# THE ORIGINS OF HIGH REAL INTEREST RATES

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# INTRODUCTION

During recent years real interest rates have appeared to be relatively high in most OECD countries. This has not prevented the recovery from proceeding (more rapidly in the United States and Japan than in Europe), nor has it apparently had a major adverse effect on business fixed investment, which has grown strongly in some countries (e.g. the United States and the United Kingdom). However, there is a concern that the persistence of high real interest rates may contribute to a slowdown in economic activity. Furthermore, high interest rates – both nominal and real – have exacerbated the difficulties of a number of heavily indebted developing countries, adversely affecting OECD exports and threatening widespread problems in the international banking system. As such, they have become a matter of concern almost everywhere.

This paper addresses a number of questions that have arisen in the context of the apparently high real interest rates which have prevailed during the **1980s.** The analysis is on a cross-country basis, and focuses on the member countries of the Group of Ten[1]. Part I examines the past behaviour of alternative measures of real interest rates and considers to what extent they are now high in historical terms. Part II discusses a number of domestic factors which may have contributed to unusual upward pressure on interest rates: macroeconomic policy influences; improvement in the real returns on investment; the tax system: uncertainty about future inflation: and financial market deregulation. The international aspect of real interest rate determination is then considered in Part III, in terms of the transmission of high rates from one country to another. A final section summarizes the arguments and offers some concluding remarks.

## I. THE BEHAVIOUR OF ALTERNATIVE MEASURES OF REAL INTEREST RATES

### A. Conceptual issues

There is no simple measure of *the* interest rate, either in nominal or real terms. Available financial instruments offer a range of yield opportunities to savers reflecting maturity, marketability and risk. Borrowers face different rates depending

on their creditworthiness, the proximate purpose of the borrowing and the length of time they wish to take to repay. Tax considerations also affect the interest rate calculations of both savers and borrowers. Evaluating a real interest rate involves an even wider range of possibilities since various measures of inflation are available. These considerations are largely ignored in what follows. For each country considered, a representative money market interest rate and a low-risk long-term bond rate have been selected and, unless explicitly stated to the contrary, all measures of real interest rates are based on these nominal rates. Consumer price indices, which are available for long periods of time, have been used to measure inflation.

Saving and borrowing decisions are foward-looking, so the nominal interest rates ought, in principle, to be adjusted for ***expected*** inflation. Expectations are not directly observable, however, and the most common practice is to use a measure of past inflation. In what follows, calculations based on observed past inflation will be called ***conventional*** real interest rates. These have the virtue of simplicity, but they can only be justified if expectations are static or extrapolative, *so* that future inflation is anticipated to be the same as in the past. Measures of real interest rates based on various estimates of expected inflation, where this differs from past inflation, are also provided: these are called ex ***ante*** real rates.

A third notion of the real interest rate is the real return that is in fact earned over the life of a financial asset. This will be called the ***ex*** post real interest rate. This is not a behavioural concept, as it can not be known when a financial decision is taken. The difference between ***ex post*** and ***ex ante*** real interest rates reflects the extent to which expectations proved to be wrong. These errors imply that lenders have made unanticipated capital gains and losses, and the accumulated experience of such gains and losses may influence future financial decisions by inviting reconsideration of the way expectations are formed, by changing perceptions of risk and by redistributing wealth.

## B. Quantitative assessment

The first panel of Charts 1-11 shows the behaviour of the nominal interest rates considered. The second and third panels compare the behaviour of the short-term interest rates in real terms, calculated ***conventionally*** by subtracting the change in consumer prices during the previous twelve months, with alternative measures of ex ***ante*** real rates. The following methods of adjusting for inflation have been made for ***ex ante*** short rates:

*i)* OECD forecasts of inflation for the year to come;

*ii)* Survey data, which is available for seven countries (the United States, Germany, France, the United Kingdom, Italy, Belgium and the Netherlands); and

## Table 1. Summary of behaviour of various measures of real short-term interest rates

**Per cent per annum**

| | | Conventional | *Ex ante* | | | | *Ex post* |
|---|---|---|---|---|---|---|---|
| | | | Survey based | Forecast based | Autoregressive | | |
| | | | | | Simple | Recursive | |
| **United States** | 1981-84 | 5.41 | 5.46 | 5.46 | 6.78 | 6.57 | 6.77 |
| | 1976-80 | -0.54 | 1.21 | 1.07 | 0.34 | 0.20 | –0.70 |
| | 1971-75 | 0.01 | 1.99 | 0.70 | 0.50 | 0.66 | 0.08 |
| | 1966-70 | 1.25 | 2.66 | 2.40 | 0.88 | 1.77 | 1.11 |
| | 1961-65 | 1.89 | 2.18 | . . | 1.15 | 1.88 | 1.75 |
| | 1956-60 | 0.79 | . . | . . | . . | . . | 0.69 |
| **Japan** | 1981-84 | 3.78 | . . | 3.74 | 2.44 | 2.14 | 4.55 |
| | 1976-80 | 0.20 | . . | 0.76 | –0.17 | –1.55 | 0.83 |
| | 1971-75 | –3.44 | . . | –0.24 | -0.04 | –0.33 | –2.95 |
| | 1966-70 | 1.76 | . . | 3.73 | 1.54 | 1.94 | 1.82 |
| | 1961-65 | 2.13 | . . | . . | 2.17 | 1.41 | 2.21 |
| **Germany** | 1981-84 | 3.87 | 5.43 | 5.06 | 4.46 | 4.26 | 4.74 |
| | 1976-80 | 1.59 | 2.25 | 2.19 | 2.01 | 1.92 | 1.57 |
| | 1971-75 | 1.82 | 3.05 | 2.10 | 2.62 | 2.64 | 1.99 |
| | 1966-70 | 3.35 | . . | 2.82 | 3.07 | 3.66 | 3.25 |
| | 1961-65 | 1.25 | . . | . . | 1.24 | 2.37 | 1.06 |
| **France** | 1981-84 | 2.9 1 | 4.07 | 3.88 | 4.83 | 4.79 | 4.32 |
| | 1976-80 | –1.21 | -0.17 | –0.40 | 0.37 | 1.13 | –1.00 |
| | 1971-75 | -0.71 | 0.71 | 0.05 | 0.11 | 2.1 1 | –0.87 |
| | 1966-70 | 2.40 | . . | 3.54 | 1.11 | 1.92 | 2.19 |
| | 1961-65 | 0.33 | . . | . . | –1.28 | –1.53 | 0.30 |
| **United Kingdom** | 1981-84 | 3.23 | 4.32 | 3.77 | 3.14 | 2.20 | 4.50 |
| | 1976-80 | –3.42 | –0.62 | –1.59 | –1.51 | –7.26 | –1.59 |
| | 1971-75 | –4.72 | –7.14 | –3.81 | –2.55 | –5.14 | –4.82 |
| | 1966-70 | 2.16 | . . | 2.89 | 1.64 | 2.93 | 1.61 |
| | 1961-65 | 1.20 | . . | . . | 0.29 | 1.28 | 1.14 |
| **Italy** | 1981-84 | 3.18 | 0.24 | 4.94 | 4.60 | 3.90 | 5.61 |
| | 1976-80 | –2.75 | –3.16 | –1.82 | –0.66 | –1.09 | –2.12 |
| | 1971-75 | –2.94 | –3.51 | –2.38 | –1.49 | –2.46 | –3.05 |
| **Canada** | 1981-84 | 4.84 | . . | 5.85 | 6.20 | 5.71 | 6.46 |
| | 1976-80 | 1.39 | . . | 2.61 | 2.29 | 2.27 | 1.29 |
| | 1971-75 | -0.28 | . . | 0.74 | -0.15 | -0.29 | -0.82 |
| | 1966-70 | 2.97 | . . | 3.77 | 2.82 | 3.49 | 3.33 |
| | 1961-65 | 2.57 | . . | . . | 1.90 | 2.92 | 2.31 |
| | 1956-60 | 2.34 | . . | . . | . . | . . | 2.21 |
| **Belgium** | 1981-84 | 5.16 | 7.85 | 5.37 | 6.04 | 5.98 | 5.82 |
| | 1976-80 | 3.44 | 5.19 | 4.40 | 4.37 | 4.28 | 3.89 |
| | 1971-75 | –2.00 | –2.08 | –1.66 | –1.44 | –2.59 | –2.33 |
| | 1966-70 | 2.38 | . . | . . | 2.10 | 2.80 | 2.55 |
| | 1961-65 | 1.41 | . . | . . | 0.15 | 1.97 | 1.01 |
| | 1956-60 | 1.89 | . . | . . | . . | . . | 2.25 |

Table 1. **Summary of behaviour of various measures of real short-term interest rates *(continued)***

**Per cent per annum**

| | | | *Ex* ante | | | | *Ex post* |
|---|---|---|---|---|---|---|---|
| | | Conventional | Survey based | Forecast based | Autoregressive | | |
| | | | | | Simple | Recursive | |
| | | Averaae for period* | | | | | |
| **Netherlands** | 1981-84 | 2.82 | 3.1 1 | 3.78 | 2.44 | 2.18 | 3.64 |
| | 1976-80 | 0.80 | 1.30 | 2.48 | 1.04 | -0.22 | 1.25 |
| | 1971-75 | –4.09 | –3.80 | –2.90 | –2.55 | –2.23 | –3.94 |
| | 1966-70 | 0.39 | .. | .. | 0.19 | 1.68 | 0.50 |
| | 1961-65 | -0.70 | .. | .. | .. | .. | –1.61 |
| **Sweden** | 1981-84 | 2.76 | .. | 3.79 | 3.55 | 3.29 | 3.95 |
| | 1976-80 | –2.33 | .. | 0.00 | –0.86 | –0.94 | –2.08 |
| | 1971-75 | –2.64 | .. | –2.94 | –1.98 | –0.40 | –2.49 |
| | 1966-70 | 1.99 | .. | .. | 1.65 | 2.92 | 1.89 |
| | 1961-65 | 0.85 | .. | .. | 0.00 | 1.70 | .. |
| **Switzerland** | 1981-84 | 0.37 | .. | 1.85 | 0.98 | 0.87 | 1.16 |
| | 1976-80 | -0.25 | .. | 0.12 | -0.73 | –0.69 | 0.74 |
| | 1971-75 | –4.01 | .. | –1.96 | –2.19 | –3.16 | –3.21 |
| | 1966-70 | 0.89 | .. | .. | 0.80 | 1.30 | 0.81 |
| | 1961-65 | –0.41 | .. | .. | -0.39 | 1.38 | –0.86 |

• **Beginning and end points of data series differ from country to country and depend on the measure of real interest rates. Averages shown in table are simple averages of existing data for the period in question. See Annex I for details of calculations.**

*iii)* Predictions derived from an autoregressive model of inflation (i.e. which treats current price increases solely as a function of a constant and past values of inflation), following two different procedures.

The fourth panel of Charts 1-11 compares conventional real long term rates with *ex post* values of real long term rates, on an annual basis, assuming five- and ten-year maturities. There are few available means of adjusting long term rates for future inflation, but two are used to provide the series shown in Chart 12. Survey data for inflation expectations over a ten-year horizon have existed for the United States since 1980, and an ***ex*** ante series, shown in the first panel, is derived from this data. A second series, shown in the second panel, consists of the yields on index-linked Treasury bonds in the United Kingdom, securities which have existed since 1981. Details of all calculations of real interest rates are provided in Annex I.

The behaviour of the various alternative measures of real interest rates presented in the charts is summarized in Tables 1 and 2. Table 1 also summarizes the behaviour of ***ex*** post real short-term rates, i.e. nominal rates adjusted for actual inflation in the following period.

| | | Conventional | *Ex ante* Survey based | Index linked | *Ex post* 5-year maturity | *Ex post* 10-year maturity |
|---|---|---|---|---|---|---|
| | | Average for period[1] | | | | |
| **United States** | 1981-84 | 5.41 | 5.18 | .. | .. | .. |
| | 1976-80 | -0.67 | 2.38 | .. | –1.36 | .. |
| | 1971-75 | -0.46 | .. | .. | –1.44 | –1.96 |
| | 1966-70 | 1.23 | .. | .. | 0.16 | –0.88 |
| | 1961-65 | 2.76 | .. | .. | 1.30 | 0.15 |
| | 1956-60 | 2.51 | .. | .. | 2.71 | 1.41 |
| **Japan** | 1981-84 | 4.92 | .. | .. | .. | .. |
| | 1976-80 | 1.39 | .. | .. | 2.87 | .. |
| | 1971-75 | –2.86 | .. | .. | –1.22 | 0.20 |
| | 1966-70 | 3.00 | .. | .. | 0.61 | –0.31 |
| | 1961-65 | 2.20 | .. | .. | 4.11 | 2.97 |
| **Germany** | 1981-84 | 4.24 | .. | .. | .. | .. |
| | 1976-80 | 3.24 | .. | .. | 2.27 | .. |
| | 1971-75 | 2.90 | .. | .. | 3.83 | 3.90 |
| | 1966-70 | 4.70 | .. | .. | 2.72 | 2.51 |
| | 1961-65 | 3.41 | .. | .. | 3.36 | 2.63 |
| | 1956-60 | 4.58 | .. | .. | 4.15 | 3.90 |
| **France** | 1981-84 | 3.97 | .. | .. | .. | .. |
| | 1976-80 | 0.68 | .. | .. | –0.83 | .. |
| | 1971-75 | 0.34 | .. | .. | –0.97 | –1.65 |
| | 1966-70 | 3.10 | .. | .. | 0.94 | –0.53 |
| | 1961-65 | 1.88 | .. | .. | 1.90 | 0.74 |
| **United Kingdom** | 1981-84 | 4.45 | .. | 3.26 | .. | .. |
| | 1976-80 | –1.12 | .. | .. | 1.93 | .. |
| | 1971-75 | –1.68 | .. | .. | –3.38 | –3.01 |
| | 1966-70 | 3.33 | .. | .. | –0.22 | –2.79 |
| | 1961-65 | 2.48 | .. | .. | 2.07 | 0.33 |
| **Italy** | 1981-84 | 3.83 | .. | .. | .. | .. |
| | 1976-80 | –1.83 | .. | .. | –2.78 | .. |
| | 1971-75 | –2.21 | .. | .. | –6.02 | –6.73 |
| | 1966-70 | 4.76 | .. | .. | 0.89 | –2.58 |
| | 1961-65 | 1.21 | .. | .. | 2.71 | 1.60 |
| **Canada** | 1981-84 | 4.06 | .. | .. | .. | .. |
| | 1976-80 | 1.22 | .. | .. | –0.25 | .. |
| | 1971-75 | 0.55 | .. | .. | –0.79 | –1.37 |
| | 1966-70 | 2.92 | .. | .. | 1.76 | 0.23 |
| | 1961-65 | 3.51 | .. | .. | 2.02 | 1.20 |
| | 1956-60 | 2.50 | .. | .. | 2.88 | 2.19 |

