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International Integration of Financial Markets and the Cost of Capital

Mitsuhiro Fukao

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ECONOMICS DEPARTMENT

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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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INTERNATIONAL INTEGRATION OF FINANCIAL MARKETS
AND THE COST OF CAPITAL

Despite the increased capital mobility that has accompanied the trend towards liberalisation and international integration of financial markets, differences remain in financing costs and, in particular, the cost of capital, that similar businesses face in different countries. These differences have attracted considerable attention as important factors influencing international investment and productivity growth. A number of reviewed empirical studies suggest that Japan and Germany enjoyed a considerable advantage with regard to the cost of equity and, more broadly, the cost of capital compared to the United States and the United Kingdom in the 1980s. This was due to higher leverage, a much lower cost of equity in Japan and a lower cost of German firms' debt to banks. Many studies have argued that closer bank-customer relationships, and more stable prices and growth rates in Japan and Germany have tended to lower their cost of capital. More recent studies which cover the period since 1990 have found some tendency towards convergence in the cost of equity and capital. However, given the important institutional differences among countries concerning the corporate governance structure, some differences in the cost of capital are likely to persist in the future.

* * * * * *

Malgré la mobilité croissante du capital qui avait accompagné la tendance vers la libéralisation et l'intégration internationale des marchés financiers, des différences subsistent dans plusieurs pays dans les coûts de financement, en particulier dans celui du capital. Ces différences ont considérablement attiré l'attention en tant que facteurs importants qui influencent l'investissement international et la croissance de la productivité. Un certain nombre d'études critiques empiriques laissent entendre que le Japon et l'Allemagne ont bénéficié d'un avantage considérable en ce qui concerne le coût des actions, et plus largement le coût du capital par rapport aux États-Unis et au Royaume-Uni dans les années 80. Ceci était dû à un effet de "levier", un coût plus faible des actions au Japon et un faible coût des dettes des entreprises envers les banques en Allemagne. Plusieurs études ont démontré que des relations étroites banques-clients, ainsi que des prix et des taux de croissance plus stables au Japon et en Allemagne ont conduit ces pays à baisser leur coût du capital. Des études plus récentes qui couvrent la période depuis 1990 ont trouvé une certaine tendance à la convergence dans les coûts des actions et du capital. Toutefois, étant donné l'importance des différences institutionnelles parmi les pays en ce qui concerne la structure des sociétés publiques, quelques différences dans le coût du capital persisteront vraisemblablement dans le futur.

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International Integration of Financial Markets and the Cost of Capital

Mitsuhiro Fukao[1]

I. Introduction

As the international integration of financial markets progresses, arbitrage transactions tend to bring about a convergence of the returns on assets with similar risk characteristics. However, many types of risk are related to specific features of local environments and, consequently, international differences in financial conditions continue to be possible. In particular, differences in the cost of capital, which affect international competitiveness, have been observed across countries. This paper reviews these differences and some of the reasons for them. Part II describes some recent trends towards increased international integration of financial markets and examines some of the reasons why arbitrage transactions have not eliminated all segmentation. Part III surveys recent comparative studies of financing costs in some major countries and Part IV offers concluding remarks. A technical appendix set out the way various financing concepts are related to the cost of capital and to each other.

II. International Integration of National Financial Markets

A. Progress towards increased integration

International financial activity is both expanding and undergoing significant structural change. Expansion is a consequence of the enlarged pool of financial assets that can be, and are, held and traded across national borders; with the progressive removal of capital controls, the holders of many of these are free to exchange them for assets in other currencies. Actual cross-border ownership of these securities is estimated to have increased from $500 billion in 1983 to some $2 trillion in 1989[2]. Transactions volumes are large as well; cross-border bond turnover is estimated at around $1 trillion per quarter in 1992, up from $750 billion per quarter in 1991, and the value of foreign shares traded in 1991 has been put at $2.1 trillion[3]. This expansion has been driven by both supply and demand considerations. Issuers, including governments, have encouraged internationalisation of their investor base, as a means of enhancing liquidity and lowering funding costs. Investors have sought more stable returns through portfolio diversification.

Structural changes in international financial markets are reducing constraints on cross-border transactions in these assets. Capital controls have been lifted by most OECD countries. The profile of investors is changing with large institutional investors such as mutual funds, pension funds, and insurance companies becoming increasingly prominent in many countries. For example, data in Table 1 show that pension funds control a sizeable and rising volume of assets in the United States, the United Kingdom and Canada. Growth in these countries, and in Japan, should continue given the larger share of pension fund investment in total personal saving. The size of these institutions allows them to maintain the analytic and operational resources to

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invest actively in several markets simultaneously. The scale of foreign investment by pension funds is also given in Table 1; though not large, it is rising in several countries as these funds seek to diversify assets, and implies a significant volume of net international investment when combined with the overall growth of these funds[4].

In addition, the growth of markets in derivative instruments (Table 2) has been spectacular in the past five years. Expansion of activity in derivatives and the growth of institutional investment have been mutually reinforcing trends. Large institutional investors generated a demand for products to manage risk and to match portfolio income to their liability structure. At the same time, derivatives have enhanced the flexibility of investing institutions to take positions across national markets and securities. These instruments both reduce transaction costs, which often are much less than for the underlying securities, and unbundle risks, allowing an institution to take on exposure selectively to foreign currencies, interest rates or equity returns. In some instances, derivatives also allow institutions to avoid regulatory limitations on portfolio composition.

One consequence of the increased international activity in financial markets and the development of derivative instruments has been to strengthen arbitrage links among national financial markets. Exchange rates of major currencies and prices of widely held instruments such as US Treasury debt are equalised across financial centres. Default-free short-term returns are linked by forward markets in foreign exchange so that covered interest-rate parity holds. On longer-term financial instruments, swaps -- which are often used in conjunction with other derivatives such as futures and options -- provide investors and borrowers with considerable scope for managing longer-term exchange risk and for arbitraging even small differences in interest rates available to individual borrowers in different markets.

B. Forces working to maintain segmentation

Real or exchange-rate adjusted returns on longer-term financial instruments depend on features of particular economic environments and are often uncertain. Hence there are limits to the ability of financial markets to arbitrage differences away. A consequence of this is that, despite the trend towards globalisation of financial markets, businesses in different countries have often faced different costs of funding their activities.

For private borrowers, the equalisation of borrowing costs across national financial markets is impeded by the costs of accommodating credit risk. Derivative markets allow international arbitrage that can even out international differences in the price of currency risk or interest-rate risk, but not of credit risk[5]. Investors often find it difficult to evaluate risk outside their home country. They may be less familiar with economic conditions in other countries, especially as they relate to specific firms or industries, and they may find disclosure requirements to be less comprehensive. Furthermore, differing legal frameworks and accounting standards may make information difficult to interpret even when it is disclosed. Thus, borrowers whose credit risk is known to be very low, essentially those with high ratings from major rating agencies, share with major governments the ability to borrow in a range of markets and currencies. This credit threshold is high, however. Institutional investors outside of North America reportedly are largely unwilling to acquire securities without a double-A or equivalent rating. More

risky borrowers will deal almost exclusively with investors and lenders in their home country, often with banks which are well-placed to inform themselves about individual borrowers and their specific business environment. This introduces an unknown degree of heterogeneity into their borrowing costs.

Moreover, the credit risk associated with two otherwise-identical enterprises situated in different countries can differ because of variations in the specific risks of operating in those countries. The degree of macroeconomic stability, for example, is an important factor that can make operating in one country more risky than in another.

One factor is that bankruptcy law differs substantially across countries. While these differences are unlikely to affect the risk of high quality corporate bonds, they make the riskiness of claims on less robust firms dependent on the country in which they operate. Bankruptcy law in the United States, for example, broadly puts more weight on preserving the ability of debtors to continue operating relative to protecting creditors than does that in other countries. Differences in sanctions against directors of failed businesses which can affect the behaviour of management of businesses facing financial difficulties, are another source of differences across countries which affect the riskiness of claims on businesses depending on where they are based. A third area where differences exist across countries is restrictions on management's freedom to alter a company's financial structure. While US businesses are usually permitted to pay dividends or to retire shares with funds generated by depreciation, for example, Japanese and German firms are not permitted to do so in normal circumstances.

