French regression since its inclusion improved the explanatory power of the equation.

Table 4.1: Real Interest Rate Regressions-UK

Dependent variable = r_t

constant	π_{t-1}	π_{t-2}	time	tb_{t-1}
8.93-004*	-1.36*	0.387*	-0.97-014*	8.92-004*
(1.98-004)	(7.35-002)	(7.28-002)	(0.000)	(6.76-005)
tb_{t-2} *	tb_{t-3}	Q(36)	F(6,234)	
-2.82-004	8.90-005	38.625	1588.699*	
(1.10-004)	(6.81-005)	(0.352)	(0.000)	

Notes: $\pi_{t,i}$ denotes inflation lagged i time periods, time, a fourth order polynomial in time, $tb_{t,i}$ the lagged nominal Treasury bill rate and r_t the current real Treasury bill rate. Figures in parentheses under the OLS estimates are estimated standard errors whilst the figures under the Q statistic and the F statistic show the significance level. Q is the Ljung-Box portmanteau statistic which is distributed as a χ^2 distribution and * denotes variables significant at the 5% level.

Table 4.2: Real Interest Rate Regressions-Japan

Dependent variable = r_t				
constant	π_{t-1}	π_{t-3}	time	tb_{t-1}
4.67-004* (1.56-004)	-7.82* (5.67-002)	-0.160* (5.30-002)	-7.24-014* (0.000)	7.15-004* (2.49-005)
Q(36)	F(4,236)			
38.657 (0.351)	543.007* (0.000)			

Notes: see Table 4.1.

Table 4.3: Real Rate Regressions-Germany

Dependent variable = r_t			
constant	π_{t-1}	tb_{t-1}	Q(36)
0.289E-03* (0.068E-03)	-0.977* (0.020)	0.751E-03* (0.012E-03)	41.064 (0.258)
F(2,241)			
1987.825* (0.000)			

Notes: see Table 4.1

Table 4.4: Real Rate Regressions-France

Dependent variable = r_t			
constant	π_{t-1}	time	tb_{t-1}
-4.640E-04 (4.708E-04)	1.681 (1.038)	2.862E-14* (0.000)	-1.360E (7.756E04)
tb_{t-2}	M1	r_{t-1}	r_{t-2}
8.462E-05** (1.042E-04)	-1.224E-03 (1.883E-03)	2.783 (1.037)	-0.136* (0.135)
Q(36)	F(4,236)		
52.412* (0.038)	543.007* (0.000)		

Notes: see Table 4.1. M1 denotes the growth in supply M1.

Table 4.5: Real Rate Regressions- US

Dependent variable = r_t				
constant	π_{t-1}	π_{t-2}	time	
-4.729E-04** (2.574E-04)	4.451** (2.497)	-2.519 (2.576)	3.845E-14* (0.000)	
tb_{t-1}	tb_{t-2}	tb_{t-3}	r_{t-1}	r_{t-2}
-3.284E-03** (1.867E-03)	1.530E-03 (1.909E-03)	2.795E-04* (5.102E-05)	5.780* (2.497)	-2.899 (2.572)
Q(36)	F(8,234)			
78.155* (0.60E-04)	589.113* (0.000)			

Notes: see Table 4.1, ** denotes variables significant at the 10% level.

ii) Ex Ante Measure of Exchange Rate Volatility

Following the evidence of non-linearities found in financial data in previous research, the first task was to test the data for such features in the dataset to be used, and so tests were carried out on exchange rate data⁷ for the presence of autoregressive conditional heteroscedasticity, the results of which can be seen in Table 4.6.⁸

⁵ARCH tests were also carried out on the other data series to be used, the results of which are reported in the appendix.

⁸These tests were carried out by regressing the effective exchange rate on a constant, saving the residuals, and then regressing the squared residuals from time period t on the squared residuals from previous time periods.

Table 4.6: Testing for ARCH Effects in Effective Exchange Rates

ARCH order	UK	Germany	Japan	France	US
1	7.228 (0.007)	1.389 (0.238)	8.311 (0.004)	10.157 (0.001)	0.046 (0.831)
2	7.085 (0.029)	1.878 (0.391)	12.170 (0.002)	10.830 (0.004)	0.480 (0.787)
3	8.024 (0.046)	3.402 (0.334)	12.830 (0.005)	11.238 (0.011)	2.215 (0.529)
4	8.987 (0.061)	4.838 (0.304)	12.879 (0.012)	11.163 (0.025)	3.234 (0.520)
5	10.035 (0.123)	6.073 (0.299)	12.801 (0.025)	11.159 (0.048)	3.460 (0.629)

Notes: Figures in parentheses are significance levels.

Evidence of ARCH effects in monthly exchange rate series was found for UK, Japan, and France. In the case of the UK there was evidence of ARCH effects up to ARCH(3). Japan displayed even stronger ARCH effects with the lagged residuals being significant up to six lags. France also showed high autoregressive conditional heteroscedastity, however the null hypothesis of no ARCH effects in the effective exchange rate series for Germany and the US could not be rejected.

These results raise some interesting points: the results show that the exchange rate returns series vary in terms of structure from country to country. In the UK, Japan and France the residuals in previous time periods affect the residuals in the present time period whereas past residuals do not explain present residuals in the German and US series. It should also be

noted that these differences do not occur in accordance with the grouping of financial systems into bank- and capital-market-based systems. The findings of the tests are in contrast to previous work in this area. Baillie and Bollerslev (1989) find that non-linearities are not typical of monthly or annual exchange rate data. While ARCH effects are highly significant with daily and weekly data, both Diebold (1988) and Baillie and Bollerslev (1989) have noted that ARCH effects tend to weaken with less frequently sampled data.

For those countries in which evidence of ARCH effects was found in exchange rate data, i.e. UK, Japan and France, exchange rate volatility will be estimated using ARCH-type methodology (Engle, 1982) as outlined earlier. The results from fitting GARCH and GARCH-M(1,1) models to monthly effective exchange rate data for the UK,⁹ Japan¹⁰ and France¹¹ for the period January 1975 to June 1995 are shown in Table 4.7.

⁹Higher order GARCH-M specifications were also tested as were GARCH and EGARCH models. The highest Log-likelihood functions were found using the GARCH(1,1) and GARCH-M (1,1), 877.310 and 877.497 respectively. Although there was only a very small difference between the likelihood functions the GARCH-M specification was preferred since the GARCH model does not capture all the ARCH effects. The number of iterations required for the model to converge was 26.

¹⁰Again other model specifications were tested but the GARCH-M (1,1) model was found to be the most appropriate. The GARCH-M model produced a log-likelihood function that was higher than those produced by the other models. Another important outcome of using the GARCH-M (1,1) specification was the lower autocorrelation present than in other models. Autocorrelation was however still present in the model chosen and consequently care should be taken when interpreting the results. The number of iterations taken for the model to converge was 39.