**Table 2. Summary of behaviour of various measures of real long-term interest rates *(continued)***

Per cent per annum

| | | Conventional | *Ex ante* Survey based | Index linked | *Ex post* 5-year maturity | *Ex post* 10-year maturity |
|---|---|---|---|---|---|---|
| **Belgium** | 1981-84 | 5.00 | .. | .. | .. | .. |
| | 1976-80 | 3.27 | .. | .. | 2.23 | .. |
| | 1971-75 | –0.61 | .. | .. | -0.65 | -0.37 |
| | 1966-70 | 3.51 | .. | .. | 1.62 | 0.34 |
| | 1961-65 | 3.29 | .. | .. | 2.32 | 1.54 |
| | 1956-60 | 3.60 | .. | .. | 3.74 | 2.92 |
| **Netherlands** | 1981-84 | 4.96 | .. | .. | .. | .. |
| | 1976-80 | 2.74 | .. | .. | 2.88 | .. |
| | 1971-75 | -0.32 | .. | .. | 0.54 | -0.78 |
| | 1966-70 | 2.20 | .. | .. | 0.32 | –0.10 |
| | 1961-65 | 1.48 | .. | .. | 0.11 | –0.78 |
| | 1956-60 | .. | .. | .. | 1.34 | 0.60 |
| **Sweden** | 1981-84 | 2.99 | .. | .. | .. | .. |
| | 1976-80 | -0.42 | .. | .. | -0.69 | .. |
| | 1971-75 | –0.46 | .. | .. | –1.97 | –2.42 |
| | 1966-70 | 2.11 | .. | .. | 0.48 | -0.92 |
| | 1961-65 | 1.85 | .. | .. | 1.12 | 0.40 |
| | 1956-60 | 1.08 | .. | .. | 1.85 | 1.48 |
| **Switzerland** | 1981-84 | –0.10 | .. | .. | .. | .. |
| | 1976-80 | 1.77 | .. | .. | –0.09 | .. |
| | 1971-75 | –1.81 | .. | .. | 1.44 | 1.15 |
| | 1966-70 | 1.29 | .. | .. | -0.79 | -0.30 |
| | 1961-65 | 0.23 | .. | .. | -0.15 | –1.01 |

• See note to Table 1.

Several broad features emerge:

*i)* The widely held view that real interest rates, conventionally measured, have been high in recent years is, for most countries, correct. For the United States, Italy, Canada and perhaps the United Kingdom, there is little precedent for these levels, while for Japan, Germany, France, Belgium, the Netherlands and Sweden levels near those prevailing recently have occurred at times in the past. Generally, however, it is necessary to *go* back to the 1960s to find a precedent. Only in Switzerland have interest rates not been high in relation to inflation.

*ii)* The various methods of measuring *ex ante* real interest rates broadly confirm this impression. Few indicate that real interest rates during the

past few years are significantly lower than suggested by the conventional measure. The principal exceptions in this regard are the autoregressive approaches to expected inflation which suggest that ***ex ante*** real rates in Japan have been comparatively low since **1982,** and that they were near zero in the United Kingdom during **1983.** Over long periods, the charts suggest that, occasionally, some differences between ex ***ante*** and conventional measures of real interest rates occur. In particular, the negative real interest rates which prevailed during much of the **1970s** in many countries, when measured conventionally, often appear substantially less negative on the basis of survey and forecast approaches to expected inflation. Sometimes, notably for the United States, France, Italy and Sweden autoregressive approaches indicate a similar pattern. This pattern reflects a tendency for these measures of expectations to have lagged behind the long-term upward trend in inflation, producing forecasting errors that were often negative.

*iii)* The differences between real long-term interest rates, as conventionally measured, and their ***ex post*** value has often been substantial. In many cases failure to anticipate the inflation of the **1973-75** period resulted in significantly negative real returns despite real rates that were apparently positive. Equally, the substantially negative conventional real interest rates existing around **1974-75** were not, except in Italy, generally realised ex post.

*iv)* Real returns on long-term investments in government bonds have often been low. ***Ex post*** real interest rates of 3 per cent or more have been exceptional. Germany is the only country where positive real returns have been paid consistently, although since the first oil shock this has also been the case in Japan, the United Kingdom, Belgium and the Netherlands.

*v)* The yield on index-linked bonds in the United Kingdom is striking. It has persistently been in the region of 3 per cent and in March **1985** stood at **3.7** per cent. Conventionally measured real long-term interest rates, and various ***ex ante*** measures of short-term real rates have often exceeded this. However, since 1960, higher yields than this on "safe" investments with either a five- or a ten-year maturity have been extremely rare. Given the frequency with which real yields have proved to be negligible or even significantly negative, index-linked bonds would appear to be a highly attractive investment.

## II. THE DOMESTIC FACTORS CONTRIBUTING TO HIGH REAL INTEREST RATES

### A. Macroeconomic policy influences

The single most widely perceived source of pressure on real interest rates is the Federal budget deficit in the United States. Following the tax cuts which were passed in **1981** and the rapid growth of defence expenditures the Federal deficit rose from 2 per cent of GNP in fiscal year **1981** to nearly 5 per cent of GNP in fiscal year **1984.** While the U.S. administration foresees a reduction by **1989** to around 2.5 per cent of GNP, many forecasters regard this as optimistic and expect continued increases in the deficit even if real economic growth should continue strongly[2]. Furthermore, the increase in the deficit has been to a substantial extent "structural", rather than a reflection of cyclical developments, and this trend is expected to continue throughout the decade.

Such large budget deficits in the United States contribute in three ways to higher real interest rates. First, the increased spending and higher demand for funds in credit markets due to these deficits tend to raise nominal interest rates relative to inflation if monetary growth is held unchanged. Second, to the extent that these deficits are expected to persist, real interest rates may be expected to be high in the future. Rational financial investors and borrowers will take account of these likely future developments in making their decisions now, which will lead to high real interest rates immediately, at least at the long end of the term structure. Third, the persistence of large U.S. budget deficits could lead, in the future, to rising government indebtedness and debt interest payments. Financial markets might be concerned that such a situation would not be corrected by fiscal retrenchment but would instead force the authorities to allow excessive monetary accommodation. Thus inflationary expectations would remain high relative to current price performance, which would contribute to higher nominal interest rates. As a result, real interest rates would be high measured conventionally, although they might not necessarily be high on an ex ante basis.

While the Federal deficit in the United States is undoubtedly a force acting to keep real interest rates higher than otherwise, the effect of fiscal policies more generally seems less clear. First, state and local governments in the United States are substantially in surplus, *so* the general government deficit is appreciably less than the Federal deficit. Although the surpluses of state and local governments have not been rising significantly over the past few years, *so* that the widening in the Federal deficit has largely been reflected in a comparable movement in the general government deficit, the latter has usually been less than the OECD average (see Table 3). Second, while deficits have increased substantially in France, Italy and

Table 3. General government financial balances[a]
Surplus (+) or deficit (–) as percentage of nominal GNP/GDP

| | 1979 | 1980 | 1981 | 1982 | 1983" | 1984" | 1985" | Changes 1979-1985 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Actual balance | Structural balance | Inflation-adjusted structural balance |
| United States | t0.6 | -1.2 | –0.9 | -3.8 | -4.1 | -3.4 | -3.7 | -4.3 | -3.3 | -4.4 |
| Japan | -4.8 | -4.5 | –4.0 | -3.6 | -3.5 | -2.6 | -1.2 | t3.6 | +3.6 | t3.7 |
| Germany | -2.7 | -3.1 | -3.8 | -3.4 | -2.7 | -2.2 | -1.4 | +1.3 | t3.4 | t3.3 |
| France | –0.7 | t0.2 | -1.8 | -2.5 | -3.3 | -3.3 | -3.8 | -3.1 | t0.5 | t0.5 |
| United Kingdom | -3.2 | -3.9 | -3.1 | -2.4 | -3.5 | -3.3 | -2.7 | t0.5 | t5.3 | +1.9 |
| Italy | -9.5 | -8.0 | -11.9 | -12.7 | -11.8 | -13.7 | -13.6 | –4.1 | -1.1 | -3.5 |
| Canada | -1.8 | -2.7 | -1.6 | -5.0 | -6.2 | -6.0 | -5.4 | -3.6 | -2.4 | -2.2 |
| Total for major seven OECD countries[c] | -1.7 | -2.5 | -2.6 | -4.1 | -4.3 | -3.8 | -3.6 | -1.9 | -0.3 | -1.3 |
| Total for 10 smaller OECD countries[c d] | -2.4 | -2.4 | -3.6 | -4.8 | -5.4 | -4.7 | -4.4 | -2.0 | -1.3 | -0.8 |
| Total for all 17 countries above[c] | -1.8 | -2.4 | -2.7 | -4.1 | -4.4 | -3.9 | -3.7 | -1.9 | -0.4 | -1.2 |

*a)* On a SNA basis except for the United States and the United Kingdom, Greece and the Netherlands, which are on a national income account basis.
*b)* OECD estimates and forecasts.
*c)* 1982 GNP/GDP weighted.
*d)* Australia, Austria, Belgium, Denmark, Finland, Greece, Netherlands, Norway, Spain, Sweden.
*Source:* OECD.

Canada since the beginning of the 1980s, they have fallen in Japan, Germany and the United Kingdom and governments in these countries are committed to consolidating the gains achieved so far. As a result, for the OECD as a whole, budget deficits have increased considerably less than in the United States. In 1985, actual deficits are projected to be only 1.9 per cent of GDP higher than in 1979, when they were generally at their lowest level since the first oil price rise. In structural terms (i.e. cyclically adjusted) budget balances are only slightly more in deficit, by 0.4 per cent of GNP, than they were in 1979, and even adjusted for inflation the move toward deficit has just been over 1 per cent of GDP. In a worldwide context, therefore, changes in the stance of fiscal policy have amounted less to a shift toward expansion then to a redistribution of government borrowing among major countries.

The increase in budget deficits in the OECD area as a whole since the late 1970s has taken place against a background of marked changes in monetary policies. Throughout the 1970s, monetary growth in many countries, while variable, was often maintained at high rates. This contributed to the low real interest rates

which often prevailed at the time, although at the cost of accelerations in rates of inflation. During the early 1980s, in order to reduce inflation and stabilize it at low rates, monetary growth rates were gradually brought down and they have generally been held below the rates which were experienced during the 1970s[3]. One of the by-products of these policies was high real interest rates, which led to the generally low levels of real demand and, hence, activity. Since 1982-83, inflation has broadly stabilized in many countries, and monetary policy has been accommodative of a recovery of activity, provided inflation remains low. While the upward pressure on real interest rates which arises as a consequence of deflationary monetary policies has therefore eased in most countries (France, Italy, and Belgium being the main exceptions), monetary policies remain non-accommodative of increases of inflation. In this circumstance interest rates have had to reflect not only the need to finance larger budget deficits but also the balance between supply and demand for funds more fully than they did in the 1970s. Thus the shift in the fiscal/monetary mix in recent years has been greater than the shift in fiscal stance alone.

## B. Improved profitability of investment

An improvement in the real returns on investment, in an environment which allows the private sector to take advantage of it, is a second factor which could work to raise real interest rates. If there has been an increase in the number of investment projects which promise an unusually high return, the financing requirements should lead to an increase in credit demands. A number of observers have argued that such an improvement in the likely returns on new investment has taken place in recent years, particularly in the United States. Furthermore, measures have been taken to ease the burden of regulation, and confidence has improved because of lower inflation and greater macroeconomic stability, so the private sector has been prepared to take advantage of these higher returns on investment more quickly than they would have done in the past. This may have contributed importantly to high real interest rates.

The validity of this thesis is very difficult to assess empirically. From Table 4 it can be seen that in many countries there has been a cyclical recovery in companies' profitability since the trough of the recent recession in 1982. However, this development follows a secular decline over the past twenty years. After two years of recovery, profitability – while higher than in 1982 – remains, in many countries, below its average during the 1970s and even further below its average during the 1960s. Although some of the recent improvement may be more than cyclical, this trend is not suggestive of high returns to investment. However, the data considered refer only to the actual return on the outstanding capital stock, whereas it is the (expected) return to new investment which is relevant.

Assuming a homogeneous aggregate capital stock, a device widely used in

Table 4. **Rates of return on capital**

Gross operating surplus as a percentage of the gross capital stock

| | | 1960s average | 1970s average | 1982 | 1984* |
|---|---|---|---|---|---|
| United States | A | 17.5 | 13.8 | 10.9 | |
| | B | .. | .. | .. | .. |
| | C | 22.2 | 16.8 | 10.6 | 16.5 |
| Japan | A | .. | .. | .. | .. |
| | B | .. | .. | .. | .. |
| | C | 36.5[a] | 26.4 | 21.4* | 25.5 |
| Germany | A | 20.5 | 16.8 | 14.5[b] | .. |
| | B | 17.2 | 13.6 | 11.0[b] | .. |
| | C | 20.9 | 15.7 | 12.0* | 13.8 |
| France | A | 22.4[c] | 21.2 | .. | .. |
| | B | 15.0[c] | 14.3 | .. | .. |
| | C | 15.6* | 16.0 | 10.7* | 12.3 |
| United Kingdom | A | 12.6 | 10.0 | 10.1 | .. |
| | B | 9.3 | 7.8 | 8.8 | .. |
| | C | 13.7 | 8.1 | 5.5 | 6.0 |
| Italy | A | .. | .. | .. | .. |
| | B | .. | .. | .. | .. |
| | C | 18.3*[d] | 15.3 | 16.3* | 16.5 |
| Canada | A | 13.5 | 12.5 | 9.7 | .. |
| | B | 10.7 | 9.8 | 7.5 | .. |
| | C | 15.2 | 13.1 | 6.7 | 9.9 |
| Belgium | A | .. | 26.1 | 22.9[b] | .. |
| | B | .. | 15.9 | 14.6[b] | .. |
| | C | .. | 13.7 | 12.2" | 14.1 |
| Sweden | A | 11.7[e] | 19.1 | 8.3 | .. |
| | B | 9.8[e] | 7.9 | 7.2 | .. |
| | C | 11.6[e] | 7.9 | 5.9 | 9.2 |

*a)* 1965-69;
*b)* **1981;**
*c)* **1967-69;**
*d)* **1961-69;**
*e)* **1963-69.**
• OECD Secretariat estimates.