III. A Survey of Recent Cost of Capital Comparisons

There are a number of concepts of companies' financing costs which are related to the cost of capital in varying ways (see Appendix for a detailed discussion). Among these concepts are:

Cost of debt -- The real cost of net debt after taking account of the deductibility of interest payments from taxable corporate income.

Cost of equity -- The real cost of equity capital from the view point of the management of the firm or the existing shareholders of the firm.

Cost of funds -- The weighted average of the cost of debt and the cost of equity. This depends on the financial structure (leverage) of the firm.

Cost of capital -- The required minimum pre-tax real rate of return that an investment project must earn to cover the cost of its finance. It depends not only on the cost of funds but the impact of the tax system on businesses making an investment. Among the most important elements of the tax system are: the corporate tax rate, the relationship between depreciation allowances under the corporate tax system and the economic rate of depreciation of the project to be financed, and any investment tax credits or investment grants.

A review of recent international comparisons of these costs, listed in Table 3, is provided below. It relies heavily on McCauley and Zimmer (1992) who conducted the only thorough analysis of the cost of capital in four countries with the latest data. While the Ando and Auerbach study was important for its discussion of conceptual issues, it did not reach many clear

empirical conclusions. In addition to the studies listed in the table, Frankel (1991) and Blow (1992) provide a good survey on this issue. Regarding the effects of tax system on the cost of capital, OECD (1991) and Commission of the European Community (1991) provide a very comprehensive analysis[6].

A. International comparisons of the cost of debt

If international transactions tend to narrow the differences in nominal returns on bonds adjusted for expected changes in exchange rates, and if future movements of exchange rates between two countries are expected to correspond to inflation-rate differentials, then real interest rates in the two countries will tend to converge. Although there is a long-run tendency for exchange rates to fluctuate around purchasing power parity, they often diverge from these levels. Expected exchange rate changes may therefore differ from expected inflation differentials, resulting in real interest-rate differentials across countries. However a stronger convergence of long-term real rates can be expected under highly integrated financial markets, so long as the exchange rate is expected to adhere to purchasing power parity in the long run.

Real interest rates can be measured in different ways because there is no clear agreement on how to measure one part of this concept: the expected rate of inflation. If real long-term interest rates are measured in the most conventional way, there has been considerably more convergence in the 1980s than in the 1970s. This is also true of real short-term rates, although the degree of convergence has been less than for real long-term rates (Chart 1). As the rate of inflation declined in the 1980s, the impact of the tax system on the cost of debt also declined. In general, a lower inflation rate tends to reduce the size of tax distortions caused by the deductibility of interest payments from taxable corporate income[7]. These factors tend to reduce international differences in the real cost of debt.

In empirical studies, interest rates used to calculate the cost of debt are often measured by those on high-quality bonds, as in Mattione (1992). McCauley and Zimmer (1989, 1992) and Ando and Auerbach (1991) attempted further to take account of the different mix of short-term and long-term debts and the holding of financial assets among countries. McCauley and Zimmer's recent studies indicate that the real costs of debt of the United States, Japan and Germany converged during the 1980s (Chart 2). Mattione's study of the United States and Japan is consistent with this except for the recent period, as it suggests some widening in the differential during the 1990s. Ando and Auerbach, on the other hand, did not reach any clear conclusions on this issue.

B. International comparisons of the cost of equity

Greater integration of financial markets may warrant less convergence of the cost of equity than of the cost of debt. Company shares can be highly heterogeneous; and investors are likely to need extensive knowledge of individual firms to judge their future developments. While many tax treaties designed to avoid double taxation exist, tax systems often have features which discriminate against foreign investors in domestic equities[8]. For example, Canada and major European countries including Germany, France, Italy and the United Kingdom have an imputation system for the tax treatment of corporate dividends. While domestic shareholders can take advantage of the high degree of integration of corporate and personal income tax systems to which the

imputation system leads, foreign shareholders often face double taxation because the imputation system often provides less advantageous tax relief for foreign shareholders than for domestic shareholders.

Even abstracting from the complication arising from the impact of tax systems, international arbitrage is unlikely to be able to assure convergence of the cost of equity across countries. In a given national equity market the cost of equity capital is determined by i) the opportunity cost of investing in equities; ii) the degree of risk aversion on the part of investors; and iii) the inherent risk in conducting business based in the country. The globalisation of financial markets tends to reduce the real interest rate differential across countries, reducing the importance of the first factor. International diversification of equity portfolios also works to reduce national differences in risk aversion by allowing residents of all countries to participate in foreign markets for equity, reducing the importance of the second factor. However, the risk of conducting business in a country cannot be affected by international financial arbitrage.

As noted above, macroeconomic stability and various institutional arrangements, for example regarding bank-business relationships, the risk of incurring large legal liability, bankruptcy procedures, rights of equity holders and government policy regarding industry, all affect the risk of investing in the equity of a firm based in a given country. Since there are large remaining international differences in these factors, it would be natural to expect that the cost of equity would be different across countries.

Measuring the cost of equity empirically is more difficult than measuring the cost of debt. There are three methods: i) estimates based on the historical total return on equity; ii) estimates based on the price-earnings ratio adjusted for cross-country institutional differences such as accounting standards, the level of cross share-holdings among firms, the trend growth rate and the distortion of profits from inflation, (see McCauley and Zimmer (1989, and 1992), French and Poterba (1991), and Mattione (1992) for discussion of these adjustments); and iii) estimates based on share prices and future dividend payments as projected by security analysts.

While method i) looks at the actual historical return on equity from dividends and capital gains, it can only usefully show the long-term average rate of return. For relatively short periods of time, this method often produces perverse results. When nominal interest rates fall, share prices often rise and do so fairly rapidly, producing large capital gains. While such a rise in share prices implies lower expected returns on equity, the immediate effect on the historical data is that they indicate a higher cost of equity. As a result, most studies employ methods ii) or iii). McCauley and Zimmer (1989, and 1992) used method ii) to estimate the cost of equity for the United States, Japan, Germany and the United Kingdom (see Chart 3, panel A)[9]. Their estimates suggest that it was relatively low in Japan during the 1980s, but that there has been a significant convergence during the 1990s. Malkiel (1992) obtained slightly different results applying method iii) to data for the United States, Japan and Germany (Chart 3, panel B). His estimates show somewhat less difference between the United States, on the one hand, and Japan and Germany, on the other, and indicate that convergence began somewhat earlier, during the latter half of the 1980s.

While the various factors described above tend to impede international convergence of the cost of capital, some arbitrage activities take place to

profit from remaining differences in the cost of equity. For example, a number of US firms have floated shares of Japanese subsidiaries on the Tokyo market to take advantage of this situation[10]. Many of these Japanese subsidiaries were in a position to realise higher price-earning multiples than their US parent companies in the US market (Chart 4). The boom in the acquisition of US firms by Japanese firms in the late 1980s was also partially driven by the large cost of equity differential between the two countries.

C. The degree of leverage

The cost of funds and the cost of capital both depend on the amount of a firm's leverage, i.e. the relative importance of debt and equity in its financing. Estimates are usually based on the assumption that firms aim to maintain a stable financial structure over time. Implicitly, therefore, any financing of individual projects i) with a mix of debt and equity that differs from a firm's overall financial structure; or ii) by hybrid instruments such as the warrant bonds widely used by Japanese corporations in recent years; is treated as introducing variations in financial structure which will be reversed over time.

International differences in the degree of leverage depend on institutional factors related to financial structure which affect the degree of risk to creditors associated with high leverage. In financial transactions, the problem of asymmetric information between creditors and borrowers and conflicts of interests among creditors are often acute. When a firm faces financial distress, these factors often make the re-negotiation of financial claims difficult. For example, free-rider problems reduce the incentive for creditors to provide financial relief. When there are a large number of creditors, they are unlikely all to be well informed about the conditions of the firm and may be less inclined to provide financial concessions.