¹¹Alternative models were also tested. By dropping the variance from the mean equation, i.e. by using a GARCH (1,1) model, a higher log likelihood function was achieved of 1031.358 with the coefficients on the lagged dependent variable λ_2 , the intercept term γ_0 , and the coefficient on the lagged residuals γ_1 , all being significant. Whilst these results were an improvement on the GARCH-M model there was also evidence of autoregressive conditional heteroscedasticity in the error terms. Also, the use of this model did not reduce the level of skew and kurtosis. Models of higher order specifications were also tried, both as GARCH and GARCH-M, but generally there was difficulty in achieving convergence, a low level of significance of variables, lower log likelihood functions and no reduction in skewness or kurtosis. The number of iterations taken for the model to converge was 44.

Using UK data there is no evidence to suggest that an increase in the conditional variance of exchange returns is associated with movements in the conditional mean of exchange rate returns, i.e. the coefficient on the conditional variance in the mean equation (equation 4.15) is not significant. In the variance equation all three coefficients are significant indicating that the conditional variance in time period t is affected by both the conditional variance and residuals in time period $(t-1)$. The conditional variance from time period $(t-1)$ is highly significant in the variance equation showing the tendency of volatility to persist over time and also the tendency for there to be periods of quiescence and turbulence. Using Japanese data, the conditional variance is again not a significant variable in the determination of mean returns. The conditional variance in the previous time period is highly significant in the variance equation showing that persistence in volatility is also an important feature of Japanese exchange returns. The lagged residual term, however, was not significant in Japan in contrast to the UK result. The results of fitting a GARCH model to French data can also be seen in Table 4.7. From the results there is no evidence to suggest that an increase in the conditional variance of exchange returns is associated with movements in the conditional mean of exchange rate returns. The inclusion of the conditional variance in the mean equation did, however, reduce the ARCH effects in the errors. In the variance equation only the intercept term and the coefficient on past residuals are significant suggesting that past conditional variance does not affect present conditional variance. It should be noted that the model does present serious problems in terms of the amount of skewness and kurtosis present and, therefore, the results may be invalidated.

iii) Tests for Evidence of Short-Termism

The results of the tests for evidence of short-termism in UK capital markets can be seen in Tables 4.8 to 4.11 where both ex ante and ex post series are used.^{12, 13} The results obtained using ex post data for both series are shown in Table 4.8.¹⁴

The constant term, i.e. the basic level of return required by investors, is positive and significant at the 5% level for France and the US, but only at the 10% level for Germany and the UK. The constant term obtained from the Japanese data was not significantly different from zero. The constant terms across countries are all similar and, in particular, the closeness between those of the UK and Germany should be noted.¹⁵ The basic required return is lowest for US and German investors, and the highest in France. From these results it does not appear that the UK rate of return is high compared to the other countries studied. It may also be seen that no classification can be made of the financial systems into capital-market-based and bank-based systems with respect to the basic rate of return investors require.

¹⁰Due to evidence of heteroscedasticity found in the series (see Appendix) the standard errors quoted are robust standard errors.

¹¹As can be seen in the Appendix, tests for stationarity could not always reject the presence of a unit root in the series used. As a result the regressions were also carried out in first differences. In terms of the ex post data this resulted in no significant variables except some lagged dependent variables and using ex ante data only the French exchange rate volatility variable was significant.

¹⁴France: adding a third lag of the dependent variable reduced the significance of the Q-statistic to 0.00606, but only the first lag of the dependent variable was significant. US: adding a fourth lag of dependent variable did not substantially improve the autocorrelation whilst the last two lags of the dependent variable were insignificant.

¹⁵Caution should be taken in the interpretation of these results as only the constant terms of France and US are significant at the 5% level. Autocorrelation problems were encountered with both the French and US data.

Table 4.7: Maximum Likelihood Estimates of GARCH(1,1) Model

Model:	$y_t = \lambda_0 + \lambda_1 h_t + \lambda_2 y_{t-1} + \epsilon_t$ $\epsilon_t \Omega_{t-1} \sim N(0,1)$ $h_t = \gamma_0 + \gamma_1 h_{t-1} + \gamma_2 \epsilon_{t-1}^2$			
UK	λ_0	λ_1	λ_2	γ_0
	-0.0024	5.916	0.374*	0.649E-04*
	(0.0026)	(9.564)	(0.071)	(0.238E-04)
	γ_1	γ_2		
0.577*	0.219*			
(0.104)	(0.066)			
Q(36)	LLF			
33.439	877.497			
(0.591)				
JP	λ_0	λ_1	λ_2	γ_0
	0.560E-03	6.175	0.332*	0.020E-03*
	(0.003)	(6.602)	(0.058)	(0.008E-03)
	γ_1	γ_2		
0.955*	0.007			
(0.020)	(0.015)			
Q(36)	LLF			
57.227*	820.321			
(0.014)				
FR	λ_0	λ_1	γ_0	
	0.140E-03*	-8.090	0.442E-04*	
	(0.001)	(13.059)	(0.110E-04)	
	γ_1	γ_2		
0.164	0.436*			
(0.107)	(0.010)			
Q(36)	LLF			
44.154	1026.102			
(0.165)				

Notes: The figures in parentheses below the maximum likelihood coefficient estimates are estimated standard errors. LLF is the log-likelihood function, Q the Ljung-Box portmanteau statistic which is distributed as χ^2 distribution and * denotes significance at the 5% level.

The exchange rate risk premium is not significant for any of the countries studied showing generally low levels of significance.¹⁶ The presence of an exchange rate risk premium would contribute to "general" short-termism and so the lack of evidence to support such a premium does not suggest the presence of short-termism amongst UK investors. The lack of support for an exchange rate risk premium suggests that the rational expectations assumption made in the previous chapter was a valid one to make¹⁷. It also challenges the theory given by Frankel and MacArthur (1988) that such a premium can explain international interest rate differences, at least in the Treasury bill market.

As has been noted the constant terms across the countries appear similar thus questioning the presence of short-termism in any of the countries. In order to examine this assertion more rigorously the analysis was repeated using a Seemingly Unrelated Regression approach. The preceding analysis considered the regression of five separate equations as shown in equation 4.16.

$$\begin{aligned}
 r_{f,uk,t} &= \alpha_{uk,t} + \beta \chi_{uk,t} + e_{uk,t} \\
 r_{f,bd,t} &= \alpha_{bd,t} + \beta \chi_{bd,t} + e_{bd,t} \\
 r_{f,jp,t} &= \alpha_{jp,t} + \beta \chi_{jp,t} + e_{jp,t} \\
 r_{f,fr,t} &= \alpha_{fr,t} + \beta \chi_{fr,t} + e_{fr,t} \\
 r_{f,us,t} &= \alpha_{us,t} + \beta \chi_{us,t} + e_{us,t}
 \end{aligned}
 \tag{4.16}$$

¹⁶ Due to the low levels of significance of the exchange rate volatility variable the regressions were rerun omitting this variable. The result of this was to increase the significance of the constant term to 5% for all countries. The ordering of the basic required rate of return is as follows: Japan, Germany, France, the UK and the US, where Japan is the highest.

¹⁷The conclusions made here regarding the validity of the rational expectations assumption should be treated with caution. The evidence produced suggests only that the assumption of rational expectations may or may not be valid in the particular context considered. There has been no attempt to provide a test of the Rational Expectations Hypothesis in more general terms.