Note: A = Total business sector (GDP excluding value added by government, financial and farm sectors).
B = Industry and transport (mining and quarrying, manufacturing, gas, electricity and water, construction, transport, storage and communication).
C = Manufacturing industry.

***Source:*** OECD.

empirical work, the secular decline in company profitability would be indicative of a persistent tendency for new investments to increase the capital intensity of production generally, driving down the rate of return on **all** capital, old and new. However, such an interpretation, which is based on a very simplified concept of capital, must be treated with caution. If the heterogeneity of the capital stock is recognized, and, setting aside the possibility that new investments might affect the return on existing capital, then the secular decline in average profitability could be taken as a simple arithmetic reflection of low returns on new, marginal, projects. Problems remain with this interpretation, however, as it assumes that *i)* physical depreciation, *ii)* changes in demand patterns, *iii)* obsolescence due to improvements in technology and *iv)* competition from producers using new investments have no adverse effects on the returns from old investments. Once these factors are taken into account it becomes impossible to conclude anything about returns on new investments from data referring to the outstanding capital stock.

If an underlying improvement in the real returns from new investment has in fact taken place, its roots must lie in an increase in the overall dynamism of the economy. In a static economic environment, characterized by fixed demand patterns, absence of supply shocks and no technical change, the only forces which would give rise to new investment opportunities would be population growth and the need to replace old equipment as it depreciates. Variations in real interest rates would therefore reflect the behaviour of other variables, such as budget deficits and savings behaviour. However, marked changes in the economic environment often create new investment opportunities. Among the factors which might contribute to such a development are: *i)* changes in demand patterns, whether due to changes in tastes, new regulatory policies or demographic shifts; *ii)* changes in primary product supply that appear likely to be long lived; and *iii)* technological improvements or other favourable supply side developments such as reductions in restrictive labour practices, increases in real wage flexibility, or relaxation of government regulations affecting the organisation of production or product development. If such developments have become more important, or if their pace of change has become more rapid, the result should be an increase in the number of new investment opportunities likely to yield a high return.

Examples of cases where changes in the economic environment have created new investment opportunities are easy to find, but can only be anecdotal[4]. They may be isolated cases, and they may be offset by developments elswhere[5]. Unfortunately, more comprehensive evidence on the rather imprecise proposition that the economy has become more dynamic is difficult to assemble. Even if there existed a satisfactory way to quantify such a concept, the fact that the alleged change has only taken place in the past few years would make it impossible to identify any underlying movement in trends from data that were inevitably influenced by random and cyclical factors. Furthermore, translation of opportunities into actual investment expenditures and associated financing needs depends on the private

sector's expectations, confidence and willingness to take risks in anticipation of higher rewards, which are intangible qualities. It must be concluded that there is no hard evidence that increased expected real returns of new investment account for high real interest rates.

Against this, it must be recognised that the secular decline in profitability on the outstanding capital stock has been an important policy concern in most OECD countries. Consequently, measures have been taken to improve profitability generally, and their effects on prospects for new investment should be favourable. In some countries these measures have included changes in taxation, discussed below, but also a wide variety of other supply-side measures. These have involved deregulation of entire industries, as in the airlines industry in the United States; partial deregulation, as in telecommunications in the United Kingdom; and simplifications of regulations, as with the proposed changes in pricing and trade law in Germany. These measures have been reinforced in some cases by labour market developments which promise to allow greater flexibility in organising production in work places, as well as making wages more responsive to market forces so that profits bear less of the burden of adjustment to change than has often been the case in the past.

## C. The impact *of* taxation

Many types of interest incomes are subject to tax, and interest payments can often be set against incomes when tax liabilities are assessed. Furthermore, that part of nominal interest payments which reflects anticipated inflation is normally treated in the same way as the real component. This implies that the relevant real interest rate faced by borrowers and lenders depends not only on the impact of both taxation and inflation on their interest payments and receipts, but also on their interaction. The complexity of modern tax systems is such that generalisations about "tax-adjusted real interest rates" are best avoided: the influence of the tax system on real interest rates depends on *i)* an individual borrower's or lender's particular tax situation; and *ii)* the use to which borrowed funds are put or the best alternative way in which a lender would use his money.

The impact of the tax system on financial behaviour broadly differs accbrding to sector[6]. For the personal sector, the main influence arises where interest payments are deductible to an important extent on borrowing to finance owner-occupied housing (this is the case in the United States, the United Kingdom, the Netherlands, Sweden and Switzerland) and consumers' expenditure (as in all the above countries except the United Kingdom). For these transactions nominal interest rates must be adjusted both for the appropriate marginal tax rate and inflation to assess the relevant perceived real rate. Here the tax system clearly works to reduce real interest rates as perceived by households and the distortion is greater the larger the premium

for anticipated inflation that is built into nominal rates. This must put upward pressure on nominal pre-tax interest rates.

Whereas most households in a position to borrow are normally liable to tax, the situation of companies is less subject to generalisation. For various reasons, such as an accumulation of past losses, some companies are effectively exempt from taxes or can defer payments almost indefinitely. This situation was widespread, for example, in the United Kingdom after **1975,** when provision of tax relief on the increases in the value of inventories nearly eliminated mainstream corporation tax in manufacturing. Unless tax relief can be transferred to someone who can use it (in some countries leasing is important in this regard), the tax system in this situation has little distorting effect on companies' financial behaviour. The discussion which follows applies to the effect of the tax system on companies actually facing tax liabilities.

Corporate borrowing is normally designed to finance investments in productive assets, and the interest payments can be set against income, including that from the asset, for purposes of calculating tax liabilities. In the absence of inflation, if depreciation allowances for tax purposes reflect economic depreciation the tax system does not affect a comparison between the return on a project and interest payments, as it affects them symmetrically. However, the tax treatment of depreciation may not reflect actual obsolescence, and inflation will interact with the tax system to affect companies' financial behaviour because the returns on a project, net of tax, will tend to rise with inflation, while interest payments, net of tax relief and allowable depreciation, do not[7]. If the inflation premium in nominal interest rates changes, so does the significance of this distortion. Furthermore, the real value of depreciation allowances is affected by both tax rates and inflation.

The quantitative significance **of** these distortions is difficult to assess. Table 5 reports estimates of borrowing for home mortgages and consumers' expenditure in selected OECD countries, together with estimates of borrowing by domestic non-financial sectors. There are major differences among countries in coverage and definition, so international comparisons **based** on these figures must be made cautiously. The table suggests some differences in behaviour between those countries where interest payments by households are deductible and others. In all countries personal sector borrowing is consistently dominated by home mortgages, and consumer credit is comparatively small. Where interest payments on mortgages are deductible to an important extent, as in the United States and the United Kingdom, personal sector borrowing has frequently exceeded the amount of funds raised in credit markets (inclusive of new equity issues) by the corporate sector and government. In France and Canada, however, where households' interest payments are not importantly deductible, personal sector borrowing has consistently been smaller than corporate or, in recent years, government borrowing. In Germany, where households' interest payments are also not deductible, available statistics do

## Table 5. Funds raised in financial markets by domestic non-financial sectors[a]

Per cent of GNP/GDP

| | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|
| **United States** | | | | | | |
| Personal | 7.4 | 4.6 | 4.3 | 3.1 | 5.3 | 6.6 |
| of *which:* | | | | | | |
| Home mortgages | 4.6 | 4.6 | 3.3 | 2.5 | 1.6 | 3.0 |
| Consumer credit | 1.9 | 0.2 | 0.9 | 0.7 | 1.6 | 2.6 |
| Corporate | 6.0 | 5.3 | 5.0 | 4.2 | 4.7 | 4.9 |
| General government | 1.6 | 3.3 | 3.1 | 5.5 | 5.7 | 5.2 |
| **Germany** | | | | | | |
| Personal (excl. housing) | 1.5 | 0.8 | 0.5 | 0.6 | 0.7 | 0.6 |
| Corporate (excl. housing) | 4.2 | 4.0 | 3.6 | 2.8 | 3.5 | 3.1 |
| Housing | 4.8 | 5.8 | 5.7 | 4.7 | 4.3 | 4.3 |
| General government | 3.0 | 3.7 | 5.0 | 4.3 | 3.4 | 2.7 |
| **France** | | | | | | |
| Personal | 4.1 | 3.3 | 2.8 | 3.0 | 2.7 | 2.5 |
| *of which:* | | | | | | |
| Home mortgages | 3.5 | 3.0 | 2.6 | 2.4 | 2.3 | 2.1 |
| Consumer credit | 0.6 | 0.3 | 0.2 | 0.6 | 0.4 | 0.4 |
| Corporate | 4.6 | 5.9 | 5.9 | 7.0 | 5.9 | 4.8 |
| Central government | 2.2 | 2.0 | 3.3 | 3.4 | 4.4 | 4.3 |
| **United Kingdom** | | | | | | |
| Personal | 5.1 | 4.5 | 6.3 | 6.8 | 6.6 | 6.6 |
| *of which:* | | | | | | |
| Home mortgages | 3.1 | 3.2 | 4.1 | 5.1 | 4.8 | 5.2 |
| Consumer credit | 1.0 | 0.7 | 1.1 | 0.9 | 1.1 | 1.0 |
| Corporate | 3.3 | 3.4 | 3.1 | 2.9 | 1.5 | 3.2 |
| General government | 6.2 | 5.5 | 5.0 | 2.1 | 4.0 | 3.1 |
| **Canada** | | | | | | |
| Personal | 10.3 | 6.8 | 6.4 | 1.4 | 4.0 | 3.5 |
| *of which:* | | | | | | |
| Home mortgages | 4.8 | 3.2 | 2.2 | 1.1 | 3.3 | 2.3 |
| Consumer credit | 1.8 | 1.6 | 1.3 | 0.1 | 0.5 | 1.2 |
| Corporate | 10.6 | 10.1 | 14.5 | 4.9 | 2.5 | 4.7 |
| General government | 3.6 | 6.0 | 5.9 | 8.3 | 8.8 | 8.3 |

a) Figures for corporate sector include new equity issues. General government sectors exclude public sector corporations and financial institutions. In the case of France, some local government authorities are not included.

Source: United States, Flow of Funds *Accounts;* Germany, Flow of Funds Statistics; France, figures provided by the Banque de France; United Kingdom, Bank of England Quarterly Bulletin, Financial Statistics; Canada, Flow of Funds Statistics.

not distinguish between personal and business borrowing for residential construction and home purchases, so comparisons of overall sectoral totals are impossible. Given that the corporate sector carries out a substantial share of total residential construction in Germany, however, it is likely that a significant portion of housing financing should be allocated to the corporate sector. In this case the pattern in Germany would be similar to that in France and Canada.

With regard to corporations, a useful notion for analysing the interaction between taxation and inflation on companies' financial decisions is the maximum payable interest rate (MPIR)[8]. This is the highest nominal interest rate at which undertaking a particular project could be justified, given expected inflation over the life of the project and the operation of the tax system. Ignoring risk considerations and assuming that the implications for debt-equity ratios are not a constraint at the margin, the difference between the MPIR and the project's internal rate of return (in the absence of inflation and taxation) measures the joint effect of these on the interest rate which firms would be prepared to pay to finance the project. It thus measures the maximum potential distortion to market rates introduced by these two factors.

Table 6 reports the recent behaviour of the MPIR in selected countries for a hypothetical investment in equipment with an expected ten-year life. While the calculations are specific to the investment in question, they are indicative of relative magnitudes of the effect of inflation and taxation on a range of investments. The expected internal rate of return on the project, in the absence of expected inflation or taxation is assumed to be 10 per cent. Since this would be the MPIR in such conditions, the MPIR less 10 per cent measures the distortions due to taxation and inflation. Expected inflation is taken to be given by OECD forecasts, and the tax system in effect in the middle of the year is assumed to last indefinitely, except in the United States in 1981. Calculations for this country are based on the provisions of the Economic Recovery Tax Act (ERTA) which was passed later in the year. Further details are provided in Annex II.

The calculated MPIRs are generally much higher than 10 per cent, although, adjusted for taxation in the conventional way, they are invariably below 10 per cent in real terms. Where inflation was expected to be low and depreciation allowances were designed to reflect actual obsolescence, as in Japan, except at the time of the first oil crisis, and Germany throughout most of the period, the distortions attributable to the tax system were small (line 4). Before the tax law in Germany was changed in 1977, the non-deductibility of interest payments on long term borrowing for purpose of calculating local taxes sometimes even made these distortions negative (i.e. the burden of taxation on the returns on investment outweighed concessions for interest costs and depreciation). However, where the tax system has been adjusted to provide investment incentives, the effect on the MPIR has been substantial, and high inflation has exaggerated it. In the United States, for example,

Table 6. **Maximum payable interest rates (MPIR) in selected OECD countries**

On a hypothetical investment in equipment with a 10 per cent real internal rate of return*