For firms with strong relationships with banks, these problems would be less severe. When a bank holds a large share of a firm's debt and equity and is well informed, it is relatively well placed to judge whether to provide it with any necessary financial assistance, because the bank faces fewer problems related to asymmetric information and conflicts of interest among different creditors (see Hoshi, Kashyap and Scharfstein (1990b)). It is often argued that the main-bank system in Japan and the Hausbank system in Germany enjoy these advantages. While monitoring by banks inevitable imposes limits on borrowers' freedom of action, and often implies higher effective borrowing costs, firms that have close relationships with such banks often maintain a higher level of leverage without incurring undue risks of bankruptcy or financial distress. They may be willing to pay slightly higher interest rates because the banks have a stake in providing support if that becomes necessary[11].

Measurements of leverage are usually based on the value of equity as measured by the market value and the amount of debt as measured by book value. The debt/equity ratios of US and UK firms have fluctuated around 1 for many years, while those of Japanese and German firms have generally been much higher and are currently above 2 (Chart 5). Most estimates show that the cost of equity is usually significantly higher than the cost of debt because interest payments are fully deductible for corporate tax purposes, whereas the earnings are usually subject to corporate tax. Hence, Japanese and German firms, which seem to be able to sustain a higher level of leverage than US or UK firms, have an advantage with regard to their cost of capital.

D. The cost of funds and the cost of capital

The cost of funds reflects the combined impact of all the influences described above, while the cost of capital further takes account of the impact of the corporate tax system. Investment incentives such as tax credits and accelerated depreciation effectively lower the cost of investment projects and therefore reduce the cost of capital. Variations in corporate taxation across countries appear to have played a declining role in explaining international differences in the cost of capital[12]. This is partly due to the convergence of inflation rates to lower levels which, as noted above, reduces a major source of distortion introduced by tax systems, and partly due to tax reforms in a number of countries, including the United States, Germany, the United Kingdom and Canada. The general thrust of these tax reforms has been to set depreciation allowances for tax purposes more realistically, to reduce or eliminate tax credits for investment, and to lower the tax rate. These changes have in most cases reduced the size of tax wedges between the cost of capital and the cost of funds, but the largest contributions to the convergence of the cost of capital, quantitatively, have been made by the convergence of inflation to relatively low levels and the convergence of real interest rates.

McCauley and Zimmer (1989) report that businesses in Japan and Germany appear to have enjoyed a considerable advantage with regard to the cost of funds over those in the United States and the United Kingdom in the 1980s. For Japanese firms, this advantage was due to a higher leverage and, during the second half of the decade, a much lower cost of equity reflecting high stock prices in the Tokyo market. For German firms, the advantage was due to a higher leverage and a lower interest cost of their short-term debt to banks. In their more recent study, they report a tendency towards convergence in the cost of funds since the beginning of 1990 (Chart 6). As far as Japan is concerned, this largely reflects the sharp fall of stock prices in that country.

Since the cost of capital takes account of tax incentives, it varies according to the type of investment project and tax treatment to which it is subject. Chart 7 shows two sets of cost of capital estimates by McCauley and Zimmer (1992) for two different types of investment. The estimates include the cost of economic depreciation in addition to the cost of capital, i.e. they measure the "user" cost of capital. The differences between the user cost of capital, as shown in Chart 7, and the cost of funds, as shown in Chart 6, are: i) the effects of tax incentives for investment and the depreciation allowance; ii) the effects of corporate tax rates on operating profits; and iii) the cost of economic depreciation. While trends in the cost of capital are broadly similar to those in the cost of funds, there is one notable difference: in the United States, the cost of capital for equipment and machinery remained high in the second half of the 1980s even though the cost of funds was falling due to the elimination of the investment tax credit by the 1986 Tax Act.

IV. Concluding Remarks

Despite the increased capital mobility that has accompanied the trend towards liberalisation and international integration of financial markets, differences remain in financing costs and, in particular, the cost of capital, that similar businesses face in different countries. These differences have attracted considerable attention as important factors influencing international

competitiveness, the direction of foreign direct investment, and differences in investment and productivity growth. A number of studies suggest that Japan and Germany enjoyed a considerable advantage with regard to the cost of equity and, more broadly, the cost of capital compared to the United States and the United Kingdom in the 1980s. This was due to higher leverage, a much lower cost of equity in Japan and a lower cost of German firms' debt to banks. Many studies have argued that closer bank-customer relationships, and more stable prices and growth rates in Japan and Germany have tended to lower their cost of capital. More recent studies which cover the period since 1990 have found some tendency towards convergence in the cost of equity and capital.

Greater efficiency of international capital markets would be facilitated if measures were taken to moderate some of the forces working for segmenting international financial markets. Perhaps most important would be to ensure that monetary policy succeed in maintaining low and stable inflation rates on a consistent basis. The interaction of inflation and tax systems is one of the largest sources of distortions in financial markets, and lower and steadier rates of inflation would reduce them. Another source of distortion which could be reduced is the discrimination against foreigners which often characterises tax imputation systems. Such systems are generally designed to reduce tax distortions domestically, but often introduce inefficiency at the international level as a side effect. Other sources of inefficiency at the international level arise from differences in national frameworks for corporate governance, accounting standards and disclosure requirements, rights of creditors and restrictions on the behaviour of financial institutions. There are many reasons for actual differences in these areas and changes should not simply be made on the basis of international considerations alone. However, there could be benefits in making efforts to increase transparency and international harmonisation in many of these areas.

Appendix

Concepts Related to the Cost of Capital

This appendix explains the derivation of the cost of capital equation used for empirical analyses and its relationship to other concepts of the financing cost of investment. The analysis assumes that there is no uncertainty, no changes in the tax system, and that the inflation is uniform and constant over time. Further details can be found in Chapter 2 of King and Fullerton (1984), OECD (1991) and Auerbach (1983).

Consider an investment project costing one currency unit. Suppose that the gross marginal real rate of return of the project, MMR, declines at a constant exponential rate of depreciation, d, (the economic rate of depreciation). Since the nominal return increases at the rate of inflation, pi, the net tax present discounted value of the profit, V, is given by:

$$V = \int_{0}^{\infty} (1-u) MMR e^{(pi-d)} e^{-it} dt \qquad [A1]$$

where

u = corporate tax rate
i = nominal discount factor used by the firm
pi = rate of inflation

The nominal discount factor, i, is often called the "nominal cost of funds". This is determined by the weighted average of the nominal cost of equity and the nominal after-tax cost of debt as follows:

$$i = (1-b) r_e + b(1-u) r_d \qquad [A2]$$

where

r_e = the nominal required return on equity (capital gain plus dividend)
r_d = the nominal interest rate on the net debt
b = the debt-asset ratio

The real cost of funds can be obtained by subtracting the rate of inflation, pi, from the above equation:

$$i-pi = (1-b)(r_e - pi) + b[(1-u) r_d - pi] \qquad [A3]$$

This equation shows that the real cost of funds is equal to the weighted average of the real cost of equity, r_e-pi, and the real cost of debt, $(1-u) r_d$-pi.

On the other hand, the cost of project, C, which takes account of the present value of the depreciation allowance, z, and the investment tax credit or investment grant, k, is given by:

$$C = 1 - k - uz \qquad [A4]$$

where

$$z = \int_0^\infty D(t)e^{-it}dt \qquad [A5]$$

and $D(t)$ is the depreciation allowance of the corporate tax system for the tth year of the project (see Fukao and Hanazaki (1986), Annex B for examples of z). Note that the present value is discounted by the nominal cost of funds, i.

At the margin, the present value of the project, V, has to be at least equal to the cost, C. Therefore, we have

$$MMR = (i+d-pi)(1-k-uz)/(1-u) \qquad [A6]$$

for the marginal project. This is the minimum gross marginal real rate of return and is often called "the user cost of capital". The minimum required real rate of return for a viable project, p, is obtained by subtracting the economic rate of depreciation, d, from the above equation:

$$p = (i+d-pi)(1-k-uz)/(1-u)-d \qquad [A7]$$

While "the cost of capital" usually means "p" in equation [A7] (Auerbach (1983)), it is sometimes used to mean "the user cost of capital" in equation [A6] (McCauley and Zimmer (1992) and Blow (1992)), "the real cost of funds" in equation [A3] (Frankel (1991)), or "the real cost of equity" in equation [A3] (Malkiel (1992)).