**Table 4.8: Tests for Evidence of Short-Termism
Ex Post Real Interest Rates & Ex Post Exchange Rate Volatility**

	Dependent variable: $r_{f,t}$		Dependent Variable		
	constant	β	t-1	t-2	t-3
UK	0.119E-02** (0.722E-03)	-4.287 (33.336)	1.311* (0.712)	-0.362* (0.103)	0.016 (0.056)
	Q(36) 45.226 (0.139)				
BD	0.113E-02** (0.601E-03)	5.285 (61.995)	0.965* (0.016)		
	Q(36) 37.177 (0.415)				
JP	0.131E-02 (0.882E-03)	8.982 (17.498)	0.941* (0.022)		
	Q(36) 41.633 (0.239)				
FR	0.146E-02* (0.478E-03)	-46.890 (55.117)	0.993* (0.057)	-0.021 (0.058)	
	Q(36) 71.145* (0.430E-03)				
US	0.985E-03* (0.441E-03)	-5.180 (17.559)	1.388* (0.132)	-0.656* (0.215)	0.226** (0.120)
	Q(36) 87.350* (0.372E-05)				

Notes: see Table 4.7, ** denotes significance at the 10% level.

Under the assumption that real interest rates are not independent across countries, hence resulting in correlated error terms, the estimation of five single equations does not use all the available information, therefore producing inefficient estimates. To improve the efficiency of the estimation, Zellner(1962) suggested the equations should be regarded as a single large equation considering explicitly the possible presence of correlated error terms. This Seemingly Unrelated Regression approach will be used here and estimated using Generalised Least Squares¹⁸. The results of this estimation may be seen in Table 4.9¹⁹. In addition to improving the efficiency of the estimates, the use of a Seemingly Unrelated Regression approach also allows the testing of restrictions across equations. For example, it is possible to test the hypothesis that the alpha terms are equal across countries, e.g. $\alpha_{uk,t} = \alpha_{bd,t}$. In other words, it is possible to test whether the basic required rate of return is the same across countries.

Estimating the five equations using a Seemingly Unrelated Regression approach, the lowest constant term was that of the UK and the highest that of Japan. Generally, the significance of the constant terms was improved, with all the α terms being significant at the 5% level, except the UK where still only a 10% level of significance was achieved. Whilst there is evidence to suggest a positive constant term for each country, there is very little evidence to suggest that the constant term differs across countries with only the difference

¹⁵Since the data was serially, as well as contemporaneously, correlated, before carrying out the SUR analysis the data was transformed using a Cochrane-Orcutt procedure.

¹⁶The reported errors are not robust errors as in previous tables due to the difficulties of incorporating robust errors into a SUR framework. However, on examination of the residuals from the SUR analysis, evidence of ARCH effects were only found in the cases of Germany and the US.

between Japan and the US being significant at the 5% level (see Table 4.10)²⁰. The constant terms of the UK and Japan were significantly different but only at the 10% level which, interestingly, was also true of Germany and Japan. These results produce little evidence that "true" short-termism is prevalent in the UK where investors display, if anything, a lower basic required rate of return. The coefficient on the exchange rate risk premium was not significant for any of the five countries, thus providing no evidence to support the existence of "general" short-termism. Again the lack of support for an exchange rate risk premium suggests that the assumption of rational expectations in the foreign exchange market was valid.

The results obtained by using ex ante real interest rates and ex ante exchange volatility, hence relaxing the assumption of rational expectations in the interest and foreign exchange markets, are presented in Table 4.11.²¹ In contrast to the ex post results none of the constant terms is significant. There is, however, evidence to suggest the existence of an exchange rate risk premium in France where the coefficient on exchange rate volatility was significant at the 5% level.

When comparing the ex post and ex ante UK data the basic rate of return, α , is much smaller with the ex ante data and is no longer significantly greater than zero (although the ex post result is only significant at the 10% level). The Japanese basic ex ante rate of return is smaller and also negative compared to its ex post counterpart, though neither differ significantly from zero.

²⁰ To test for the difference between constant terms TSP was used.

²¹ Using the French dataset adding a second lag of the dependent variable resulted in a slight increase in autocorrelation with the significance level of the Q statistic being 0.018.

**Table 4.9: Testing for Evidence of Short-Termism-
Seemingly Unrelated Regression Results.**

Dependent variable: $r_{r,t}$		
	constant	β
UK	0.839E-03** (0.478-03)	31.824 (21.858)
BD	0.124E-02* (0.271-03)	-11.781 (41.682)
JP	0.206E-02* (0.420-03)	18.442 (18.998)
FR	0.140E-02* (0.374-03)	-33.561 (22.541)
US	0.101E-02* (0.364-03)	19.582 (13.486)

Notes: * and ** denote significance at the 5 and 10% levels respectively. Figures in parentheses are estimated standard errors.

Table 4.10: Significance Tests.

$H_0 = \alpha_{1t} = \alpha_{2t}$	UK	BD	JP	FR
BD	-0.736			
JP	-1.943**	-1.720**		
FR	-0.907	-0.392	1.179	
US	-0.306	0.528	1.970*	0.820

Notes: * and ** denote significance at the 5 and 10% levels respectively.

In terms of the exchange rate volatility variable, there is also little difference between the results produced by ex ante and ex post data. There is little evidence, therefore, that the rational expectation assumption made in the previous chapter was not a valid one to make. The French data do, however, produce a contrast between the ex ante and ex post results with the ex post basic return being higher and significantly different from zero. Using the ex ante data also produce a significant exchange rate volatility variable in contrast to the ex post data.

**Table 4.11: Tests for Evidence of Short-Termism
Ex Ante Real Interest Rates and Ex Ante Exchange Volatility**

Dependent Variable = $r_{f,t}$				
	constant	β	Dependent Variable	
			t-1	t-2
UK	0.160E-03 (0.111E-03)	-0.072 (0.370)	0.982* (0.073)	-0.031 (0.076)
	Q(36) 47.060 (0.103)			
JP	-0.263E-03 (0.245E-03)	0.953 (0.641)	0.914 (0.029)	
	Q(36) 35.048 (0.514)			
FR	0.015E-03 (0.0528E-03)	0.667* (0.268)	0.978* (0.011)	
	Q(36)* 55.940 (0.018)			

Notes: see Table 4.7.

V) SUMMARY AND CONCLUSION

Following the finding in Chapter 3 that if short-termism does exist it is in the form of "true" short-termism, the purpose of this chapter has been to provide further empirical investigation into "true" short-termism. In addition, by relaxing the rational expectations assumption made in the preceding chapter, a non-zero exchange rate risk premium was allowed to exist. The exchange rate risk premium is of interest to the issue of short-termism in that a higher exchange rate risk premium would lead, *ceteris paribus*, to a higher discount rate and would, therefore, constitute "general" short-termism.