Percentage points

| | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| United States | | | | | | | | | | | | | | | | | |
| 1 | 17.8 | 15.6 | 15.5 | 20.6 | 20.4 | 25.0 | 29.0 | 27.1 | 25.2 | 26.1 | 27.7 | 30.7 | 32.1 | 29.6 | 26.2 | 24.0 | 22.9 |
| 2 | (6.1) | (3.7) | (3.7) | (6.4) | (6.5) | (5.6) | (4.9) | (6.6) | (6.9) | (6.7) | (6.5) | (6.3) | (6.0) | (6.9) | (7.3) | (7.0) | (7.2) |
| 3 | 7.8 | 5.6 | 5.5 | 10.6 | 10.4 | 75.0 | 19.0 | 17.1 | 15.2 | 16.1 | 17.7 | 20.7 | 22.1 | 19.6 | 16.2 | 14.0 | 12.9 |
| 4 | 4.8 | 1.1 | 0.9 | 6.5 | 6.4 | 7.6 | 8.6 | 9.6 | 9.2 | 9.5 | 9.8 | 10.3 | 10.8 | 10.8 | 10.1 | 8.5 | 8.3 |
| United Kingdom | | | | | | | | | | | | | | | | | |
| 1 | 17.4 | 16.8 | 20.8 | 23.2 | 25.1 | 28.5 | 51.2 | 57.5 | 39.9 | 40.1 | 36.4 | 46.1 | 47.9 | 37.1 | 30.0 | 27.3 | 21.4 |
| 2 | (6.1) | (6.4) | (6.4) | (6.9) | (8.6) | (7.7) | (7.3) | (7.3) | (7.4) | (7.4) | (7.5) | (7.4) | (7.4) | (7.5) | (7.6) | (7.8) | (7.1) |
| 3 | 7.4 | 6.8 | 10.8 | 13.2 | 15.1 | 18.5 | 41.2 | 47.5 | 29.9 | 30.1 | 26.4 | 36.1 | 37.9 | 27.1 | 20.0 | 17.3 | 11.4 |
| 4 | 3.6 | 3.9 | 4.1 | 5.5 | 7.9 | 11.9 | 22.2 | 25.2 | 17.0 | 17.1 | 15.5 | 19.9 | 20.7 | 15.8 | 12.5 | 10.9 | 6.3 |
| Japan | | | | | | | | | | | | | | | | | |
| 1 | 14.6 | 16.0 | 16.1 | 16.3 | 16.8 | 21.7 | 35.1 | 18.7 | 20.3 | 18.3 | 16.7 | 17.6 | 17.7 | 16.7 | 14.9 | 12.5 | 12.8 |
| 2 | (4.4) | (3.9) | (3.8) | (3.8) | (3.7) | (2.7) | (–0.4) | (2.6) | (2.3) | (2.7) | (3.1) | (2.9) | (2.8) | (2.8) | (3.3) | (4.0) | (3.7) |
| 3 | 4.6 | 6.0 | 6.1 | 6.3 | 6.8 | 11.7 | 25.1 | 8.7 | 10.3 | 8.3 | 6.7 | 7.6 | 7.7 | 6.7 | 4.9 | 2.5 | 2.8 |
| 4 | 1.0 | 1.3 | 1.3 | 1.3 | 1.4 | 2.5 | 6.6 | 1.9 | 2.4 | 1.9 | 1.5 | 1.7 | 1.7 | 1.6 | 1.2 | 0.8 | 0.8 |
| Germany | | | | | | | | | | | | | | | | | |
| 1 | 11.0 | 14.1 | 15.3 | 16.0 | 14.8 | 18.0 | 18.1 | 15.1 | 13.4 | 13.9 | 14.2 | 14.4 | 15.1 | 15.3 | 15.1 | 15.0 | 14.4 |
| 2 | (3.5) | (2.4) | (2.1) | (1.8) | (2.2) | (0.5) | (1.2) | (2.1) | (2.7) | (2.6) | (2.8) | (2.7) | (2.5) | (3.2) | (3.3) | (3.5) | (3.7) |
| 3 | 1.0 | 4.1 | 5.3 | 6.0 | 4.8 | 8.0 | 8.1 | 5.1 | 3.4 | 3.9 | 4.2 | 4.4 | 5.1 | 5.3 | 5.1 | 5.0 | 4.4 |
| 4 | –0.8 | –0.6 | –0.4 | -0.3 | –0.5 | 0.2 | 0.0 | –0.5 | –0.7 | –0.6 | 0.4 | 0.4 | 0.5 | 1.4 | 1.4 | 2.0 | 2.0 |
| France | | | | | | | | | | | | | | | | | |
| 1 | 16.1 | 18.7 | 16.9 | 19.0 | 19.0 | 21.5 | 28.9 | 27.1 | 26.2 | 23.5 | 25.3 | 28.3 | 31.0 | 33.1 | 32.3 | 27.5 | 24.7 |
| 2 | (4.8) | (4.3) | (4.6) | (4.2) | (4.2) | (3.8) | (2.6) | (2.9) | (3.0) | (3.4) | (3.1) | (4.4) | (4.0) | (3.7) | (4.7) | (5.4) | (5.7) |
| 3 | 6.1 | 8.7 | 6.9 | 9.0 | 9.0 | 11.5 | 18.9 | 17.1 | 16.2 | 13.5 | 15.3 | 18.3 | 21.0 | 23.1 | 22.3 | 17.5 | 14.7 |
| 4 | 2.6 | 3.2 | 2.8 | 3.3 | 3.3 | 3.9 | 6.0 | 5.5 | 5.2 | 4.4 | 4.9 | 7.7 | 8.5 | 9.1 | 9.8 | 8.4 | 7.5 |

* See Annex II for details of calculations.

Note: 1. MPIR
2. Real after-tax equivalent of MPIR (i.e. the MPIR net of tax relief, less anticipated inflation).
3. Effect of taxation and anticipated inflation on MPIR (line 1 less 10 per cent).
4. Effect of taxation alone on MPIR (line 1 less the MPIR calculated on the basis **of** a zero tax rate and no investment tax credit).

where an investment tax credit of 7 per cent was available between 1971 and 1974 and was raised to 10 per cent in 1975, the tax system has consistently added around 6-11 per cent to the MPIR, with the amount rising and falling with expected inflation. In the United Kingdom the shift to free (i.e. immediate) depreciation and a higher corporation tax rate between 1970 and 1973 created a tax system which has a much larger effect on the MPIR. When inflation took off from 1974 these distortions due to taxation increased even further, occasionally exceeding 20 per cent. As inflation fell during the 1980s the distortions due to the tax system returned to their 1973 range. The low figure for 1984 reflects the shift in the tax system away from free depreciation and toward lower tax rates. Similarly, in France, the introduction of fiscal incentives to investment in 1979 resulted in a substantial increase in the effect of the tax system on the MPIR in that country.

A specific factor which has increasingly been suggested as a major contributor to the current perceived high level of interest rates is the change in company taxation in the United States since 1981[9]. More favourable tax treatment of investment has, it is argued, reinforced increases in the prospective real returns on investment, adding to companies' incentives to borrow and, hence, upward pressure on real market interest rates. Table 7 shows the effect of these changes in tax law. ERTA added around 1.5 points to the MPIR in 1981-82, while the combination of ERTA and the Tax Equity and Fiscal Responsibility Act (TEFRA), passed in 1982, added only 0.2 percentage points. These numbers are small compared with the total distortions associated with the tax system.

Great caution is warranted when assessing the effect of taxation on interest rates. The unusually large presence of households in credit markets in the United States and the United Kingdom, where mortgage interest is deductible, at least suggests that fiscal concessions have a major effect on their financial behaviour. How far interest rates are actually raised by such concessions is impossible to assess, but the effect must be less than the size of these. The analysis of the effect

Table 7. **Effect of recent changes in corporation tax law in the United States on the maximum payable interest rate (MPIR)**

On a hypothetical project with a 10 per cent real internal rate of return*

Percentage points

| | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|
| 1. Actual MPIR | 29.6 | 26.2 | 24.0 | 22.9 |
| 2. Effect of tax system on MPIR | 10.8 | 10.1 | 8.6 | 8.3 |
| 3. MPIR under 1980 tax system | 28.3 | 24.7 | 23.8 | 22.7 |
| 4. Effect of 1980 tax system on MPIR | 9.5 | 8.6 | 8.4 | 8.1 |
| 5. Effect of changes in tax law since 1980 on MPIR (line 2 less line 4) | 1.3 | 1.5 | 0.2 | 0.2 |

* See Annex II and text for details of calculations.

of taxation on MPIRs suggests potential distortions to companies' financial behaviour which are also quite large. However, the calculations are based on a specific type of investment on the assumption that the returns on the investment would be fully subject to tax: As noted earlier, with particular reference to the United Kingdom after 1975, this is not always the case. Furthermore, the source of distortion appears to be less taxation itself than the interaction of taxation and high inflation. This last point is germane to the role taxation has played in recent years in raising real interest rates to high levels. As inflation has come down, *so* have the distortions to MPIRs attributable to taxation. Therefore, while these distortions remain substantial, they cannot provide an explanation of the present high level of real interest rates, even in the United States following the changes introduced in the tax system during 1981-82 (ERTA and TEFRA).

## D. Uncertainty about future inflation

The notion that a nominal interest rate can be decomposed into an expected real component and an inflation premium abstracts from uncertainty about future price increases. In practice, views about the course of future inflation are not unanimous, and both borrowers and lenders make assessments of the extent to which "best guesses" may be wrong. Thus not even conventional government bonds can be regarded as risk-free assets.

Given an aversion to risk, lenders will demand a premium and borrowers a discount on expected real interest rates. To the extent that borrowers and lenders are equally risk averse, the effects on real interest rates should cancel each other out. However, debt contracts tend to be asymmetrical in the sense that borrowers can generally pay off the debt before maturity with a relatively small penalty. Thus borrowers have some protection against the possibility that a decline in inflation might ultimately lead to lower nominal interest rates, whereas lenders do not. Moreover, governments do not reduce their borrowing requirements, at least in the short term, because they believe real interest rates will prove to be high. Since governments are far more active in credit markets as borrowers than as lenders, it is likely that lenders as a group are more risk-averse than borrowers. Consequently the high level of perceived real interest rates may reflect a premium to compensate lenders for the risk that inflation may be higher than anticipated.

Past experience also suggests that market interest rates, particularly at the long end, should contain a premium, rather than a discount, for uncertainty about future inflation. In the past, as noted earlier, real rates of return on fixed interest investments have often turned out to be low, regardless of what various *ex ante* measures suggested at the time investments were made. Furthermore, these returns have been very variable. Table 8 shows the mean and standard deviation of the real returns which interest-bearing investments have actually paid in G-10

## Table 8. *Ex post* real returns on fixed interest investments

***Line A:*** Mean and standard deviations of annual data series consisting of the real returns on fixed interest bearing financial assets, ex ***post,*** (i.e. adjusted for changes in consumer prices) held to maturity. Data series end in 1979 for five-year investments and in 1974 for ten-year investments*.

***Line B:*** As above, except the data series are confined to interest bearing financial assets which do not mature until after 1984. It is assumed that these are sold in 1984. Data series begin in 1980 for five-year investments and in 1975 for ten-year investments*.

| | | Five-year investments | | | Ten-year investments | | |
|---|---|---|---|---|---|---|---|
| | | Sample period | Mean | Standard deviation | Sample period | Mean | Standard deviation |
| United States | A | 1960-79 | –0.1 | 1.5 | 1955-74 | -0.7 | 1.1 |
| | B | 1980-83 | 2.0 | 3.6 | 1975-83 | 0.0 | 4.0 |
| Japan | A | 1962-79 | 1.4 | 3.0 | 1962-74 | 0.9 | 2.4 |
| | B | 1980-83 | 3.4 | 1.6 | 1975-83 | 4.1 | 1.8 |
| Germany | A | 1956-79 | 3.3 | 1.2 | 1956-74 | 3.2 | 1.0 |
| | B | 1980-83 | 2.8 | 2.1 | 1975-83 | 3.3 | 2.7 |
| France | A | 1960-79 | 0.4 | 1.3 | 1960-74 | –0.3 | 1.2 |
| | B | 1980-83 | 2.2 | 1.9 | 1975-83 | 1.5 | 4.4 |
| United Kingdom | A | 1960-79 | 0.0 | 2.5 | 1960-74 | –1.5 | 2.1 |
| | B | 1980-83 | 3.7 | 3.0 | 1975-83 | 4.3 | 3.7 |
| Italy | A | 1960-79 | –1.1 | 3.7 | 1960-74 | –2.0 | 3.5 |
| | B | 1980-83 | 2.7 | 3.2 | 1975-83 | 1.6 | 7.4 |
| Canada | A | 1955-79 | 1'2 | 1.5 | 1955-74 | 0.7 | 1.4 |
| | B | 1980-83 | 2.3 | 3.5 | 1975-83 | 1.2 | 4.2 |
| Belgium | A | 1955-79 | 1.9 | 1.8 | 1955-74 | 1.2 | 1.3 |
| | B | 1980-83 | 1.4 | 2.5 | 1975-83 | 1.9 | 2.6 |
| Netherlands | A | 1960-79 | 0.9 | 1.4 | 1960-74 | 0.0 | 1.1 |
| | B | 1980-83 | 3.5 | 2.5 | 1975-83 | 4.2 | 2.9 |
| Sweden | A | 1960-79 | –0.1 | 1.4 | 1960-74 | -0.7 | 1.3 |
| | B | 1980-83 | -0.4 | 2.1 | 1975-83 | 0.5 | 2.1 |
| Switzerland | A | 1960-79 | 0.1 | 1.6 | 1960-74 | –0.1 | 1.1 |
| | B | 1980-83 | –0.7 | 1.3 | 1975-83 | –0.1 | 1.9 |

* **Line A is based on *ex post* real interest rate series presented in Chart C. Details of calculations of annual real interest rate data used to derive figures in both lines A and B are provided in Annex I.**

countries over the past twenty to thirty years. Line A refers to investments held to maturity, while line B refers to investments undertaken too recently to have matured. These latter are assumed to have been sold at a capital loss or gain in 1984. Only in Germany has the tendency of the authorities to prevent accelerations of inflation persistently resulted in significant positive real returns on investments held for as long as ten years. Elsewhere, real returns have on average been low and their dispersion high, as reflected by the fact that the standard deviation exceeds the mean in all other countries. *On* assets with a life as short as five years, held to maturity, the record has been significantly better only in Belgium. With regard to recent investments, whose returns have been to varying degrees influenced by capital losses or gains due to interest rate changes, the high real interest rates available during the early 1980s are reflected in relatively high mean returns on five-year assets for many countries. Only in Japan, Germany, the United Kingdom, the Netherlands and perhaps Belgium, however, are these also clearly reflected in the mean returns on ten-year assets.

While the low real returns which have often been paid to lenders implies that borrowing has tended to be cheap in the long run, the dispersion of real returns has been great enough to justify taking account of the risk that real costs of borrowing may, in the end, prove to be higher than anticipated. The available ways of reducing this risk to both borrowers and lenders are limited. Index-linked contracts are the most obvious vehicle, but their legal status is in many countries unclear[10]. A second possibility is long term loans at floating interest rates. Given the looseness of the relationship between market interest rates and inflation, the protection they provide is imperfect. Nevertheless, they have become widely used in a few areas, notably mortgage financing in the United Kingdom and, more recently in a restricted form, in the United States. However their use by the company sector remains limited. As both borrowers and lenders have good reason to leave themselves a margin, but in opposite directions, to cover risk when making financial decisions, an imperfection is introduced into credit markets. This has the effect of reducing, or at least distorting, the flow of savings from lenders to borrowers and adversely affects the amount and/or the composition of investment. The extent of this distortion can best be limited by reducing uncertainty about future rates of inflation.

In recognition of such distortions, which arise as a consequence of the experience of high and variable inflation, OECD governments have laid much stress on the importance of consistency and credibility of anti-inflationary monetary policies. For uncertainty about future inflation to be reduced, the authorities' objective in this respect must be clear to the public, and the commitment to achieving it must be convincing. The view that the appropriate goal is price stability has been gaining ground, though to date only Japan, Germany, the Netherlands and perhaps Switzerland can be said to be close to this goal. Furthermore, if the various measures of expected inflation used in Part I to calculate ex ante real interest rates have any validity at all, the public in most countries has not yet based its behaviour

on the assumption that this goal will be achieved. Stronger public statements may play some role in reducing uncertainty about future inflation, but successful elimination of distortions associated with such uncertainty ultimately depends on performance, and requires perseverence with non-accommodating monetary policies.