From equations [A2] and [A7], the following equation for the estimation of the cost of capital can be derived.

$$p = [(1-b)r_e + b(1-u)r_d + d - pi](1-k-uz)/(1-u) - d \qquad [A8]$$

Suppose there is no corporate tax (u=0, k=0). When the project is fully financed by debt, the cost of capital is equal to the real interest rate on debt, r_d- pi. When the project is financed by both equity and debt, the cost of capital is equal to the average of the real cost of equity and the real cost of debt with the weights determined by the debt-asset ratio, $(1-b)(r_e-pi) + b(r_d-pi)$. Under an ordinary corporate tax system, interest payments are deductible from the taxable income. Thus, the nominal cost of debt is reduced by the factor of $(1-u)$ in the brackets of equation [A8]. The inside of the brackets excluding the rate of economic depreciation can be rewritten as follows:

$$(1-b)(r_e-pi) + b[(1-u)r_d-pi].$$

This is equal to the real cost of funds (see equation [A3]).

The tax incentives for investment and the depreciation allowance reduce the real cost of funds for investment and this is expressed by the multiplying factor, $(1-k-uz)$. On the other hand, since the earnings on the project are taxable, the real cost of funds is grossed up by division with $(1-u)$. Finally, the distorting effect of the tax system on depreciation appears as the two non-offsetting terms with economic rate of depreciation, d.

By estimating various terms in the equation, the cost of capital can be calculated.

NOTES

1.   The author would like to thank Kumiharu Shigehara, Paul Atkinson and
      Paul F. O'Brien for extremely detailed comments and suggestions on the
      drafts of this paper. Special thanks are due to Josette Rabesona for
      research assistance and Paula Simonin and Andrea Prowse for assistance
      in the preparation of this working paper.

2.   Turner (1991).

3.   OECD (1992) and *Financial Times* (1992).

4.   Other institutional investors are also increasing their holdings of
      foreign assets. For example, between 1980 and 1991 foreign securities
      increased from less than 10 per cent to nearly 30 per cent of the
      securities holdings of both life and non-life insurance companies in
      Japan. See Turner (1991).

5.   National differences in credit risk can be partly compensated for by
      portfolio diversification, but not entirely.

6.   While these two studies provide estimates of "the cost of capital", they
      assume that the real cost of equity capital is equal to the real
      interest rates and do not estimate the actual cost of equity. Although
      these estimates provide very useful information on the effects of tax
      systems on the international differences in the cost of capital, they
      cannot directly answer the international difference in the <u>actual</u> cost
      of capital.

7.   A higher inflation rate tends to increase the size of tax distortion on
      debt finance. For a given real interest rate, when the rate of
      inflation increases the nominal interest rate increases by the same
      amount. While the increased interest payments can be deducted from
      taxable income, the effective capital gain from the reduction in the
      real value of outstanding borrowings is not taxable, reducing the total
      tax liability of a firm.

8.   This discussion relies heavily on Fukao and Hanazaki (1987).

9.   In general, estimates based on the price-earning ratio give the <u>real</u>
      cost of equity because the price of an equity represents the claim on
      real assets of the issuing firm. Since McCauley and Zimmer's estimates
      of the cost of equity are not adjusted for differences in the trend real
      growth rate of corporate profits across countries, they may understate
      the cost of equity capital of Japan to some extent.

10.   See Fikre (1991).

11.   Hoshi, Kashyap and Scharfstein (1990a) showed that investment by
      Japanese firms that have close relationships with their banks is less
      affected by the level of cash flows than that of other Japanese firms.
      Moreover, Hoshi, Kashyap and Scharfstein (1990b) demonstrated that
      Japanese firms in industrial groups -- with close financial
      relationships to their banks, suppliers, and customers -- tend to invest
      more and sell more after the onset of financial distress than non-group
      firms.

12.   For discussion, see Commission of the European Communities (1992) and
      Fukao and Hanazaki (1987).

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Tables and Charts

Table 1. Representative statistics on activity of pension funds

	Assets as a percentage of GDP		Net investment as a percentage of personal saving	Foreign securities as a percentage of total assets	
	1980	1990	1988	1980	1990
United States	24	35	50	1	4
Japan	3	8	20	1	7
Germany	2	3	4	0	1
France	n.a.	3	2	n.a.	4 (1)
United Kingdom	23	55	71 (2)	9	18
Canada	17	28	39	4	6

1.   1988.

2.   The source of this table suggests this figure may be inaccurately measured.

Source: Davis (1992) and estimates by the author.

Table 2. **Market size and activity for selected derivative instruments**

	Notional amounts outstanding ($ billion equivalent)		Annual turnover (number of contracts traded, millions)	
	end-1987	end-1991	1987	1991
Exchange-traded instruments (1)	725	3518	214 (2)	336 (2)
Interest rate futures and options	610	3231	175	285
Currency futures and options	74	77	39	51
Equity-related futures and options	41	209	n.a.	n.a.