The test for evidence of short-termism carried out in this chapter was based on the decomposition of the rate of return on Treasury bills into two components: a basic required rate of return and an exchange rate risk premium. The null hypothesis to be tested was that the basic rate of return required by investors did not differ across the sample of countries. If evidence of a higher rate of return was found, this would be taken as indicative of the presence of "true" short-termism. Similarly, any evidence of a high exchange rate risk premium would be taken as being indicative of "general" short-termism. This test was carried out using firstly with *ex post* data and then repeated using *ex ante* data.

Using *ex post* data the basic rate of return for UK investors was lower than those in France and Japan but higher than Germany and the US. However, the basic rate of return was only significantly different from zero at the 5% level for the French data. The use of a Seemingly Unrelated Regression approach improved significance levels, showing that the lowest returns were in the UK and US with the highest in Japan, which is in direct contrast

to the short-termism arguments outlined in Chapter 2. The use of ex ante figures did result in a relatively higher constant term for the UK than the other countries, but none of the constant terms was found to be significantly different from zero. Therefore, these results produce little evidence to support the assertion that UK investors display "true" short-termism. The similarity between the ex ante and ex post results suggests that the assumption of rational expectations appears to be valid except when the French data were used.

There was very little evidence to suggest the presence of an exchange rate risk premium in any of the countries and no evidence to suggest the presence of such a premium in the UK, hence further casting doubt on the assertion that UK investors are short-termist. The lack of evidence to support a non-zero exchange risk premium suggests the assumption made in the previous chapter concerning the validity of rational expectations in the foreign exchange market is correct.

Therefore the evidence presented in this chapter, supporting those produced in the previous chapter, suggests that UK investors are not short-termist in their investment behaviour either in terms of 'true' short-termism or 'general' short-termism in the form of an exchange risk premium. As has been seen in Chapter 2, however, short-termism covers a wide range of definitions of which just one has been used here. As a result, whilst no evidence has been found for short-termism in terms of the definitions and assumptions used in this analysis this does not rule out the presence of short-termism in other forms. In particular short-termism is not ruled out in the form of the numerator effect i.e. the underestimation of future cash flows due to, for example, macroeconomic uncertainty.

APPENDIX

Tests for Stationarity and Autoregressive Conditional Heteroscedasticity

Tests for stationarity and Autoregressive Conditional Heteroscedasticity were carried out on all series to be used in the empirical work. Previous research has shown that the assumption of constant conditional variance of the error term is not always valid in time series models, particularly in finance models, therefore ARCH tests will be carried out on all the data to be used. The test for the presence of ARCH in a series will be carried out by using the following regression

$$y_t = \alpha_0 + \epsilon_t \quad (A1)$$

From this regression the squares of the fitted errors are obtained and regressed on the squared residuals from q previous time periods, under the null hypothesis that no ARCH effects are present. The presence of ARCH effects suggests the use of heteroscedastically consistent standard errors such as those produced by White's procedure.

A second set of tests to be carried out were stationarity tests: in order for OLS estimation techniques to be valid the dependent and independent variables must be stationary with error terms displaying a zero mean and finite variance (i.e. mean, variance and covariance should be constant over time). Dickey-Fuller (1981) tests are used to test for the presence of stationarity in each series. The procedure is carried out by considering the p th order autoregressive process

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 y_{t-2} + \dots + \alpha_p y_{t-p+1} + \epsilon_t \quad (\text{A2})$$

which can be "reparameterised" as

$$\Delta y_t = \alpha_0 + \left(\sum_{i=2}^p \alpha_i - 1\right) y_{t-1} - \left(\sum_{i=2}^p \alpha_i\right) \Delta y_{t-1} - \left(\sum_{i=3}^p \alpha_i\right) \Delta y_{t-2} - \dots - \alpha_p \Delta y_{t-p+1} + \epsilon_t \quad (\text{A3})$$

This generalises to a higher order autoregressive process, therefore the AR(p) model may be reformulated as

$$\Delta y_t = \alpha_0 + \gamma y_{t-1} + \sum_{i=2}^p \beta_i \Delta y_{t-i+1} + \epsilon_t \quad (\text{A4})$$

where n is large enough to ensure that ϵ_t is white noise, $\Delta y_t = (y_t - y_{t-1})$ and $\gamma = (\sum \alpha_i - 1)$. The parameter of interest in equation (A4) is the coefficient on y_{t-1} , γ , which is used as the test statistic. In the presence of a unit root $\sum \alpha_i = 1$ and thus $\gamma = (\sum \alpha_i - 1) = 0$. Therefore the value of γ must be significantly different from zero to enable the null hypothesis of a unit root to be rejected. However, under the null of a unit root the t -distribution is no longer an appropriate and so alternative critical values are required. Such values were developed by Dickey and Fuller (1981) through Monte Carlo simulation methods. Rejection of the null hypothesis indicates that the series is I_0 , whilst if the null hypothesis cannot be rejected the series may be I_1 . To test whether or not a series is I_1 the series should be considered in first differences

$$\Delta^2 y_t = \alpha_0 + \gamma \Delta y_{t-1} + \sum_{i=2}^p \beta_i \Delta^2 y_{t-i+1} + \epsilon_t \quad (\text{A5})$$

The above tests however, are only valid under fairly restrictive assumptions: i.e. errors

are assumed to be both independent and to have constant variance. Whilst the number of lags in the tests above are chosen to eliminate serial correlation, the power of the tests may be reduced by the presence of moving average terms and also by heterogeneously distributed disturbance terms (Perron, 1988). As a result, further tests for stationarity, Phillips-Perron tests, were also carried out. In contrast to the Dickey Fuller tests, Phillips Perron tests do not assume independent and identically distributed errors allowing the disturbances to be weakly dependent and heterogeneously distributed. Consider the following regressions

$$y_t = a_0 + a_1 y_{t-1} + a_2 (t-T/2) + u_t \quad (A6)$$

$$y_t = a_0^* + a_1^* y_{t-1} + u_t \quad (A7)$$

where T = number of observations and u_t = disturbance term. While $E u_t = 0$, the disturbance is not required to be serially uncorrelated or homogeneous. The statistics developed by Phillips (1987a, 1987b) and Phillips and Perron (1988) allow the testing of the following hypotheses about the coefficients a_i :

$$1). a_2 = 0, \quad 2). (a_0, a_2, a_1) = (0, 0, 1) \quad 3). (a_2, a_1) = (0, 1).$$

Where 1) is a transformation of the standard t-statistic and denoted $Z(t_\tau)$ while 2) and 3) are standard F-statistics denoted $Z(\phi_2)$ and $Z(\phi_3)$ respectively. Two further hypotheses,

4). $a_1^* = 1$ and 5). $(a_0^*, a_1^*) = (0, 1)$ can also be tested using the Phillips-Perron transformations of the relevant t-statistic and F statistic denoted $Z(t_\mu)$ and $Z(\phi_1)$ respectively. The validity of the regression equation (A7) depends upon the drift term a_0^* being zero (Taylor, 1992, p10).

Therefore where there is no significant time trend the more powerful test statistics $Z(t_\mu)$ and $Z(\phi_1)$ will be estimated, otherwise the test will comprise of regression (A6) with test statistics $Z(t_\tau)$, $Z(\phi_2)$ and $Z(\phi_3)$.