### E. Financial market deregulation

In recent years, a number of countries have tended to reduce the importance of administrative restrictions on financial activities. Notably in the United States, where restrictions on rates that financial institutions may pay on deposit instruments have largely been removed[11], the result has been that such institutions have now greater scope for competing for funds. This was reflected in an acceleration of financial innovations making the remuneration of certain types of monetary assets more attractive and raising the costs of funds to financial intermediaries. To the extent that the role of interest rates in rationing credit has increased relative to administrative restrictions, the overall effect of these changes is that interest rates must be higher than was formerly the case in order to achieve a given degree of monetary restraint.

## III. THE INTERNATIONAL TRANSMISSION OF REAL INTEREST RATES

The emergence of real interest rate differentials internationally could be expected to lead to capital flows tending to eliminate these differentials. If exchange rates are flexible, modern theories of exchange rate determination suggest that, in the absence of risk, exchange rates will move to a point where the subsequent expected real appreciation or depreciation will match real interest rate differentials. In this situation anticipated rates of return on financial assets in different countries will be the same when measured in a common currency. To the extent that this fails to occur, a risk premium or discount can be said to exist, reflecting exchange rate or political uncertainties, administrative restrictions or other considerations.

Where the movement in exchange rates necessary to offset changes in real interest rate differentials or risk premia is considered undesirable by the monetary authorities, monetary policies may be adjusted to forestall them. For this to be fully effective, any real interest differential must either be eliminated by the policy change or be reduced to the point where it matches the risk premium or discount.

Persistence of real interest differentials internationally, therefore, largely reflects uncertainties associated with exchange rates and political risk, administrative restrictions or other market imperfections which cause disturbances affecting real credit costs to be confined to the country of origin rather than being transmitted internationally.

## A. The role of current account imbalances

Under the flexible exchange rate system, capital movements induced by credit market imbalances are no longer accommodated by central bank intervention in the foreign exchange market. Rather, the exchange rate pressure to which they lead normally calls forth offsetting capital movements to clear the exchange market so that the net financial flow is zero. So long as countries do not adjust their monetary policies, adhere to monetary targets and allow exchange rates to absorb pressures arising from external imbalances, capital on a net basis can actually flow internationally, and affect credit markets, only to the extent that a current account imbalance emerges. Otherwise, credit market disturbances and the associated impact on real interest rates should largely be confined to the country in which they originate. If a current account imbalance does emerge, the original disturbance is transmitted internationally. However, the effect on real interest rates, worldwide, will be dampened because it will be spread among all of the country's trading partners and be absorbed by world financial markets collectively.

In recent years the most prominent source of potential imbalance in credit markets has been the budget deficit in the United States. As noted earlier, this has increased by some 4 per cent of GNP since 1979, 3 per cent of which may have been structural. The budget deficit has added directly to aggregate demand and the associated credit demands, by leading to intended capital inflows, have contributed importantly to the strength of the dollar. These have been important factors behind the deterioration of the current account by about 3 per cent of GNP. This very broad comparison suggests that the financing of the higher budget deficit has largely been taken on by the rest of the world, leaving comparatively little to be absorbed domestically. To the extent that this has occurred, the direct impact of the budget deficit on interest rates in the United States itself has been limited. While this implies that interest rates elsewhere have been affected, the dispersion of the financing burden has presumably moderated the impact. Furthermore, any such effect on world interest rates has been partially offset by the reductions in budget deficits in countries outside the United States.

The expectational aspect of the impact of U.S. budget deficits remains, however. If, as argued earlier, the prospect of persistently large deficits leads the markets to expect high real interest rates in the future, this will tend to be reflected in current credit costs. While for the moment the budget deficit is evoking nearly

compensating capital inflows from abroad, mitigating the effect on U.S. interest rates, the impact of anticipated future deficits will remain unless such inflows are expected to be sustainable. Many observers, however, doubt that the United States can indefinitely sustain current account deficits of the order of 3 per cent of GNP as a counterpart of these capital inflows. The implications for the U.S. external net investment position and external interest payments, should deficits of this size continue, would be very great, and a persistently increasing favourable balance on trade in goods and services would be required just to maintain the current account deficit at its present size. This, it is felt, would be a potentially unstable situation as at some point international investors might cease to add dollar assets to their portfolios.

The main evidence in support of this view is the rarity of persistently large current account imbalances during much of the post-war period, which suggests that ultimately disturbances to credit markets must largely be absorbed domestically[12]. This would imply that current accounts play only a limited role in equilibrating real interest rates worldwide and, in the absence of monetary policy adjustments to stabilize exchange rates, that there is considerable scope for them to vary across countries. On this argument the dollar should at some stage fall sharply, restoring a more balanced current account position and, in the process, U.S. financial markets would have to absorb more of the burden of financing the budget deficit. If this argument is widely accepted, U.S. interest rates should be high today in anticipation of these developments.

One difficulty with this expectational argument is that while it can apparently explain high real interest rates in the United States, it does not explain them elsewhere. If a fall in the dollar and substantial reductions in the U.S. current account deficit are widely anticipated, then, as counterparts, so are rising exchange rates and reductions in current account surpluses elsewhere. To the extent that these future developments are taken into account interest rates now should be lower, not higher, in countries outside the United States. This should be particularly the case where budget deficits have been reduced and where these reductions are expected to be sustained. Therefore, while the expectational effect associated with deficits budget and current account imbalances should increase the dispersion of real interest rates internationally, it should not necessarily raise the average level across countries. Moreover, it is true that recent and prospective current account imbalances, notably in the United States and Japan, are comparatively large measured against the experience of the 1960s and 1970s (see Table 9). The argument that they are unsustainable, however, regardless of the policies followed, should be treated cautiously. In a longer historical perspective they are not exceptionally large: before 1914, despite less sophisticated financial markets than exist today, current imbalances of the order of 5 per cent or more of GNP were not unusual[13]. However, for virtually the entire period since then, impediments to capital flows have been an outstanding feature of the international environment[14]. The small size of observed

current account imbalances observed at the time may simply be reflections of these impediments to lending.

Table 9. **Current account imbalances**[a]
Percentage of nominal GNP/GDP

| | Group of Ten countries | Other OECD countries* | All OECD countries[b] |
|---|---|---|---|
| 1960 | 0.80 | 2.22 | 0.94 |
| 1961 | 0.91 | 1.51 | 0.97 |
| 1962 | 0.67 | 1.38 | 0.73 |
| 1963 | 0.73 | 0.95 | 0.75 |
| 1964 | 0.92 | 1.21 | 0.95 |
| 1965 | 0.96 | 1.89 | 1.08 |
| 1966 | 0.63 | 1.70 | 0.75 |
| 1967 | 0.60 | 1.73 | 0.73 |
| 1968 | 0.61 | 1.72 | 0.71 |
| 1969 | 0.65 | 1.68 | 0.74 |
| 1970 | 0.55 | 1.67 | 0.65 |
| 1971 | 0.67 | 1.70 | 0.79 |
| 1972 | 0.80 | 1.57 | 0.83 |
| 1973 | 0.80 | 2.04 | 0.87 |
| 1974 | 1.27 | 3.15 | 1.55 |
| 1975 | 1.07 | 2.77 | 1.29 |
| 1976 | 0.80 | 3.67 | 1.13 |
| 1977 | 0.96 | 3.16 | 1.24 |
| 1978 | 1.24 | 2.21 | 1.37 |
| 1979 | 0.67 | 2.11 | 0.81 |
| 1980 | 0.94 | 2.82 | 1.14 |
| 1981 | 0.89 | 3.51 | 1.17 |
| 1982 | 0.90 | 3.53 | 1.15 |
| 1983 | 1.19 | 2.59 | 1.34 |
| 1984 | 1.89 | 2.57 | 1.96 |

*a)* Current GNP/GDP weighted average of the absolute value of the current account imbalance, measured as a share of GNP/GDP. This is equal to the sum of the absolute values of current account deficits and surpluses as a percentage of total GNP/GDP for all countries considered.
*b)* Excluding Turkey.
Source: OECD.

During the 1970s many of these impediments were eliminated and the world economy is now financially more open than at any time since 1914. The euromarkets have emerged as a major unrestricted source of finance for creditworthy borrowers, and the United States (in 1974) and the United Kingdom (in 1979) have joined Germany in removing virtually all controls on capital movements. Japan has also moved significantly in this direction. This has been reflected in the increase in the average size of current imbalances since the first oil

shock (Table 9). Institutional and regulatory changes of the fast ten years, therefore, may imply more scope for current account imbalances to respond to domestic financial pressures than at any time within the past seventy years. Thus if the U.S. budget deficit persists, the current account deficit which it has helped to generate may be longer-lived than is often thought likely.

## B. Policy responses to exchange rate pressures

A policy of adhering to a monetary target and allowing the exchange rate to absorb pressures arising from intended capital movements can, at least until current accounts respond, largely insulate credit markets from direct external influences. However, the experience of the past twelve years suggests that the resulting fluctuations in exchange rates may be large. These fluctuations give rise to a number of policy concerns: at the macroeconomic level, exchange rate depreciations lead to fears about possible inflationary consequences, while appreciations directly threaten those sectors of the economy most exposed to international competition and may have an overall deflationary impact; at the microeconomic level, large exchange rate fluctuations may adversely affect investment, distort industrial structures and encourage protectionist pressures. Many countries, particularly the more open ones, regard these concerns sufficiently seriously to adjust their monetary policies in order to moderate such exchange rate fluctuations. This implies, however, a degree of adjustment to the external financial situation and, therefore, of importing credit market disturbances originating abroad.

### *1. United States*

As indicated above, the tendency for the United States to attract capital from the rest of the world has resulted in a major rise in the dollar against virtually all currencies. Except for the Canadian dollar, this rise has been substantial in real as well as nominal terms. The rise in the real exchange rate, by weakening the competitiveness of tradeable goods and services industries in the United States, has facilitated the emergence of the present large current account deficit. As a counterpart, capital inflows have provided a net addition to the financial resources available in credit markets. The dollar's appreciation has also contributed to the restraint of inflation by holding import prices down not only relatively but absolutely. As noted earlier, many observers fear that the present situation may not be sustainable, and that a risk exists that changed sentiment about the dollar's prospects may lead to a substantial fall.

A precipitate fall in the dollar, which would not necessarily eliminate the current account deficit, would lead to higher costs of U.S. imports and primary commodities whose prices tend to be determined in world markets. This could threaten recent

progress against inflation and might force the Federal Reserve to react. Fears have been expressed that policy would be tightened, i.e. that monetary expansion would be decelerated sharply in order to forestall a dollar depreciation, which could affect the sustainability of the recovery. However, the Federal Reserve has not, so far, adjusted its policies to compensate for the dollar's persistent strength during the past four years. If the U.S. monetary authorities continue to adhere to steady non-accommodating monetary targets appropriately chosen in light of domestic circumstances, some reversal of the dollar's rise should not necessarily threaten the prospects for a sustainable non-inflationary recovery or cause the Federal Reserve to modify its policy stance.

### 2. *Other countries*

At present, the main forces working to raise real interest rates are generally perceived to be emanating from the United States and the persistent tendency for the dollar to rise has constrained other countries to decide how to respond. In Canada, the country most closely integrated with the United States, high priority has been attached to avoidance of a substantial depreciation of the Canadian dollar *vis-P-vis* the U.S. dollar in order to restrain inflation. Monetary policy has often been adjusted in response to developments in the United States, with the result that real interest rates appear to be as high in Canada as in that country, while real depreciation of the exchange rate has been avoided (see Table 10). In Japan, where foreign trade with the United States is more important than it is for European countries, concerns about protectionist tendencies, as noted earlier, have led to some adjustment of monetary policy to developments in the United States. There has been some real depreciation of the yen *vis-a-vis* the dollar since 1980, but

**Table 10. Real exchange rates *vis-à-vis* the U.S. Dollar[a]**

**Indices 1980 = 100**

| | 1981.I | 1981.II | 1982.I | 1982.II | 1983.I | 1983.II | 1984.I* | 1984.II* |
|---|---|---|---|---|---|---|---|---|
| Japan | 105.8 | 91.5 | 83.3 | 75.6 | 83.2 | 81.1 | 81.4 | 75.2 |
| Germany | 83.6 | 76.4 | 73.3 | 71.8 | 71.2 | 66.6 | 65.0 | 58.6 |
| France | 87.4 | 79.0 | 75.6 | 68.4 | 69.2 | 64.1 | 62.2 | 59.5 |
| United Kingdom | 96.9 | 79.8 | 77.0 | 72.4 | 66.2 | 65.3 | 63.4 | 58.0 |
| Italy | 87.6 | 81.9 | 78.5 | 76.7 | 83.6 | 78.1 | 76.5 | 72.5 |
| Canada | 102.6 | 106.6 | 108.0 | 108.5 | 109.0 | 110.2 | 102.3 | 99.2 |
| Belgium | 83.6 | 73.2 | 63.5 | 56.9 | 56.8 | 50.5 | 50.6 | 47.1 |
| Netherlands | 81.1 | 73.5 | 71.3 | 67.9 | 68.8 | 62.3 | 57.8 | 53.5 |
| Sweden | 93.3 | 81.6 | 73.7 | 64.2 | 57.8 | 56.0 | 56.2 | 52.5 |
| Switzerland | 87.6 | 84.1 | 85.6 | 81.2 | 87.6 | 86.8 | 83.2 | 74.9 |

a) Nominal exchange rates versus the dollar adjusted for differential movements in unit labour costs.
* OECD Secretariat estimates.
Source: OECD.

virtually all of it occurred during **1981-1982.** In Germany and the United Kingdom, the authorities have generally acquiesced in substantial depreciation of their exchange rates against the dollar while pursuing their monetary targets. Given the relatively limited importance of bilateral trade with the United States in these two countries, and the fall in commodity prices, the inflationary consequences of this have been less than have often been feared, and in any case, have not interfered with the substantial progress that has been made in reducing inflation.

In France, Italy, Belgium and the Netherlands, commitments within the European Monetary System (EMS) in practice require that monetary policy must accommodate to developments in Germany, which has assumed a role within the EMS similar to that of the United States under the Bretton Woods system. Interest rate developments in the United States tend to be transmitted to these countries only to the extent that they are transmitted to Germany. The result is that real exchange rates *vis-à-vis* the dollar in these countries have followed the Deutsche-mark downward, although somewhat more slowly in the case of Italy where inflation remains higher than elsewhere.