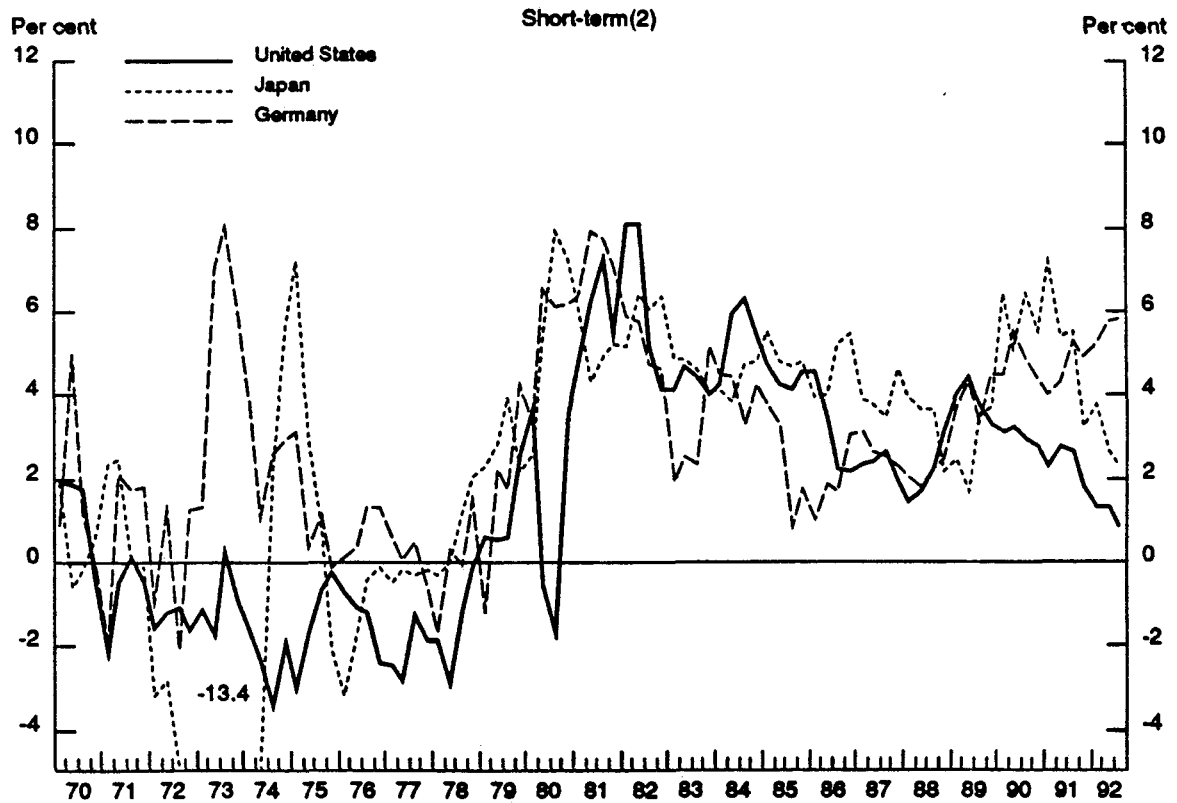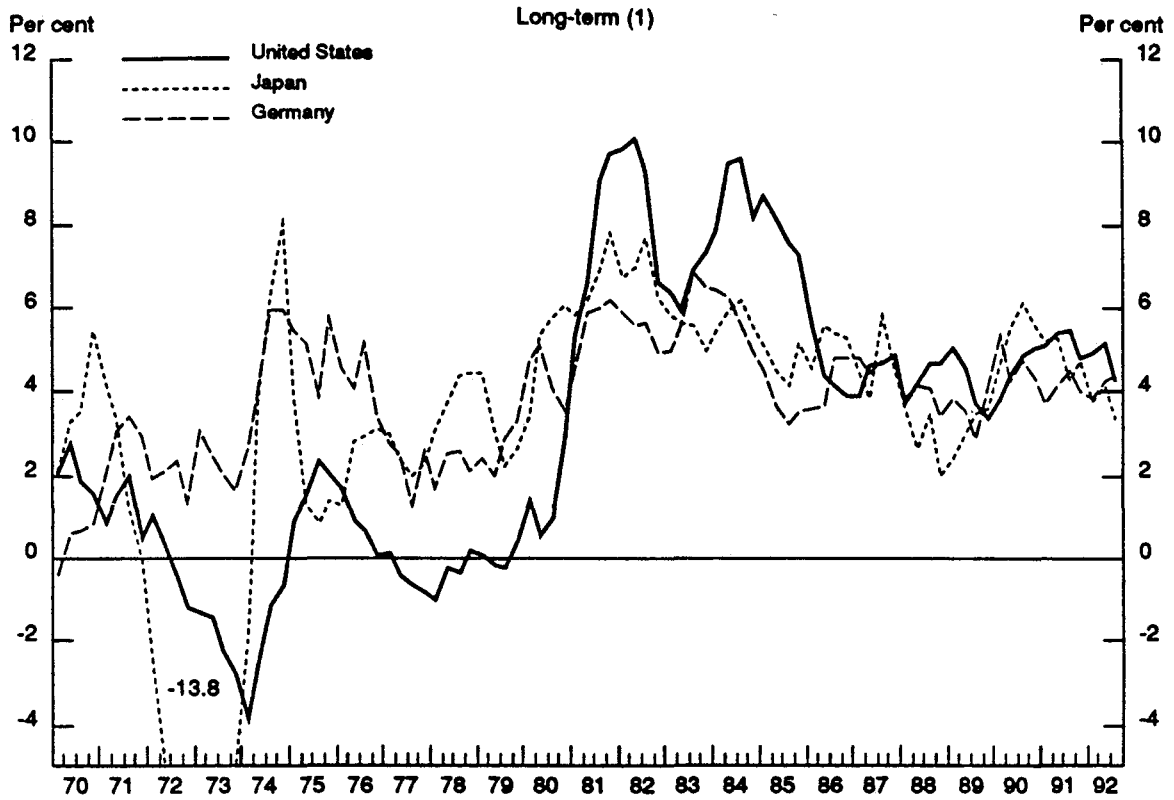|			Annual turnover (new swaps arranged, $ billion)	
Over-the-counter instruments (3)	867	4449	475 (4)	1950 (4)
Interest-rate swaps	683	3065	388	1622
Currency swaps	184	807	87	328
Other instruments	n.a.	577		

1. Excludes options on individual shares and derivatives involving commodities. Options includes calls plus puts.

2. Sum excludes equity-related instruments.

3. See notes to Table 6 in Bank for International Settlements (1992) for specific instruments included.

4. Sum includes interest-rate and currency swaps only.

Source: Bank for International Settlements (1992).

Table 3. Recent studies of corporate financing costs

Authors	Country	Estimated costs	Period
Ando and Auerbach (1991)	USA, JPN	Cost of capital	1967-88
McCauley and Zimmer (1989)	USA, JPN, UKM, GER	Cost of equity, debt, and capital	1977-88
McCauley and Zimmer (1992)	USA, JPN, UKM, GER	Cost of equity, debt, and capital	1977-92
Malkiel (1992)	USA, JPN	Cost of equity	1977-89
Mattione (1992)	USA, JPN	Cost of debt and equity	1970-92

- Chart   1
Comparison of real interest rates

Long-term (1)

Per cent

	United States
....	Japan
— — —	Germany

-13.8

70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92

Short-term(2)