Phillips-Perron tests have been used to overcome any weaknesses in the Dickey-Fuller tests in the presence of error terms which are not independent and identically distributed. However it should be noted that Phillips-Perron statistics may reject the null of a unit root too often in the presence of a first-order moving average process. Furthermore, tests for stationarity, whether Dicky-Fuller or Phillips-Perron, do not provide conclusive evidence on the time series properties of data.

Table A1: Augmented Dickey Fuller Statistics-Real Treasury Bill Rates

	Levels		First Differences	
	γ	Q(36)	γ	Q(36)
UK	-3.507* (2)	45.198 (1.140)	-10.764* (0)	48.229 (0.084)
Germany	-2.291 (0)	37.284 (0.410)	-13.053* (0)	34.584 (0.536)
Japan	-2.821** (0)	42.039 (0.226)	-17.488* (0)	46.336 (0.116)
France	-2.373 (4)	50.843 (0.052)	-7.288* (4)	33.446 (0.591)
France (with time trend)	-3.526* (3)	47.728 (0.091)		
US	-1.782 (12)	43.425 (0.184)	-6.597 (11)	41.371 (0.248)

Notes: The equations tested for levels and first differences are equations A4 and A5 respectively. The tests were also run for all series including a time trend, where this time trend was found to be significant the results are reported. The null hypothesis is that the series contains a unit root i.e. $\gamma = 0$. The critical values for the Augmented Dickey-Fuller test are -2.87 and -2.57% at the 5% and 10% significance levels respectively. * denotes significance at the 5% level and ** denotes significance at the 10% level. The figures in parentheses below the ADF statistics refer to the number of lags required to produce white noise residuals. Q is the Ljung-Box statistic with the figures in parentheses below this statistic being the marginal significance levels.

Table A2: Augmented Dickey Fuller Statistics-Ex Ante Real Treasury Bill Rates

	Levels		First Differences	
	γ	Q(36)	γ_*	Q(36)
UK	-3.657*	46.990	-14.693*	49.136
	(1)	(0.104)	(0)	(0.071)
Germany	-2.306	37.445	-12.926*	33.923
	(0)	(0.403)	(0)	(0.568)
Japan	-2.693**	37.302	-17.306*	45.290
	(0)	(0.409)	(0)	(0.138)
France	-2.210	49.253	-6.796*	34.390
	(4)	(0.069)	(4)	(0.545)
France (With time trend)	-3.646*	45.992		
	(3)	(0.123)		
US	-2.048	48.089	-7.574*	45.515
	(7)	(0.086)	(6)	(0.133)

Notes: see Table A1.

Table A3: Augmented Dickey Fuller Statistics-Ex Post Exchange Rate Volatility

	Levels		First Differences	
	γ	Q(36)	γ	Q(36)
UK	-10.012*	27.684	-17.002*	43.883
	(0)	(0.838)	(1)	(0.172)
Germany	-12.207*	40.318	-10.637*	46.556
	(0)	(0.285)	(5)	(0.112)
Japan	-9.880*	30.442	-16.369*	48.746
	(0)	(0.730)	(1)	(0.076)
Japan (With time trend)	-10.168*	28.795		
	(0)	(0.798)		
France	-4.084*	48.447	-13.168*	29.886
	(7)	(0.080)	(7)	(0.754)
US	-11.097*	39.357	-12.762*	47.949
	(0)	(0.322)	(3)	(0.088)
US (With time trend)	-2.235	35.885		
	(0)	(0.474)		

Notes: see Table A1.

Table A4: Augmented Dickey Fuller Statistics-Ex Ante Exchange Rate Volatility

	Levels		First Differences	
	γ	Q(36)	γ	Q(36)
UK	-6.774*	30.695	-17.804*	42.073
	(0)	(0.719)	(0)	(0.225)
Japan	-11.966*	22.731	-7.642*	44.221
	(0)	(0.958)	(1)	(0.163)
Japan (With time trend)			-8.511*	33.955
			(1)	(0.566)
France	-10.190*	26.350	-15.109*	49.403
	(0)	(0.881)	(1)	(0.068)
France (With time trend)	-10.468*	28.495		
	(0)	(0.809)		

Notes: see Table A1.

Table A5: Phillips-Perron Statistics- Real Treasury Bill Rates

	Levels		First Differences	
	$Z(t_m)$	$Z(\phi_1)$	$Z(t_m)$	$Z(\phi_1)$
UK	-3.635*	7.021*	-10.621	56.397
Germany	-3.005	4.659	-12.773	81.475
Japan	-2.236	2.502	-19.262	184.976
France	-1.855*	2.019*	-12.993*	84.503*
US	-2.368*	2.879*	-10.086*	50.588*

Notes: $Z(t_m)$ and $Z(\phi_1)$ are the Phillip-Perron test statistics. * denotes cases where autocorrelation is present.

Table A6: Phillips-Perron Statistics- Ex Ante Real Treasury Bill Rates

	Levels		First Differences	
	$Z(t_m)$	$Z(\phi_1)$	$Z(t_m)$	$Z(\phi_1)$
UK	-4.022	8.457	-14.520	105.447
Germany	-3.024	4.764	-12.639	79.789
Japan	-2.887	4.411	-18.053	162.612
France	-2.065 ^a	2.665 ^a	-15.046 ^a	113.048 ^a
US	-2.503 ^a	3.194 ^a	-17.020 ^a	144.576 ^a

Notes: see Table A5. A significant time trend was found for the French series. The Phillips-Perron test statistics, Z_τ , $Z(\phi_2)$ and $Z(\phi_3)$, were as follows -3.425, 4.314, 6.019.

Table A7: Phillips-Perron Statistics- Ex Post Exchange Rate Volatility

	Levels		First Differences	
	$Z(t_m)$	$Z(\phi_1)$	$Z(t_m)$	$Z(\phi_1)$
UK	-10.128	51.317	-27.214	367.831
Germany	-12.055	72.673	-38.382 ^a	728.430 ^a
Japan	-11.627	67.678	-34.901 ^a	604.222 ^a
France	-10.338	53.486	-29.691 ^a	434.031 ^a
US	-13.842	95.900	-56.958 ^a	1614.254 ^a

Notes: A significant time trend was found in the US data. The Phillips-Perron test statistics, Z_t , $Z(\phi_2)$ and $Z(\phi_3)$, were as follows -14.031, 65.662, 98.494.

Table A8: Phillips-Perron Statistics- Ex Ante Exchange Rate Volatility

	Levels		First Differences	
	$Z(t_m)$	$Z(\phi_2)$	$Z(t_m)$	$Z(\phi_2)$
UK	-6.818	23.258	-19.391	187.493
Japan	-7.763	38.973	-13.469 ^a	90.915 ^a
France	-10.102	51.029	-31.203	483.878

Notes: see Table A5. A significant time trend was found in the first differences series for Japan. The Phillips-Perron test statistics, Z_t , $Z(\phi_2)$ and $Z(\phi_3)$, were as follows -14.056, 65.986, 98.976

Table A9: Testing for ARCH effects: Ex Post Real Interest Rates

ARCH order	UK	Germany	Japan	France	US
1	223.690* (0.000)	209.549* (0.000)	196.939* (0.000)	213.273* (0.000)	159.642* (0.000)
2	225.801* (0.000)	207.672* (0.000)	196.838* (0.000)	211.519* (0.000)	172.329* (0.000)
3	224.479* (0.000)	204.931* (0.000)	196.012* (0.000)	210.050* (0.000)	175.173* (0.000)
4	222.279* (0.000)	202.301* (0.000)	195.757* (0.000)	208.247* (0.000)	174.699* (0.000)

Notes: Figures in parentheses are marginal significance levels, * denotes significance at the 5% level.