## CONCLUSIONS

During recent years real interest rates, both short- and long-term, have been high by historical standards in many OECD countries. This conclusion appears to hold regardless of the measure of expected inflation used to adjust nominal interest rates. However, unanticipated changes in inflation have often rendered real returns over the life of financial assets different from what conventional measures had suggested, particularly at the long end of the term structure. Both lenders and borrowers therefore have grounds for considerable uncertainty about present levels of real interest rates.

A number of factors have been suggested as causes of high real interest rates: monetary and/or fiscal policies; improved profitability of investment; the tax treatment of interest payments and receipts; uncertainty about future inflation; and financial market deregulation. The analysis in this paper suggests that, although each of these factors may at times have had some influence, none can be attributed a sufficiently dominant role to permit a monocausal explanation. In particular, the following observations can be made:

*i)* With respect to fiscal policies, the Federal budget deficit in the United States may in itself be regarded **as** a force working to raise real interest rates. However, while this seems very large when measured against domestic private savings in that country, the deficit on a general

government basis is about the same size in relation to **GNP** as the average of other **OECD** economies. Furthermore, the increased deficit in the United States has been accompanied by substantial deficit reductions elsewhere, notably in Japan, Germany and the United Kingdom. Thus, in a worldwide context, changes in the stance of fiscal policies, in recent years, have amounted less to an increase in government borrowing than to a redistribution, and, taken by themselves, go further toward explaining the prevailing pattern of current account imbalances, and perhaps exchange rate developments, than the overall level of real interest rates. However, these developments have taken place against a background of widespread reductions in monetary growth in order to bring inflation down and to accommodate only slow rates of price increases. In contrast to the 1970s, monetary policies have largely avoided the accommodation of credit demands by faster monetary creation, *so* the shift in the fiscal/monetary mix has been greater than the shift in fiscal policies alone.

*ii)* In some countries taxation appears to have a potentially significant distorting effect on financial behaviour, and hence may be a force working to raise market interest rates. However, this has been the case for many years. The recent changes in the corporation tax system in the United States, which have often been cited as an important factor, appear capable of only a comparatively small effect although they may have contributed to a general sense of optimism on the part **of** corporate management. Since the potential distortions are greatest when inflation is high, taxation is an unlikely explanation for rising real interest rates at a time when inflation has come down to its lowest levels for twenty years.

*iii)* The remaining factors such as possible improvements in expected profitability on new investment, due to greater economic "dynamism", risk premia associated with uncertainty about future inflation, and the effects of the deregulation of financial markets, are difficult to quantify. Their contribution to high real interest rates can be neither rejected nor supported on the basis of empirical evidence. However, as long as less subjective influences are unable to explain successfully the behaviour of real interest rates, the possiblity that these factors have played an important role cannot be dismissed.

It is perhaps unsurprising, therefore, that most countries perceive high real interest rates as emanating from abroad, particularly from the United States. For Canada and, during the last two years, Japan – where monetary policy has been adjusted to prevent significant exchange rate depreciation against the U.S. dollar (at least in real terms) – this view has considerable force. For Europe, however, it **is**

unlikely that this can provide a full explanation. It is true that in many European countries concern has been expressed about the strength of the dollar, and that the timing, at least, of monetary policy adjustments has often been determined by considerations about exchange rates against the dollar. Nevertheless, most of these countries have acquiesced in substantial real depreciations of their currencies against the dollar. In Germany and the United Kingdom, which attach most weight to monetary aggregates, interest rate developments have been broadly consistent with the achievement of monetary targets felt to be appropriate on domestic grounds. Thus, apart from short-lived episodes of more acute pressure, developments in the United States do not appear to have induced a major monetary policy reaction in these two countries.

Among other European countries, France, Italy, Belgium and the Netherlands have been constrained by commitments within the EMS to pursue exchange rate objectives, but the dominant currency in that regard has been the Deutschemark and not the dollar. The influence of interest rate developments in the United States on interest rates on these countries would tend mainly to be indirect, via their influence on events in Germany. In Sweden, the exchange rate is pegged to a basket of currencies in which the Deutschemark and other European currencies have high weights, *so* monetary policy has not adjusted greatly to offset the tendency of the dollar to rise. Finally, Switzerland is a somewhat special case. Depreciation against the dollar has been less than in most European countries, but real interest rates have been low.

As it is difficult to diagnose the causes of high real interest rates, policy implications must be derived cautiously. Reductions in real interest rates would be welcome in the present context of reduced inflation and disturbingly high unemployment. They would help sustain the recovery by encouraging investment expenditure in the near term, and by ensuring that greater productive capacity is in place in the years ahead. They would also have a favourable impact on the situation of indebted developing countries. Efforts to achieve these reductions, however, must be made with a view to ensuring that their medium- to longer-term consequences are favourable. Resort to expansionary monetary policies may appear tempting, but this temptation should be assessed against the risk of a consequent reacceleration of inflation, which would necessitate another round of deflationary policies and ensure that the recovery was not sustained. Fiscal policy could make a more direct contribution to lowering real interest rates. While budget deficits do not appear to have increased by *so* much on a worldwide basis to constitute the dominant explanation for the present high level of real interest rates, substantial and widespread reductions in government borrowing could be expected to have a favourable impact on credit costs. Finally, any changes in tax systems which reduced effective subsidies to borrowing would also contribute to lowering interest rates.

## NOTES

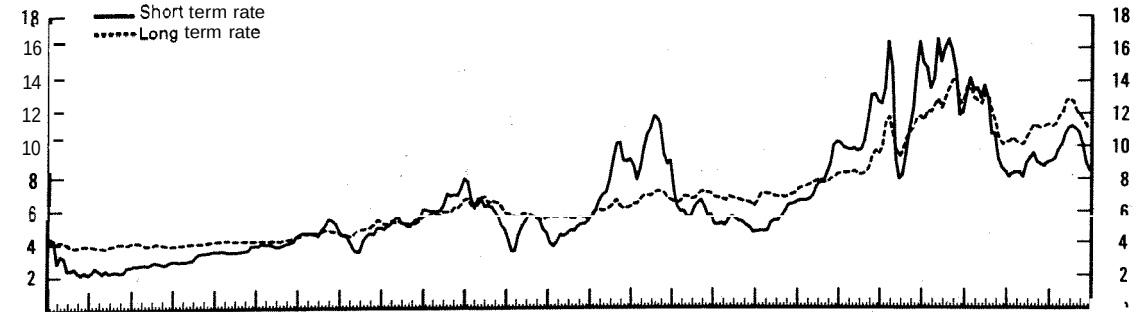
1. United States, Japan, Germany, France, United Kingdom, Italy, Canada, Belgium, Netherlands, Sweden and Switzerland.
2. The Congressional Budget Office, for example, foresees a deficit of more than 5 per cent of GNP in fiscal year 1990, without significant changes in present policies. See CBO (1985).
3. For further details of monetary policy developments since the late 1960s, see Atkinson and Chouraqui (1984).
4. For instance: *i)* The demographic shift in the United States from the north-east and mid-west to the south and west has implied changes in the pattern of housing demands. The increase in housing construction in areas receiving migration is less than the fall in areas facing outward migration to the extent that excess supply in the latter areas leads to lower rents and house prices and/or higher vacancy rates; *ii)* Increases in oil prices during the 1970s created profitable investment opportunities in the oil and oil supply industries, particularly in North America and the North Sea; *iii)* Airline deregulation in North America and rising fuel prices made it attractive for the aerospace industry to develop, and for airlines to purchase, a new generation of fuel-efficient jets; *iv)* Continued advances in computer technology have made it attractive for businesses to make major investments in new types of office equipment.
5. For example, the boom in oil exploration and development in the United States and United Kingdom after 1973 was not reflected in an acceleration of total fixed capital formation in those countries.
6. On the tax treatment of interest expenses, see Tanzi (1984).
7. If borrowing is on a floating interest rate basis there will be some tendency for interest payments to adjust to changes in inflation. The returns from the project, however, will tend to rise with the price level. The existence of floating interest rates, therefore, qualifies but does not substantively alter the point made in the text.
8. This notion is derived from Feldstein and Summers (1978). See also Kennedy (1984).
9. The Economic Recovery Tax Act (ERTA) provided for accelerated depreciation on most purchases of equipment and structures. The Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) altered the provisions somewhat to moderate the effect of ERTA.
10. For example, in the United States index-linked financial contracts were unenforceable at least until 1977. While the main legal obstacle was repealed at that time, uncertainties about their status with respect to state usury laws, securities laws and tax treatment remain. The government in the United Kingdom has presumably been able to allay fears in this area in order to market its index-linked bonds. Where the legal situation is clearly favourable to index-linked securities, such securities have become widespread. For discussion see McCulloch (1980).
11. For further discussion of this issue, see Johnson and Scanlon (1985).
12. For discussion, see Feldstein (1983); Feldstein and Xarioka (1980); and Dooley and Isard (1983).
13. For example, between 1906 and 1913 the current account surplus in the United Kingdom ranged between 5.9 and 9.2 per cent of GNP [see Ashworth, (1960), Table X].
14. Since 1914 two world wars, the reparations and inter-allied debt commitments of the 1920s, the defaults and autarchic policies of the 1930s, widespread use of exchange restrictions outside North America after the second world war and the increasing resort by the United States to controls in the 1960s all restricted capital movements. Where these did not work directly, monetary policy was often adjusted to achieve the same effect.

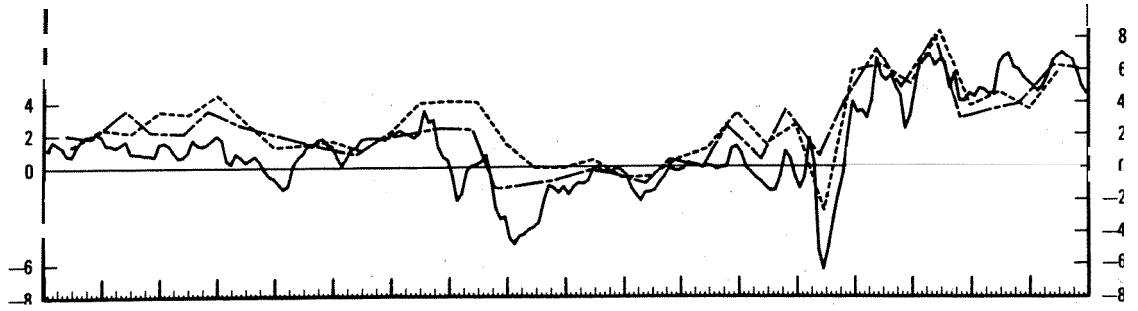
**CHART 1**

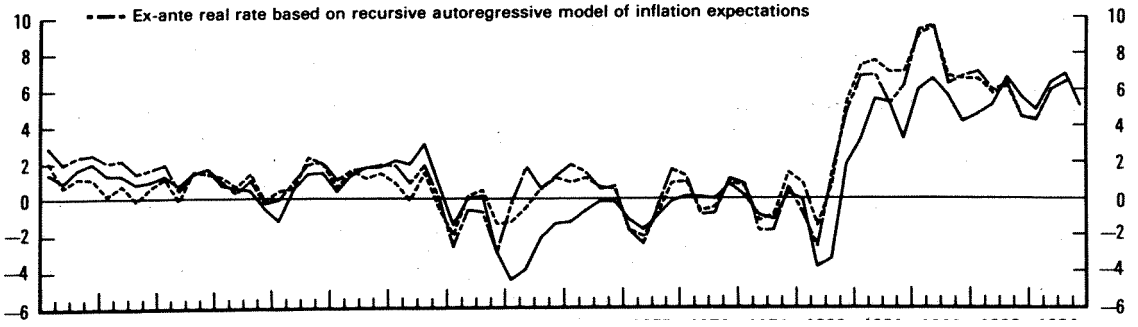
# INTEREST RATE BEHAVIOUR IN THE UNITED STATES

Per cent

## Nominal interest rates





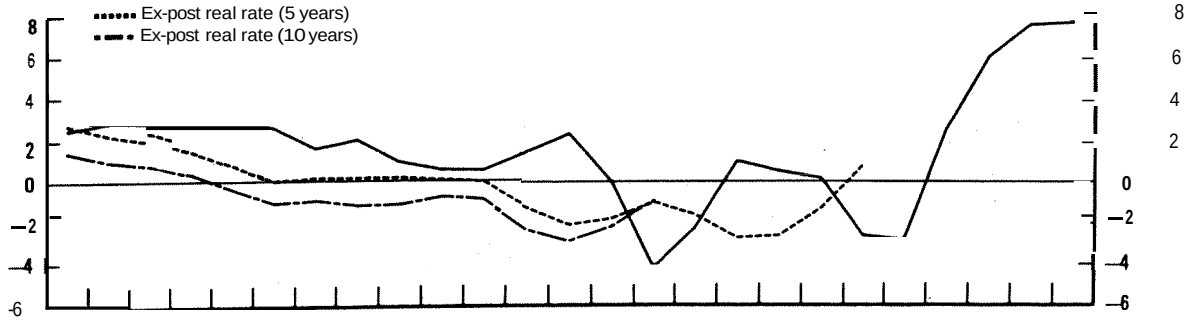
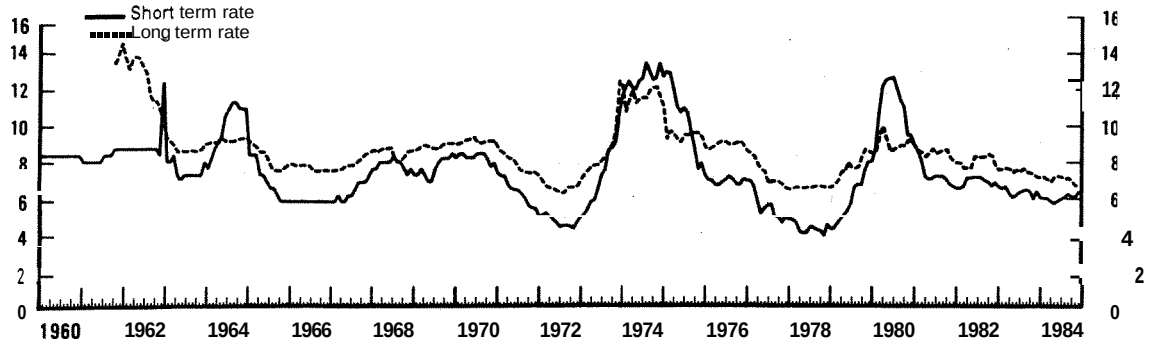