Per cent

	United States
....	Japan
— — —	Germany

-13.4

70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92

1. 10 year Government bond rate minus ex-post 1-year GDP deflator inflation rate.
2. 3 month rate minus ex-post 3 month GDP deflator inflation rate(3Q moving average).
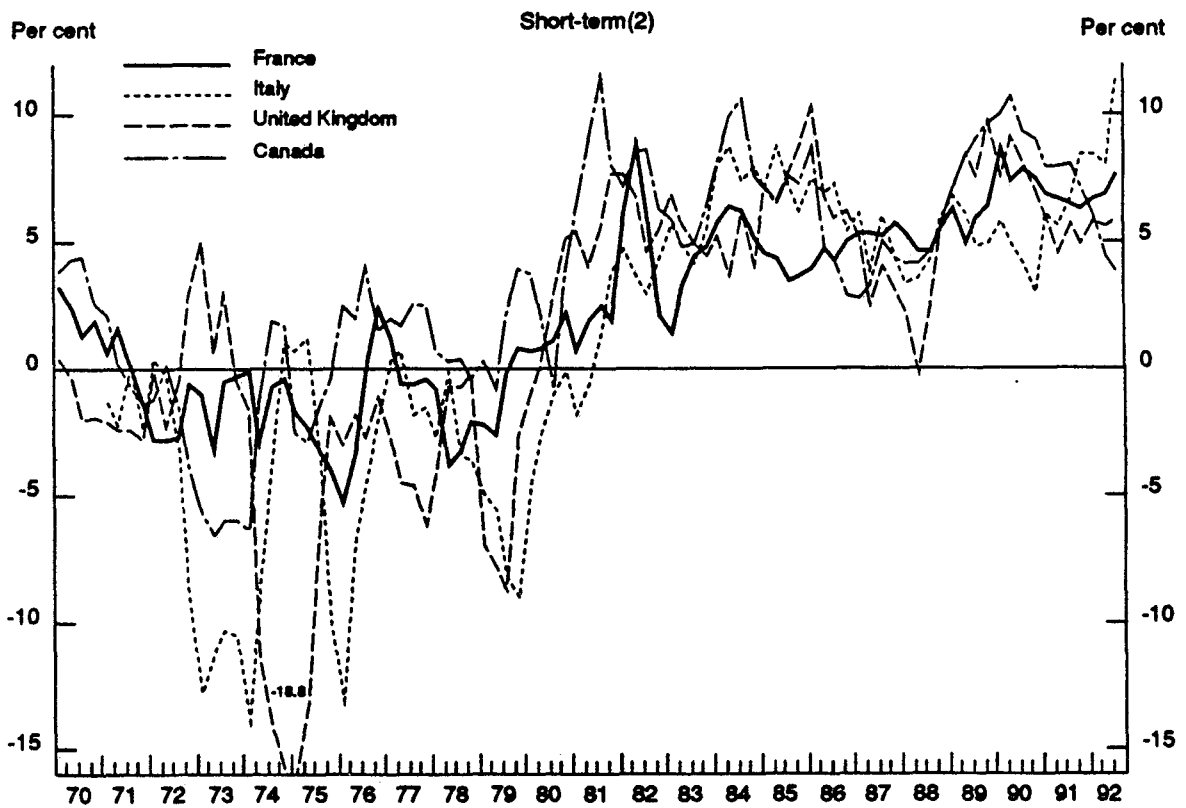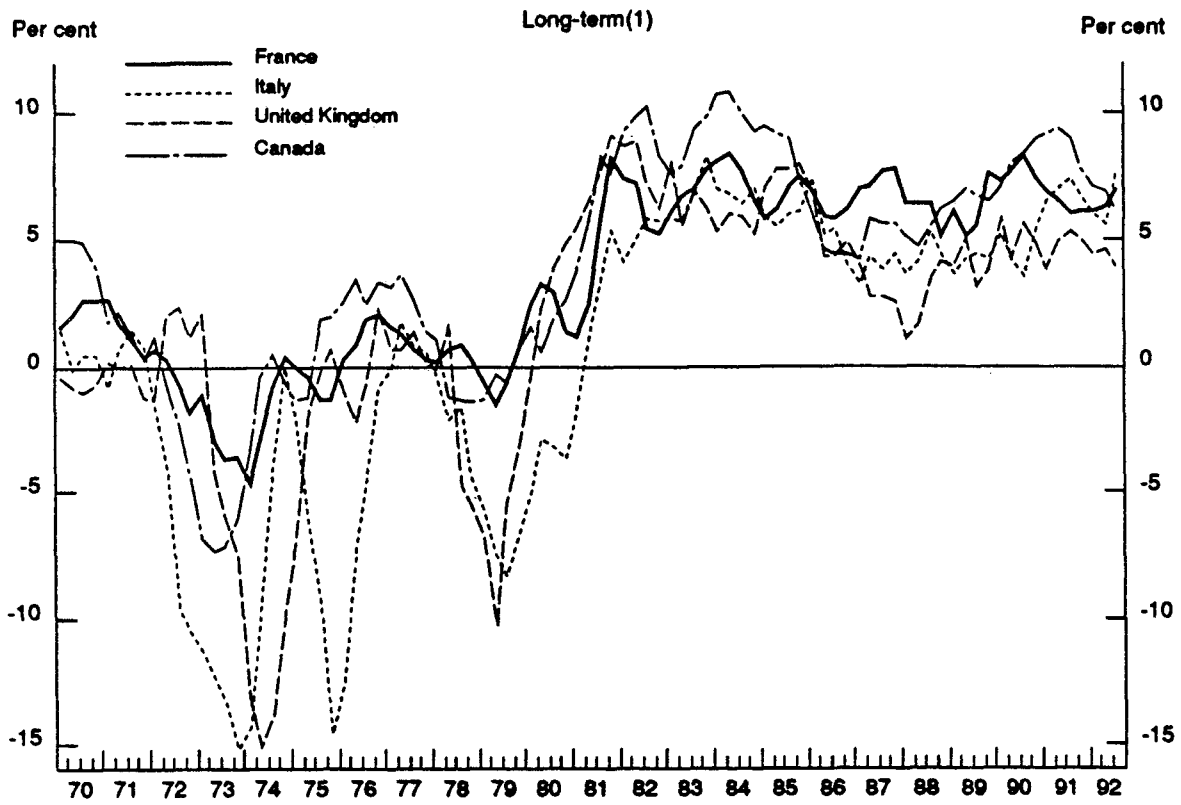
19
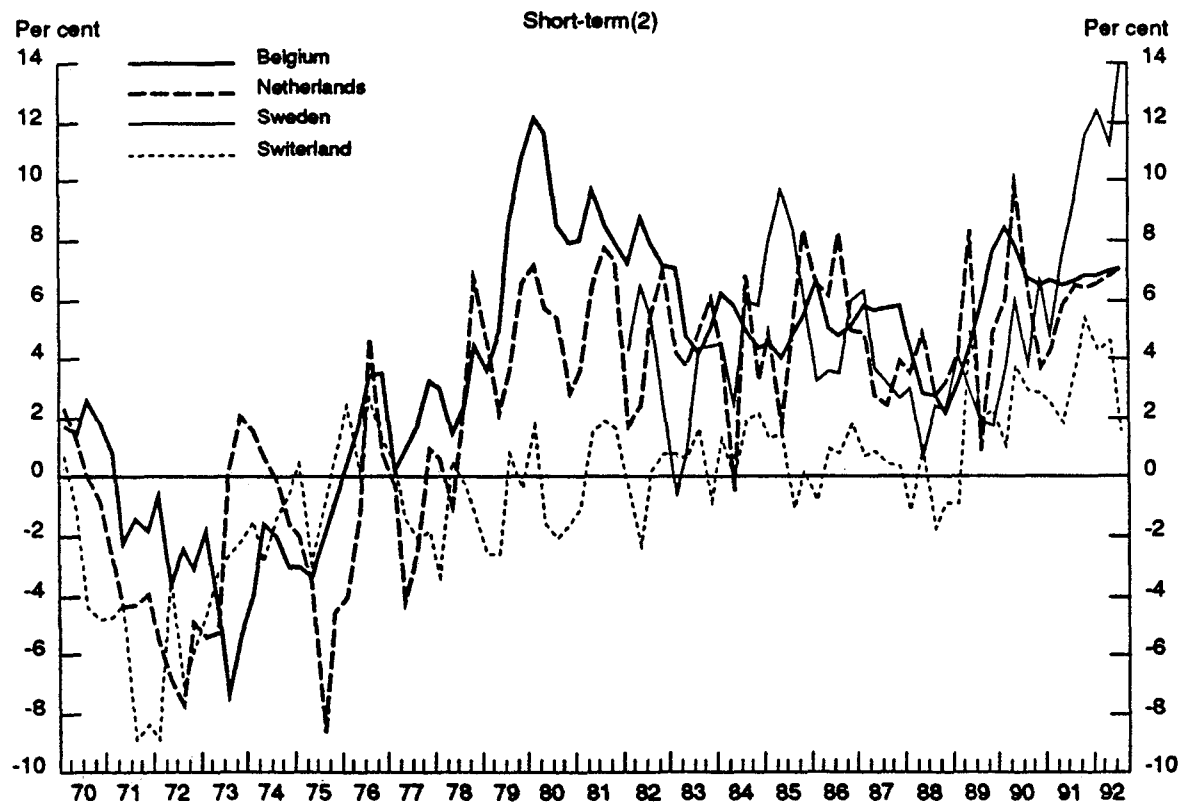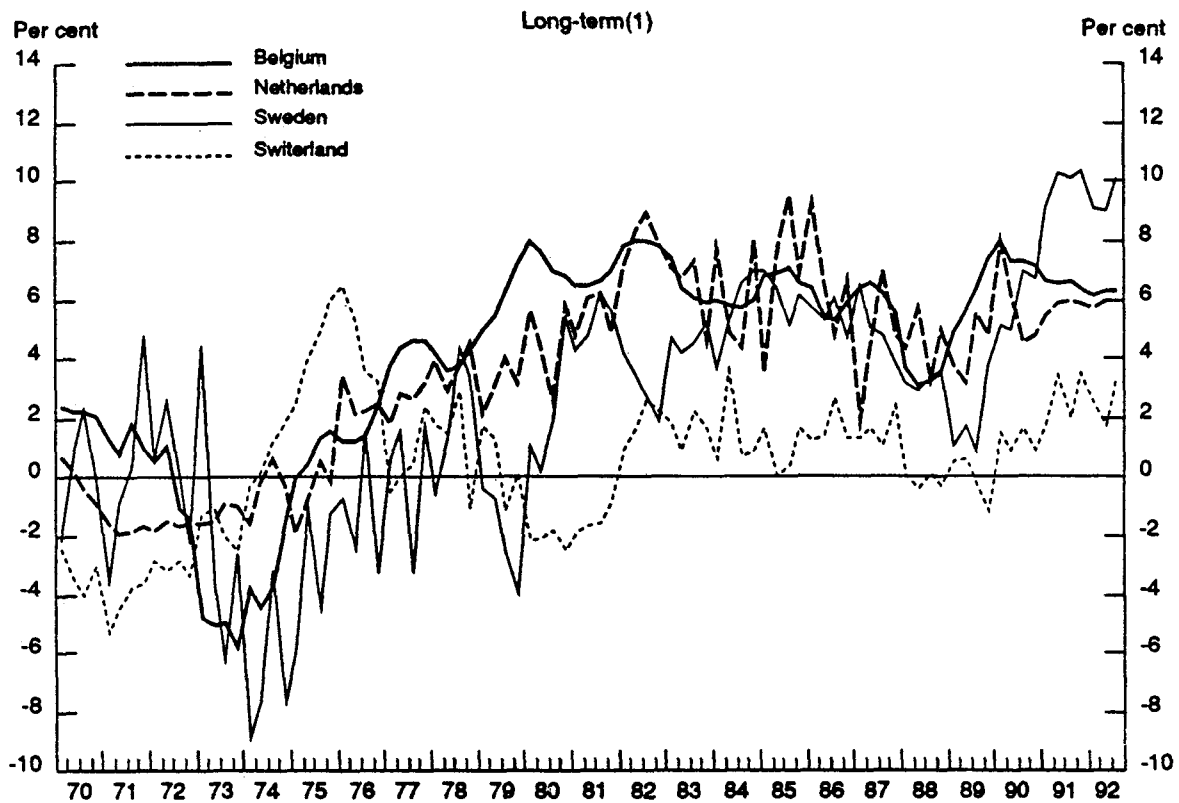
Chart 1