Table A10: Testing for ARCH effects- Ex Ante Real Interest Rates

ARCH order	UK	Germany	Japan	France	US
1	212.610* (0.000)	205.745* (0.000)	207.762* (0.000)	208.812* (0.000)	129.826* (0.000)
2	211.407* (0.000)	203.706* (0.000)	207.898* (0.000)	206.934* (0.000)	131.841* (0.000)
3	207.712* (0.000)	200.907* (0.000)	209.490* (0.000)	205.421* (0.000)	132.692* (0.000)
4	205.636* (0.000)	198.247* (0.000)	209.337* (0.000)	203.648* (0.000)	132.283* (0.000)

Notes: see Table A9.

Table A11: Testing for ARCH effects- Ex Ante Exchange Rate Volatility

ARCH order	UK	Japan	France
1	21.056* (0.446E-05)	236.851* (0.000)	5.118* (0.024)
2	22.172* (0.153E-04)	235.828* (0.000)	8.095* (0.017)
3	22.119* (0.616E-04)	234.803* (0.000)	8.970* (0.030)
4	33.426* (0.098E-05)	233.769* (0.000)	9.206 (0.056)

Notes: see Table A9.

Table A12: Testing for ARCH effects- Ex Post Exchange Rate Volatility BOE

ARCH order	UK	Germany	Japan	France	US
1	18.391* (0.180E-04)	0.092 (0.762)	5.682* (0.017)	0.568E-02 (0.940)	0.166 (0.684)
2	22.104* (0.159E-04)	0.265 (0.876)	6.187* (0.045)	0.710E-02 (0.996)	0.177 (0.915)
3	22.351* (0.551E-04)	0.455 (0.929)	6.539 (0.088)	0.021 (0.999)	0.210 (0.976)
4	22.323* (0.173E-03)	0.633 (0.959)	7.202 (0.126)	0.067 (0.999)	0.233 (0.994)

Notes: see Table A9.

RESULTS

The Augmented Dickey-Fuller (ADF) test results for all countries are reported in Tables A1-A4. The ex post real interest rate series are considered first where, in levels, the null hypothesis that the series contains a unit root can be rejected for the UK at a 5% level of significance and for Japan at a 10% level of significance. This is not true however of the German and US data. A significant time trend was found in the French data and when the ADF tests are carried out including this time trend it became possible to reject the presence of a unit root. Tests using first differences all reject a unit root. The Phillips-Perron tests for the ex post real interest rate series are reported in Table A5. These results support those obtained by the ADF tests for the UK and US. In contrast to the ADF results, however, the hypothesis of a unit root can be rejected in the German series in levels, whilst such a hypothesis can no longer be rejected for France or Japan. In first differences the null hypothesis can be rejected for all countries.

The Augmented Dickey Fuller tests on the ex ante real interest rates produce the similar results when considering levels to those obtained using the ex post series. When the Phillips-Perron tests are used a unit root can be rejected at the 5% level for UK, Germany and Japan. The French data allows the rejection of a unit root when a time trend is included. Whilst the US data cannot reject the null hypothesis the significance of the test only just fails to reach the 10% level. The ADF tests of the ex post exchange rate volatility series allow the rejection of a unit root in levels for all series except the US. This was also true of the series in first differences. The Phillips-Perron tests replicated these results except that the US data

was found to reject a unit root in contrast to the ADF results. All the ex ante exchange rate volatility series rejected the null hypothesis of a unit root at the 5% level both in levels and first differences. These results were produced by both the Augmented Dickey-Fuller and the Phillips-Perron tests. In summary, the evidence presented here suggests that exchange rate data is stationary whilst there is evidence that some of the interest rate series may be non-stationary most notably those of the US.

The results of the tests for Autoregressive Conditional Heteroscedasticity are reported in Tables A9-A12 and indicate the presence of heteroscedastic error terms in many of the series. All the interest rate series, ex ante and ex post, displayed highly significant ARCH effects. The ex ante series on exchange rate volatility also displayed ARCH effects, whilst in the ex post (Bank of England) series ARCH effects were only found in the UK and Japanese series (up to ARCH order 2). As has already been seen in Table 4.6 ARCH effects were found in the Datastream exchange rate series in UK, Japan and France.

CHAPTER 5: SUMMARY AND CONCLUSION

The concern over the possible existence of short-termism has arisen out of the relatively poor economic performance of the UK compared to its major competitors. It has been widely argued that this poor performance has been the result of investors' behaviour and in particular myopic attitudes leading to relatively low long-term investment. The aim of this thesis has been to carry out an empirical investigation into some UK evidence on short-termism. A parallel hypothesis to be considered was whether international differences in investor behaviour, where they exist, follow a pattern. Of particular interest was whether a distinction could be made between behaviour of investors in countries with capital-market-based financial systems and those with bank-based financial systems.

The starting point of the thesis was to draw together the existing work on short-termism which has so far covered a diverse area. Chapter 2 examines and categorises some of the existing work on short-termism. The various approaches to short-termism are categorised into those which result in the denominator of the present value equation being too high and those which result in the numerator being too low, referred to as the denominator effect and the numerator effect respectively. The result of both these effects is to reduce the present value of a proposed project thus causing the project to be rejected when it might otherwise have been accepted.

The assertion that short-termism exists in equity markets relies on two factors: firstly that shareholders focus on the short-term performance of the company and secondly that they have the ability to constrain the managers' behaviour. Several theories were put forward as to why shareholders may focus on the short-term. The first group of these theories was built upon the existence of asymmetric information whereby shareholders do

not have the same level of information about the firm as that available to the managers. In order to assess the firm, therefore, shareholders have to use those instruments available to them such as current earnings and dividend payments, necessarily leading to a focus on the short-term. Such behaviour by investors need not be irrational but may simply be a rational response to market conditions. Proponents of the view that short-termism occurs due to the presence of asymmetric information call for improved information flows in capital markets.

A second approach to short-termism involves imperfect knowledge. Here a game-theoretic approach is used in which the players are managers and shareholders. The managers can either reward themselves now, or invest now and reward themselves at a future date. Shareholders face a similar choice of either accepting higher dividends now, or accepting lower dividends now in anticipation of receiving higher dividends in the future resulting from current investment. The difficulty arises in that neither side knows how the other will behave, leading to moral hazard problems. In this context managerial incentive schemes become important and any measures which produce cooperation between managers and shareholders help to alleviate moral hazard problems. Other potential causes of short-termism in equity markets are speculative activity, the existence of institutional investors and takeover activity. The presence of these factors may also compound the problems of asymmetric information and moral hazard. There are, therefore, many explanations as to why shareholders might pursue short-term gains but in order for these to be translated into short-termism there needs to some mechanism for corporate control.