**CHART 2**

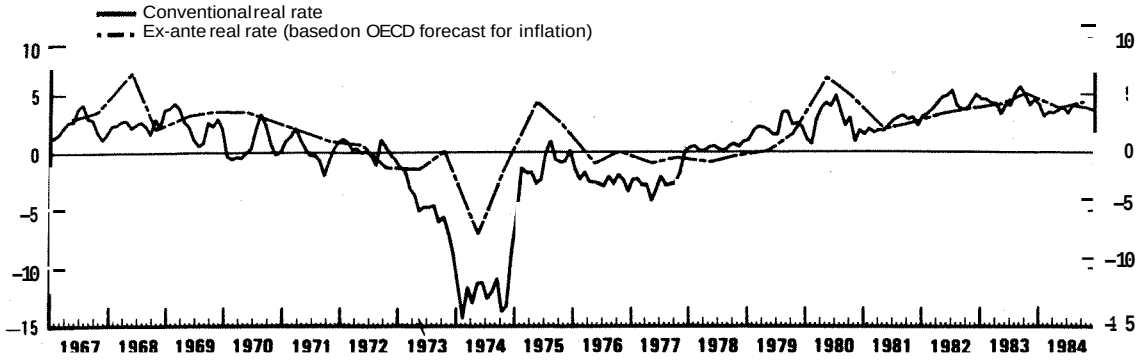
# INTEREST RATE BEHAVIOUR IN JAPAN

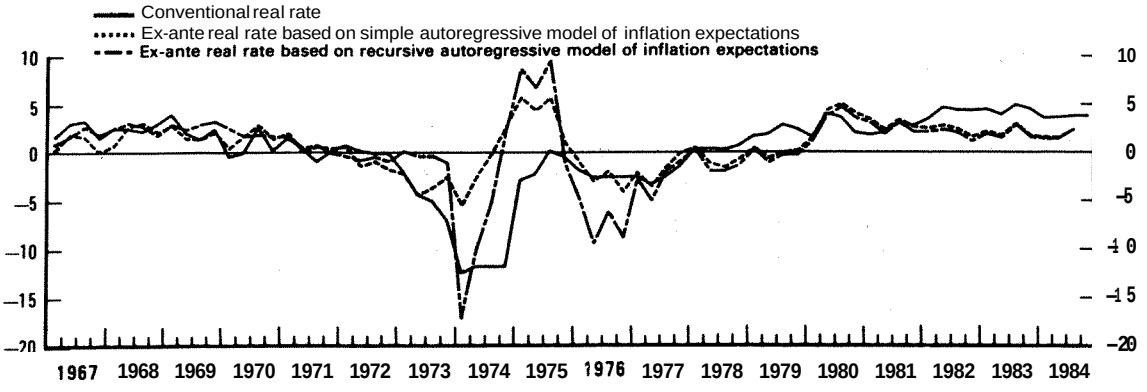
Percent

## Nominal interest rates

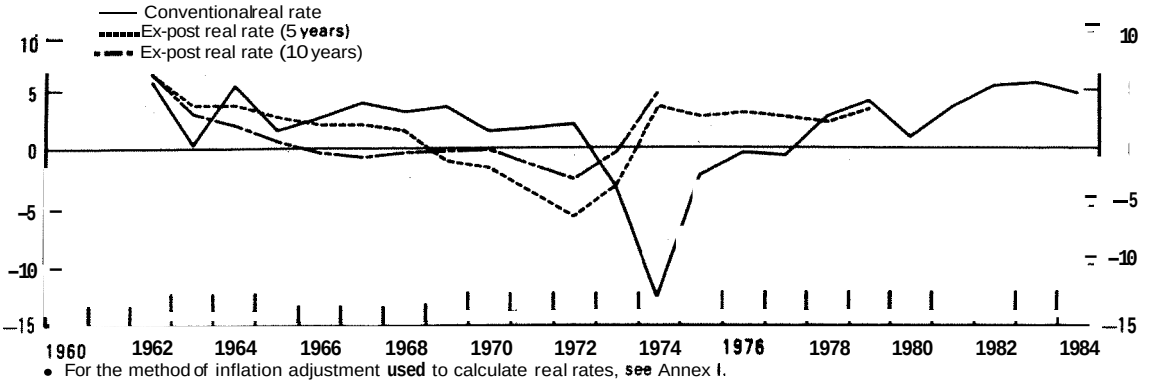



## Short-term real interest rates*




## Long-term real interest rates*




* For the method of inflation adjustment used to calculate real rates, see Annex I.

**CHART 3**

# INTEREST RATE BEHAVIOUR IN GERMANY

Per cent

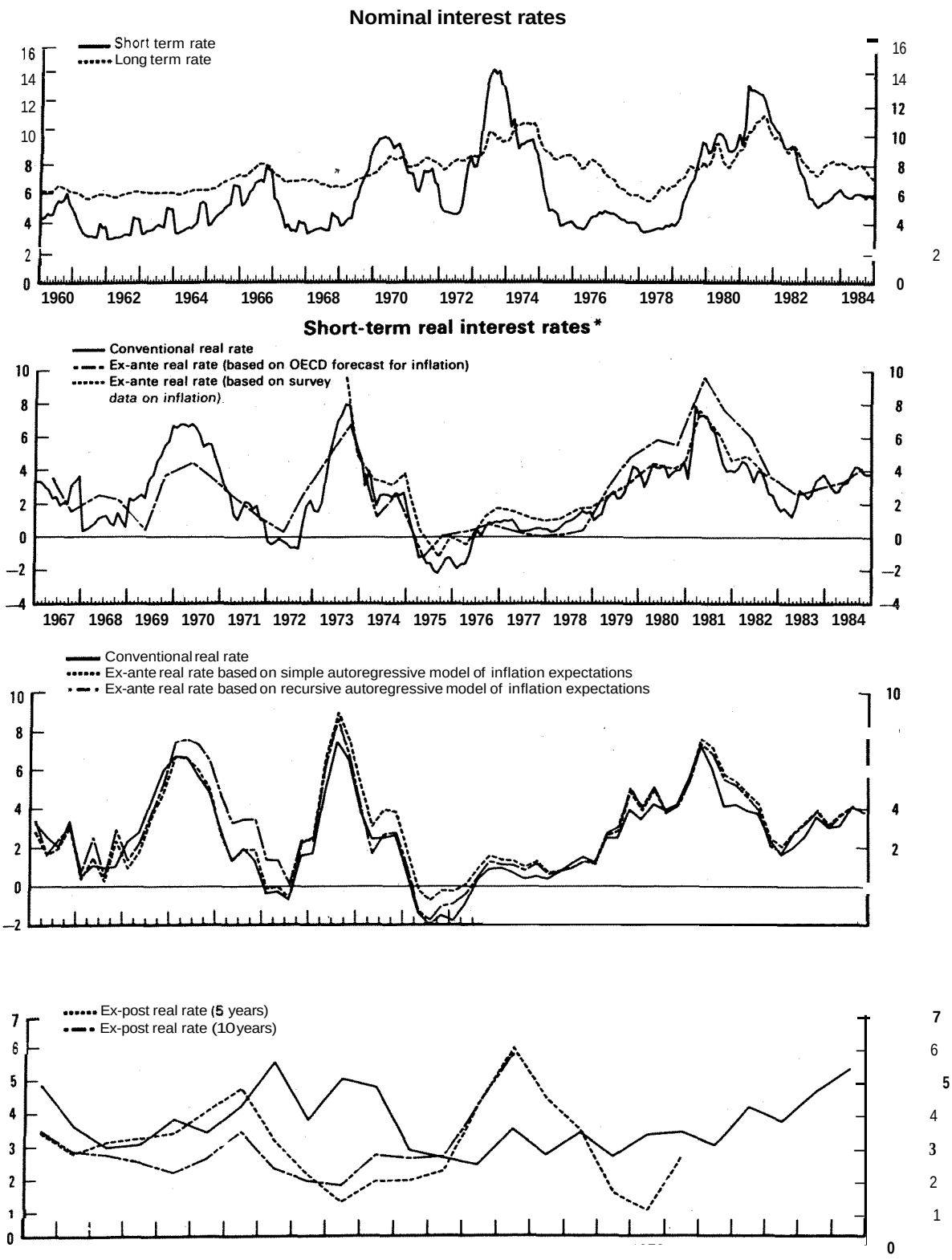
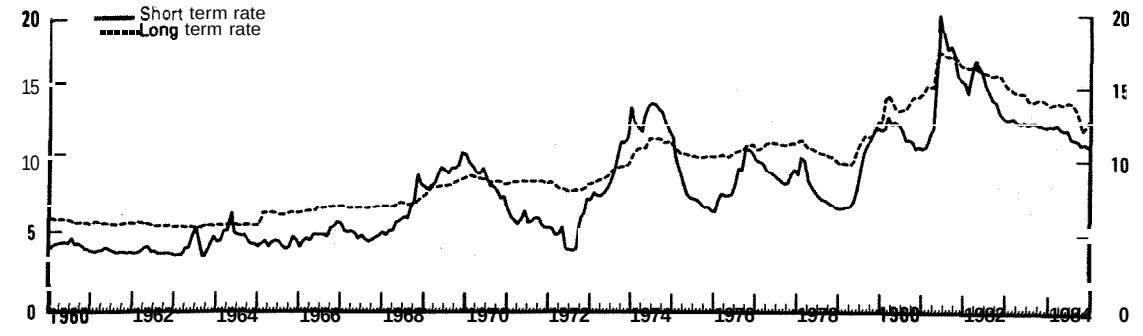