(continued)

Per cent   Long-term(1)   Per cent

France
Italy
United Kingdom
Canada

70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92

Per cent   Short-term(2)   Per cent

France
Italy
United Kingdom
Canada

70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92

Chart 1

(continued)

Long-term(1)

Per cent / Per cent

Belgium
Netherlands
Sweden
Switerland

Short-term(2)

Per cent / Per cent

Belgium
Netherlands
Sweden
Switerland

Chart 2. Cost of debt

Percentage points

Effective Real After/Tax Cost of Debt

Japan

Germany

United States

United Kingdom

1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992

Source: McCauley and Zimmer (1992).

Chart 3. Two sets of estimates of real cost of equity
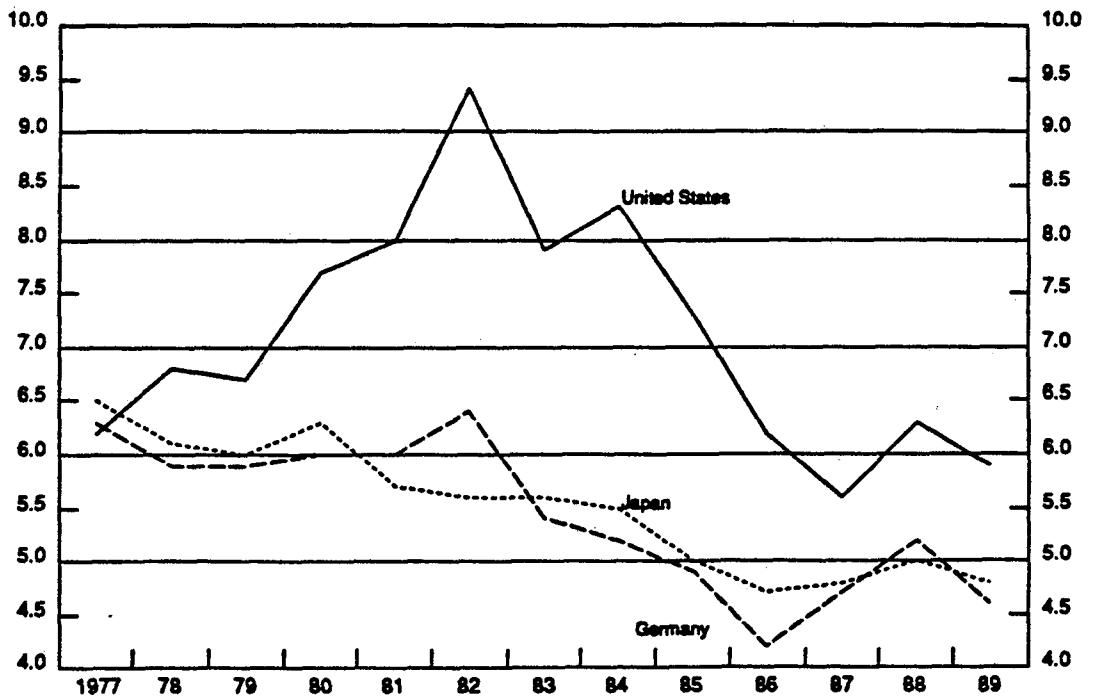
A. McCauley and Zimmer (1992)

B. Malkiel (1992)
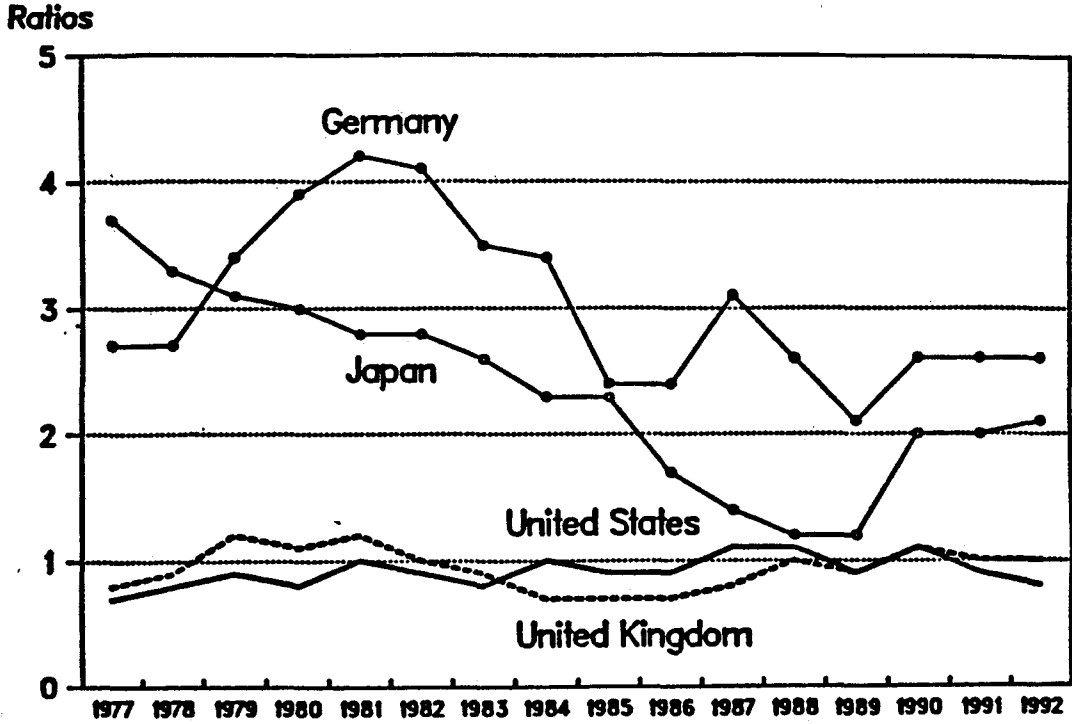
Chart 4. Price-earnings multiples of equity carve-outs
relative to US and Japanese markets

Note: Price-earnings ratios for Japan and the United States are taken from Morgan Stanley Capital International; price-earnings ratios for the subsidiaries, based on initial public offering prices, are computed using one-year lagged earnings.

* The parent company price-earnings ratio used for Levi Strauss is from September 1985, when management took the company private.