Short-termism, it has been argued, may also arise through the banking system. The UK banking system has typically been compared and contrasted to systems elsewhere,

particularly those of Germany and Japan. The nature of the German and Japanese banking systems allows the development of closer links between banks and industry through characteristics such as universal banking, the exchange of staff, ownership of shares and the establishment of industrial groups. The close relationship between banks and industry leads to improved information flows, which, in turn, improves the accuracy with which the present value of a project can be calculated. This reduces the risk premium and therefore the discount rate. In contrast, the UK banking system has resulted in a more distant relationship leading to asymmetric information and moral hazard problems.

The managers themselves may display short-term attitudes through remuneration schemes, the anticipated time horizon within the present job/ company, project appraisal and intra-firm relationships. In terms of managerial performance UK and US firms use short-term indicators, such as accounting profit, whereas in Japan bonus schemes emphasise long-term performance. Of particular concern in the UK has been the extent to which the payback method of investment appraisal is still used. The presence of these factors can lead to an emphasis on the short-term by managers, i.e. managers use a higher discount rate.

A final area which has been considered as a cause of short-term behaviour in the UK is the economic environment. The stable economic environment of Germany and Japan has been contrasted with the unstable and unpredictable UK economy. The presence of economic volatility makes the prediction of future cash flows, and therefore the calculation of the present value of an investment project, difficult. The uncertainty may lead to a numerator effect since managers may err on the cautious side when forming expectations of future cash flows.

In addition to categorising the existing theories, the aim of Chapter 2 was to

develop a more exact definition of short-termism, with particular emphasis being put on the development of a definition which could be used as a basis for empirical investigation. The various approaches to short-termism were drawn together to define short-termism as a situation in which the value of long-term returns is underestimated either through the underestimation of future cash flows (numerator effect) or the use of a high discount rate given the level of risk involved (denominator effect). Whilst Chapter 2 identifies a number of possible explanations to account for the existence of short-termism this thesis has sought to concentrate only on one aspect; that short-termism may be identified by the use of a high discount rate, i.e. the existence of a denominator effect. The reasons for choosing such an approach were two-fold: firstly, whilst the numerator effect provides a valid explanation of short-termism, it remains unclear as to why such an effect should arise, and secondly, the numerator effect involves a practical difficulty in identifying whether or not cash flows are unduly pessimistic. In contrast, there are many explanations as to why the denominator effect should exist and it constitutes a more directly testable hypothesis through international comparisons.

The purpose of Chapter 3 was to provide a preliminary investigation into the presence of short-termism in UK capital markets. The basic hypothesis to be tested was whether the rate of return received by UK investors is higher than those experienced in four other countries: Germany, Japan, France and the US. A key contribution of this chapter was the decomposition of the discount rate into various individual components and to consider the issue of short-termism in relation to each component. The discount rate was decomposed into the following elements: the time value of money; an inflation adjustment; a liquidity premium; an equity risk premium and an exchange rate risk premium. Which of these components are relevant depends on the type of asset under

consideration. The analysis concentrates on three forms of finance, Treasury bills, government bonds and equities, utilising their differing features to calculate the time value of money, the liquidity premium and the equity risk premium. The breakdown of the discount rate into individual components enables a distinction to be drawn between two different types of short-termism: "true" and "general" short-termism. "True" short-termism refers to a high time value of money and "general" short-termism to the use of a high discount rate for whatever reason, whether it be a high time value of money, liquidity premium or equity risk premium. The use of international comparisons also facilitates the consideration of a second hypothesis regarding the influence of differing financial systems on economic performance.

The chapter considers three tests for the presence of short-termism looking for both "true" and "general" short-termism. The first test concentrates on "true" short-termism looking at the time value of money across countries by comparing international Treasury bill rates (or equivalent rates). The aim was to test whether investors in the UK have a higher time value of money than investors elsewhere. It was assumed in this chapter that rational expectations hold in both the interest rate and foreign exchange markets such that ex post and ex ante figures only differ by a random error. The implication of this assumption is that ex post interest rates may be used in the analysis to measure investors' required rate of return and also implies a zero exchange rate risk premium. An examination of the real rates of return found mean real returns relatively low in the UK and relatively high in Germany. In contrast to the arguments put forward in Chapters 1 and 2, which suggest that the UK and US financial markets may typically be associated with short-termism, these countries appear to have lower rates of return than elsewhere. Evidence to support the assertion that UK, and French, investors display short-term

behaviour was found, however, over the period 1985 to June 1995. Over this later period the US did not see a similar rise in real rates of return. Therefore, whilst there is little evidence to suggest UK investors are short-termist over the period 1975 to 1995, there is evidence to suggest that UK investors are short-termist over the sub-period 1985 to 1995. Since any short-term tendencies that are present do not prevail over the longer period 1975 to 1995, it is not possible to say that UK investors consistently behave in a short-term manner, i.e. it is not true to say that they are inherently short-termist. This is an important result in terms of policy as the changes in investor behaviour may then be associated with market features or prevailing economic conditions.

One possible explanation for the pattern of real rates of return involving economic conditions was put forward as the incorrect anticipation of inflation. The low real rates of return in the UK during the 1970s may have occurred as a result of investors underestimating the extremely high inflation rates of that period. Having experienced such high inflation in the 1970s, the high real rates of return seen in the 1980s could in turn have been the result of the overestimation by investors of future inflation rates. Comparing the UK real rates of return to those of the US lends support to this theory. The US, in contrast to the UK, did not experience such high inflation during the 1970s. Consequently there was less overestimation by US investors of future inflation rates, resulting in a less severe increase in real interest rates during the 1980s.

Of key interest in this thesis has been how investors behave over the longer term and consequently the rate of return on a long-term government (risk-free) asset is important. The lowest mean return on long-term government bonds was found in UK with the highest being in Germany. The UK mean real rate of return was only significantly lower than those of France and Germany. These results further question the hypothesis

that UK investors are short-termist with, in contrast to the arguments outlined in Chapter 2, no significant difference between the mean returns of UK and Japan. When the sub-period 1985 to June 1995 was considered the UK mean real return increased relative to those elsewhere, only now being significantly lower than France and significantly higher than Japan. The return on long-term government bonds was then used to calculate a liquidity premium to show the reward investors require for investing over the long-term rather than the short-term. The liquidity premium is of interest to the issue of short-termism as it constitutes one of the components of the discount rate and so a high liquidity premium would constitute "general" short-termism. The results from this calculation showed that the real liquidity premium required by UK investors was on average lower than elsewhere whilst there was little difference in the nominal liquidity premium across countries. These results provide no evidence that there is a relatively high liquidity premium in the UK and consequently no evidence that "general" short-termism is present among UK investors.

The third test to be carried out used equity return data to consider both equity returns and the equity risk premium. The equity risk premium has been described as the rate of return investors expect to obtain from an equity investment in excess of that which they would expect from a risk-free asset. The equity risk premium is of interest as it can affect the discount rate and so, like the liquidity premium, may contribute to "general" short-termism. The highest mean rate of return on equity was found in UK and the lowest in Japan, however these differences were not found to be significant at the 5% level. Similar results were obtained when considering the real and nominal equity risk premiums. A mean price of risk, defined as the return to an asset over a given period divided by the standard deviation in returns to that asset over the period, was also calculated and

produced similar results. Therefore, as with the tests involving the liquidity premium those carried out using the equity risk premium do not suggest that "general" short-termism is present in the UK.

In addition to considering whether or not short-termism exists in amongst UK investors, this thesis has also considered whether or not any differences in investor behaviour which do exist may be associated with the type of financial systems which prevails in a particular country, i.e. whether it is capital-market-based or bank-based. Using Treasury bills and long-term government bonds it was not possible to group the countries according to financial systems. That is, it was not possible to group the countries according to bank-based and capital-market-based financial systems except that the capital-market-based group did show a greater deviation in Treasury bill returns. The liquidity premium was in general lower for countries associated with capital-market-based financial systems. The equity risk premium was higher for the capital-market-based countries of the US and UK than the bank-based Japan and Germany, there was however little evidence to suggest these differences were significant.

Following the results of Chapter 3 which suggest if short-termism does exist it is in the form of "true" short-termism rather than "general" short-termism, Chapter 4 seeks to provide further empirical investigation into "true" short-termism. This was achieved by extending the analysis of Chapter 3 such that rational expectations were no longer assumed. The relaxation of this assumption allows an exchange rate risk premium to exist and also no longer assumes that ex ante and ex post interest rates differ only by a random error. The chapter therefore includes the derivation of ex ante real interest rates and an ex ante exchange rate volatility variable.

To further examine the issue of short-termism, the Treasury bill returns were

broken down as follows: a basic required rate of return, α , an exchange rate risk premium, χ , and a residual term ϵ . The null hypothesis was that the basic rate of return required by investors should be the same for each country and any departures from this may be interpreted as behavioural differences on the part of investors and, in particular, a higher α may be interpreted as evidence of "true" short-termism. Also of interest is the exchange rate risk premium which, like the liquidity and equity risk premia, is a form of "general" short-termism. The testing of this hypothesis was carried out in terms of both *ex ante* and *ex post* data.

Using *ex post* data the constant term was found to be positive and significant at the 5% level for France and the US and at the 10% level for Germany and the UK. The closeness between the constant terms was noted and, in particular, the closeness between the constant terms of Germany and the UK. The lowest returns were to US and German investors whilst the highest were to French investors. From these results, therefore, it can be seen that the basic rate of return received by UK investors was not high relative to the other countries in the sample. The exchange rate risk premium was not found to be significant for any of the countries studied. Given that no evidence of relatively high basic rates of return or an exchange rate risk premium was found, these results suggest that UK investors do not display either "true" or "general" short-term behaviour relative to the other countries in the sample. Re-running the regressions using a Seemingly Unrelated Regression approach resulted in all the α terms being significant at the 5% level except that of the UK which was significant at the 10% level. The basic return to UK investors was the lowest and Japanese investors the highest. There was evidence of a positive constant term in all countries but no evidence to suggest that the constant term differs across countries with only the difference between Japan and the US being significant at

the 5% level. There was a significant difference however at the 10% level between Japan and the UK, and between Japan and Germany. Therefore there is again little evidence to support the hypothesis that short-termism exists in the UK with UK investors, if anything, displaying a lower, rather than higher, basic rate of return. The exchange rate risk premium was not significant so suggesting that "general" short-termism does not exist. Ex ante data were also used to test the hypothesis that UK investors displayed short-term behaviour. Using ex ante data allowed the relaxation of the rational expectations assumption in the interest rate market. In contrast to the ex post data none of the constant terms were found to be significantly different from zero, so little could be drawn from these results. The key point to note, however, is that the basic rate of return received by UK investors is not higher than elsewhere. Generally, there was little difference in the results produced by ex post and ex ante data, therefore supporting the validity of the rational expectations assumptions made in the previous chapter. The French ex ante data did however produce different results from the ex post results suggesting that such an assumption was not valid. The French ex ante data produced a higher and significant α term and also a significant exchange rate risk premium in contrast to the French ex post data.

In summary, there is little evidence within the framework employed here to suggest that UK investors behave in a short-term manner. If short-termism does exist in the UK, the analysis in this thesis suggests that it is in the form of "true" short-termism and was present over the period 1985 to 1995. There was, however, no evidence to support the hypothesis that "general" short-termism exists in the UK with the liquidity, equity risk and exchange rate risk premia being relatively no higher than in the other countries studied. There was also very little evidence to support the assertion that the capital-market-based

financial systems of the UK and the US result in more short-term investor behaviour than the bank-based financial systems of Germany and Japan.

Several notes need to be made about the findings of this thesis, firstly, no attempt has been made to distinguish between rational and irrational behaviour. Of key importance to this study is whether or not UK firms face a higher required rate of return than its major competitors. The impact on the firms investment will be the same whether the behaviour can be described as rational or irrational. Secondly, whilst there is no evidence of short-termism provided by the analysis of rates of return carried out in this thesis, this does not rule out short-term tendencies on the part of investors. Such tendencies may be eliminated through international arbitrage. Of key importance is the fact that the rate of return required by investors is not higher than elsewhere. As discussed in Chapter 1, much of the debate on short-termism links financial behaviour and economic performance, with myopic financial markets leading to underinvestment, particularly over the longer term. The lack of evidence to support the assertion that UK financial markets display short-term attitudes, at least in terms of the definition used here, suggests that other factors should be looked for to explain the UK's relatively poor economic performance. Finally, this thesis has only concentrated on only one of a number of forms of short-termism, being based on a particular set of assumptions and data and does not preclude short-termism existing in other forms. In particular, the results do not imply that a higher discount rate is not used by firms, but only suggest that it is not the investors who require a high discount rate to be used.

Therefore, this thesis has provided some important contributions to the debate on short-termism. Firstly, it has developed a concise definition of short-termism which forms a more concrete basis for empirical work. Although many forms of short-termism have

been discussed, the work here has concentrated only on one strand of short-termism. This concentration has had the advantage of being able to consider and eliminate the possibility that short-termism exists in the form of a denominator effect according to the particular assumptions made. By showing there is limited evidence to support the existence of a denominator effect in UK capital markets according to these assumptions, this analysis indicates that if short-termism is present it is in some other form, thus providing direction for future research. Further, the decomposition of the discount rate into its components has two important benefits. Firstly, it becomes possible to identify more closely the particular aspect of investment appraisal which contributes to any short-term attitudes which may exist. The ability to ascertain whether short-term behaviour is the result of the time value of money of investors or the various risk premia included in the discount rate, leads to the second benefit which is that a distinction may now be drawn between "true" and "general" short-termism. A final contribution of this thesis has been to link the role of the exchange rate risk premium in the international interest rate equality literature and the issue of short-termism.

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