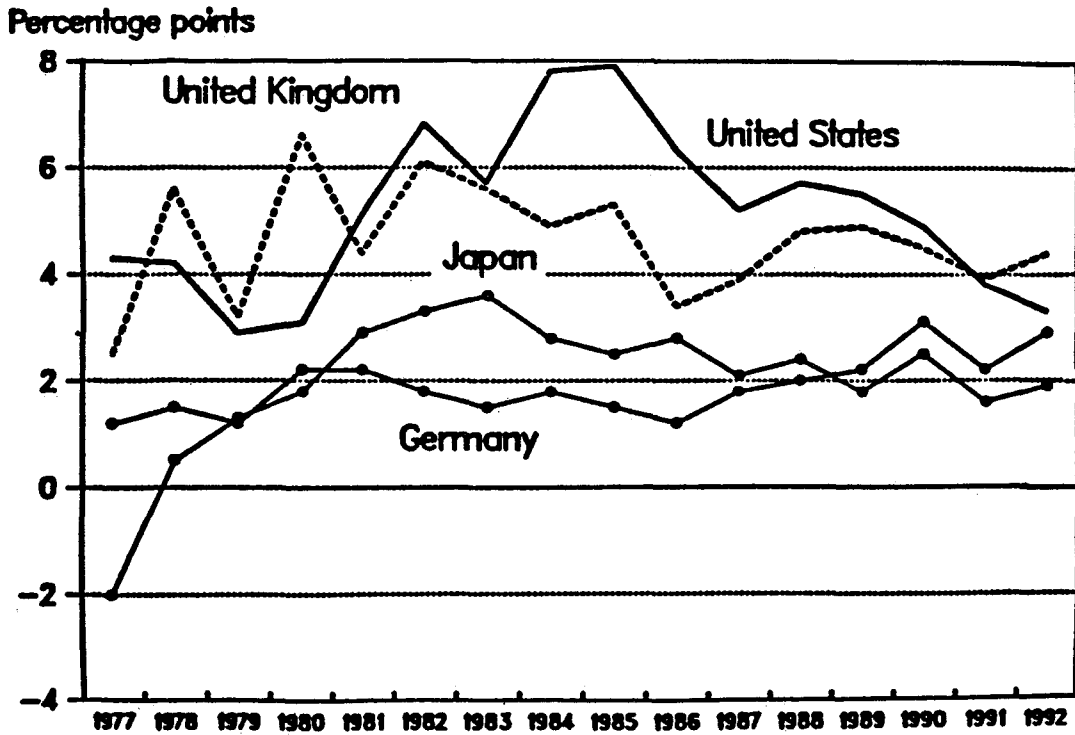*Source:* Fikre (1991).

24

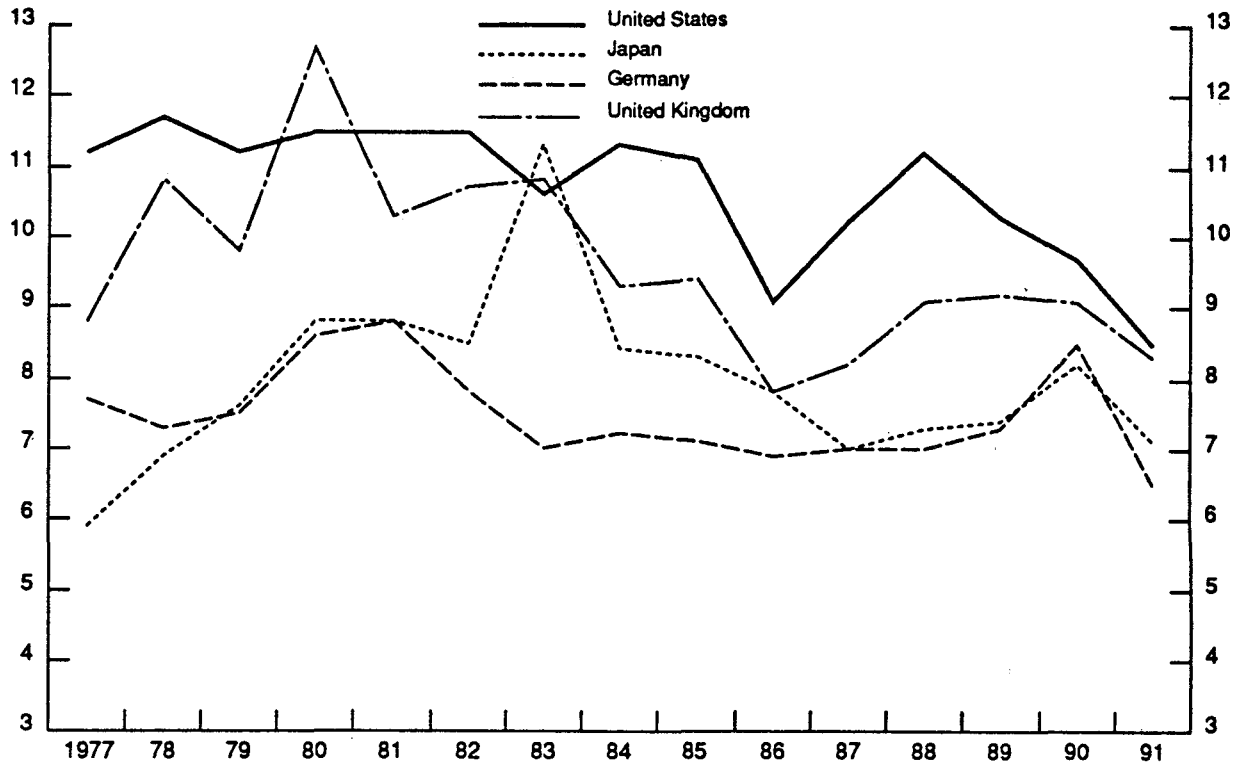## Chart 5 Debt/market equity ratios

Source: McCauley and Zimmer (1992)

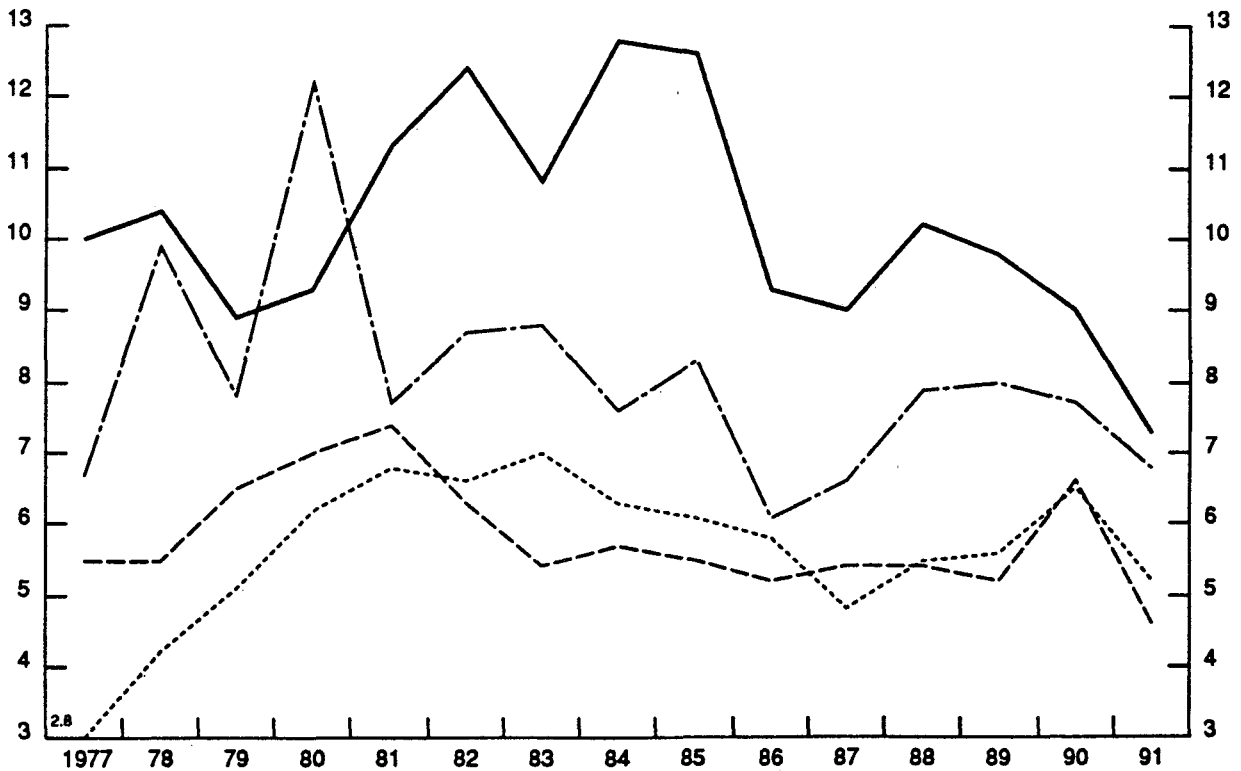## Chart 6. Real after-tax cost of funds

Source: McCauley and Zimmer (1992)

Chart 7
User cost of capital for two types of investment
A. Equipment and machinery with physical life of 20 years

Legend:
— United States
.... Japan
— — Germany
—·— United Kingdom

B. Factory with physical life of 40 years

Source : McCauley and Zimmer (1992).

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