**CHART 4**

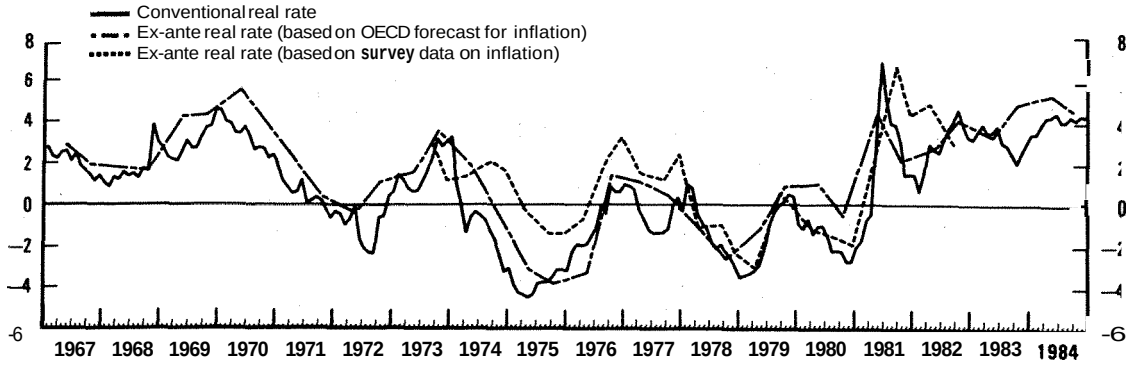
# INTEREST RATE BEHAVIOUR IN FRANCE

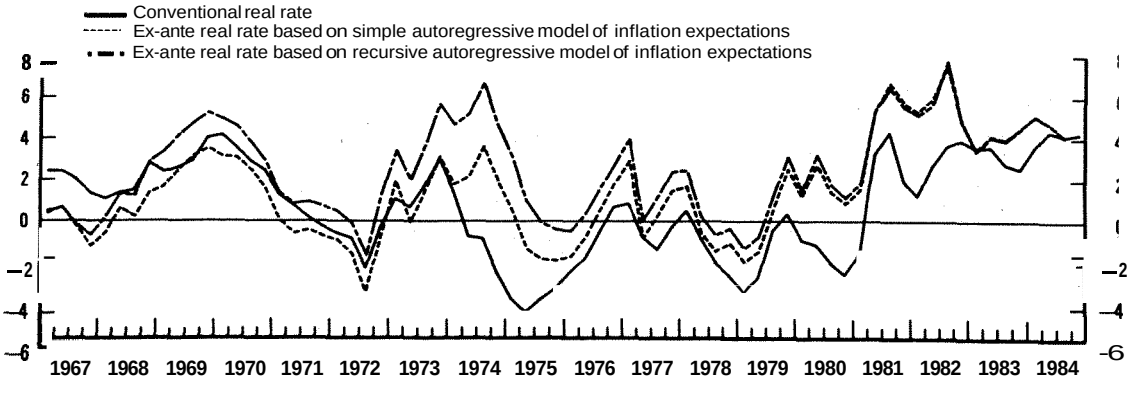
Per cent

## Nominal interest rates

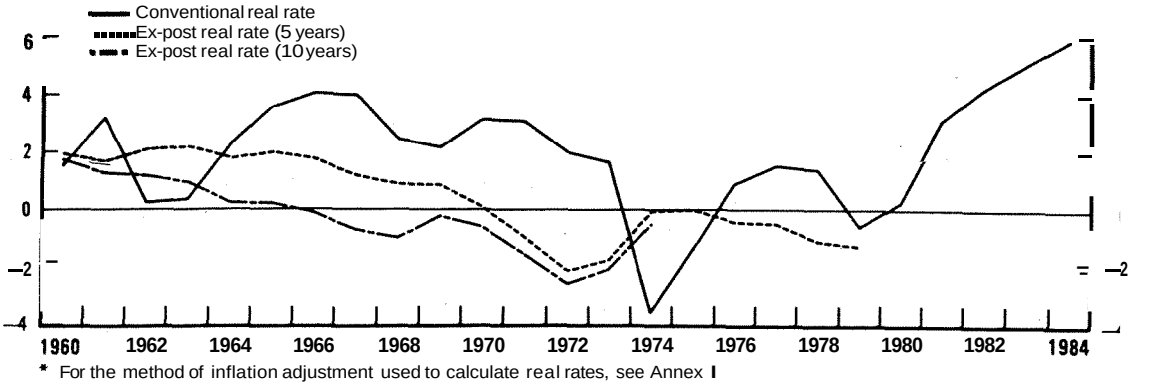



## Short-term real interest rates*




## Long-term real interest rates*

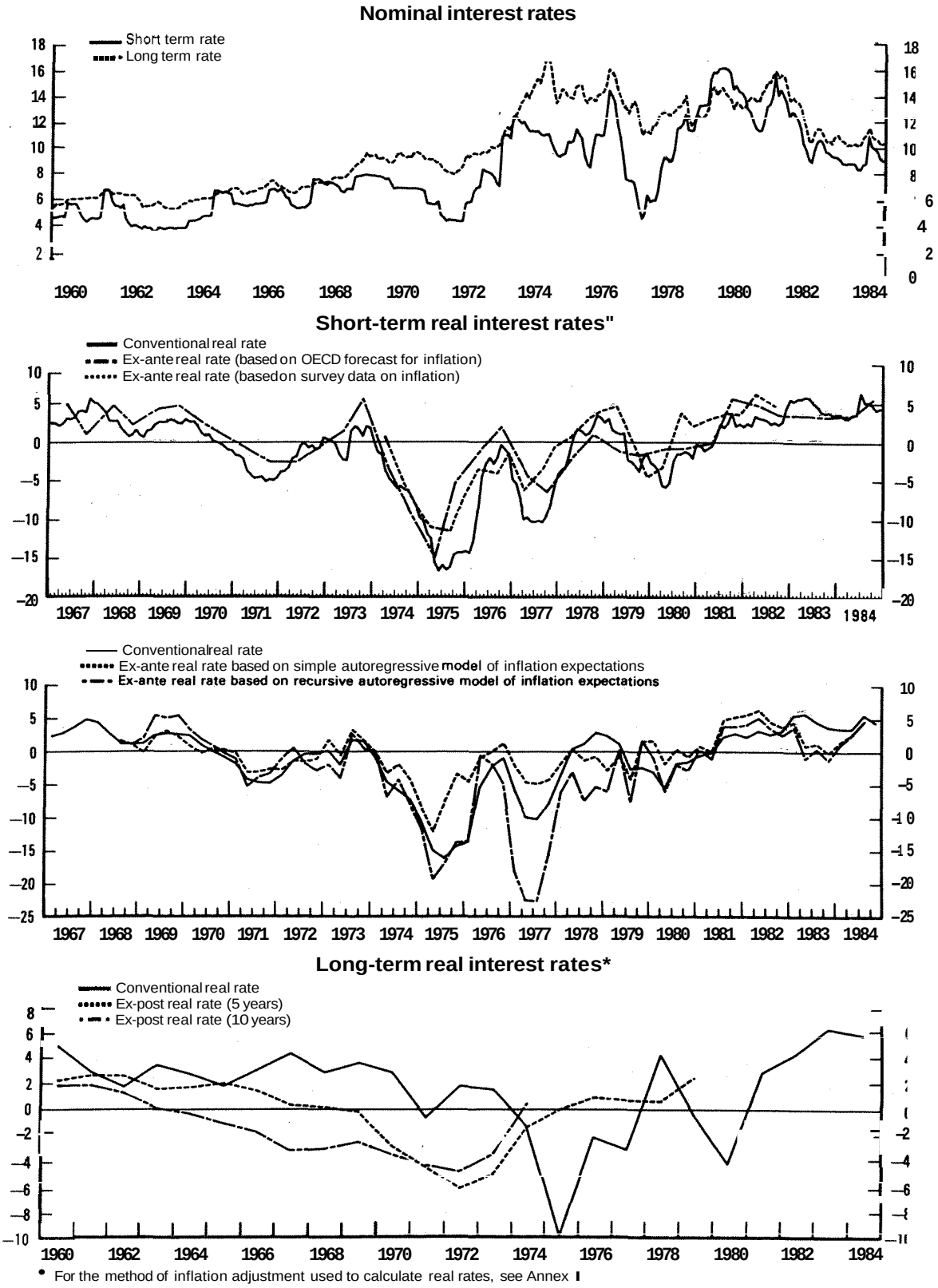



* For the method of inflation adjustment used to calculate real rates, see Annex I

CHART 5

# INTEREST RATE BEHAVIOUR IN THE UNITED KINGDOM

Per cent

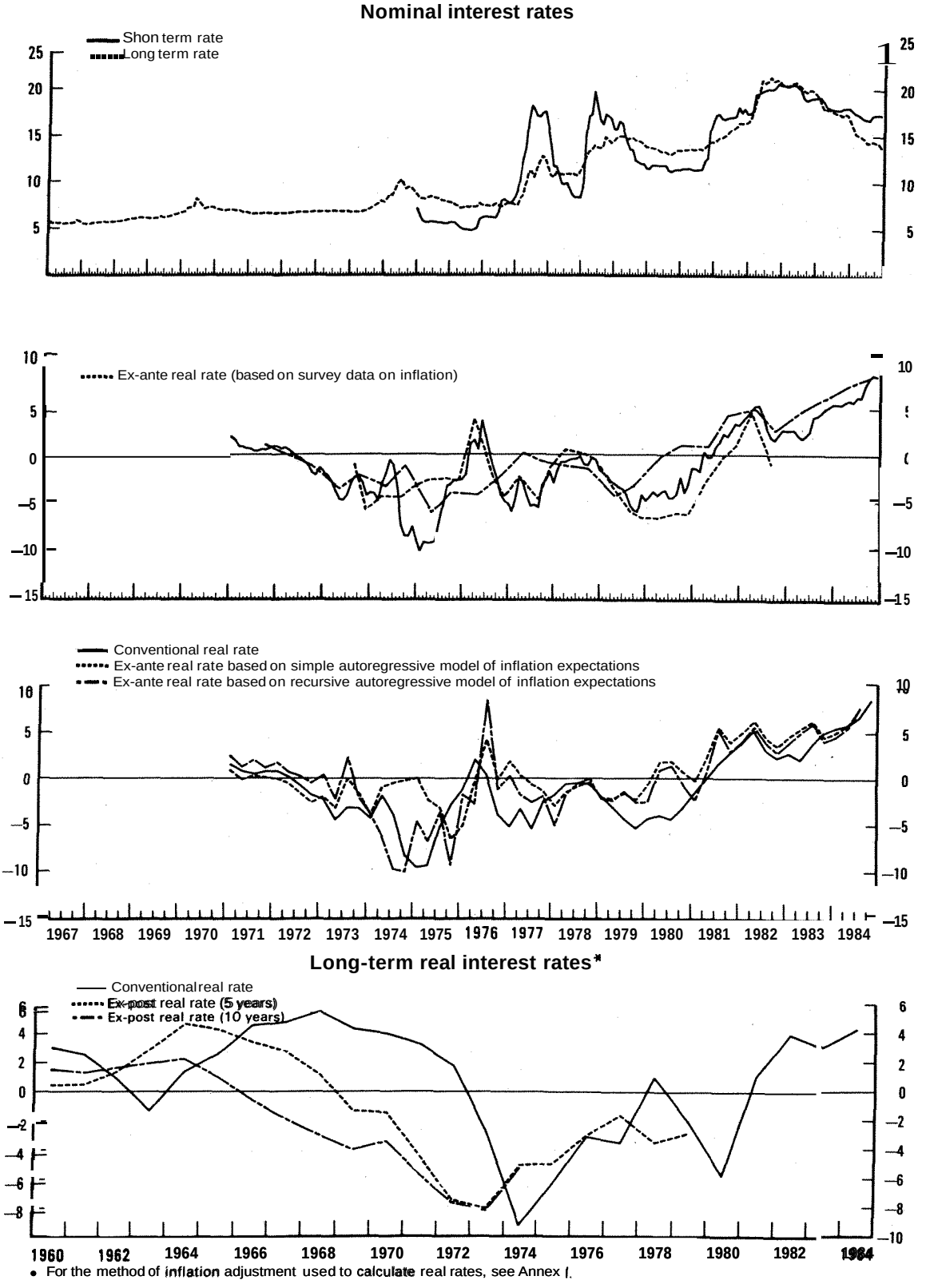



• For the method of inflation adjustment used to calculate real rates, see Annex I

CHART **6**

# INTEREST RATE BEHAVIOUR IN ITALY

Per cent



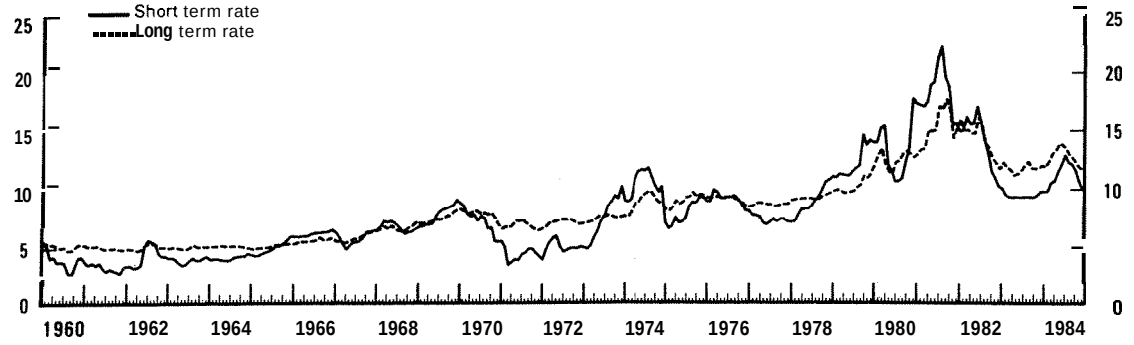

• For the method of inflation adjustment used to calculate real rates, see Annex I.

**CHART 7**

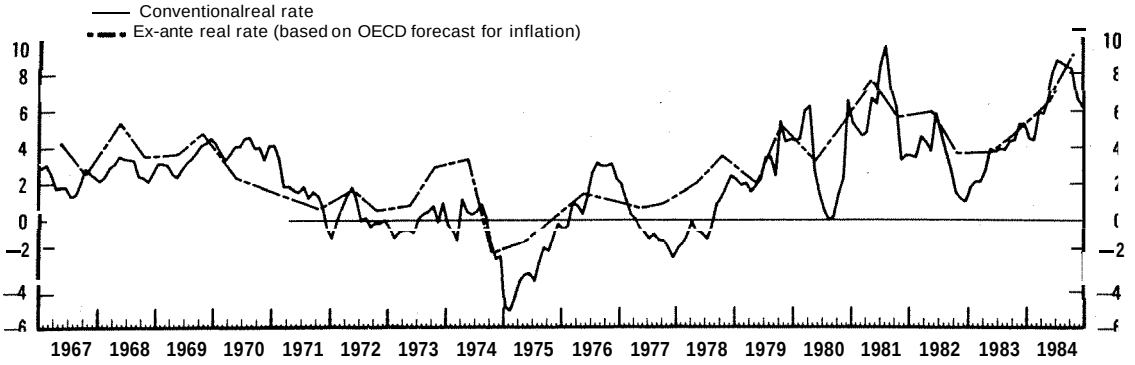
# INTEREST RATE BEHAVIOUR IN CANADA

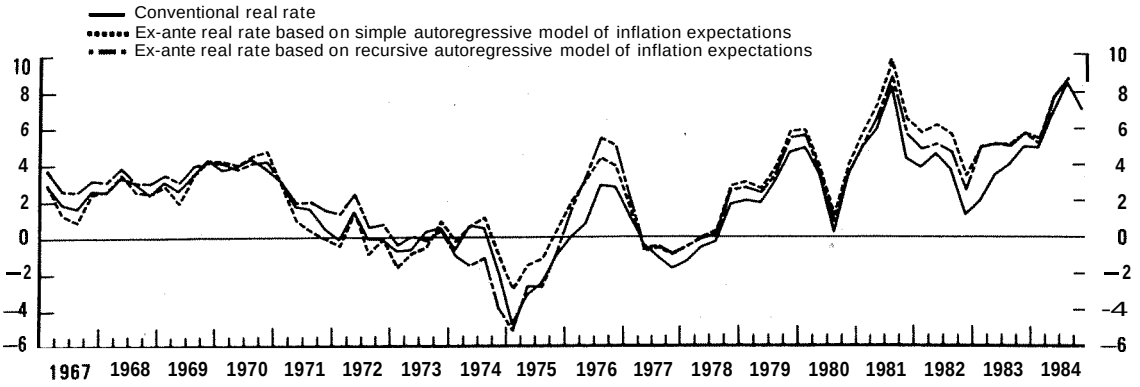
Per cent

## Nominal interest rates

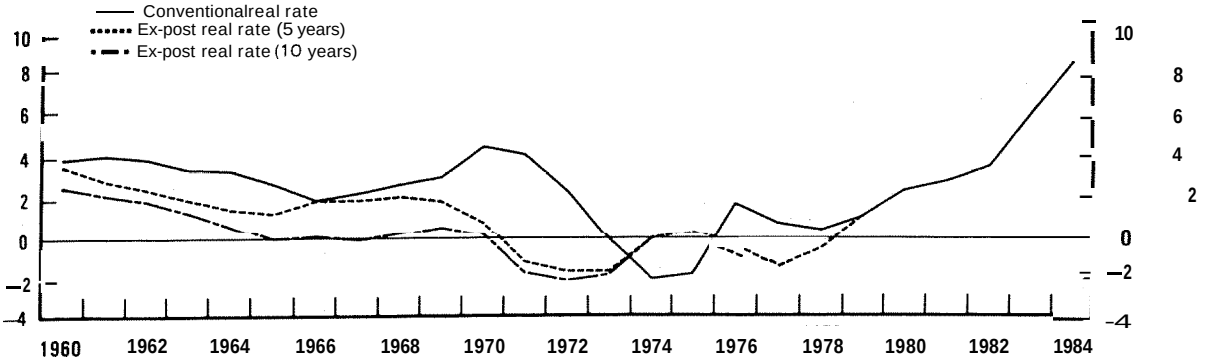



## Short-term real interest rates*




## Long-term real interest rates*



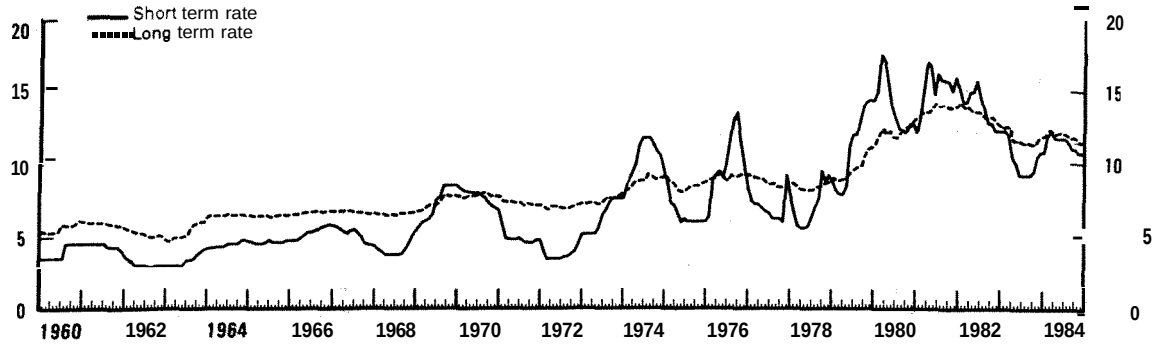

* For the method of inflation adjustment used to calculate real rates, see Annex I

**CHART *8***

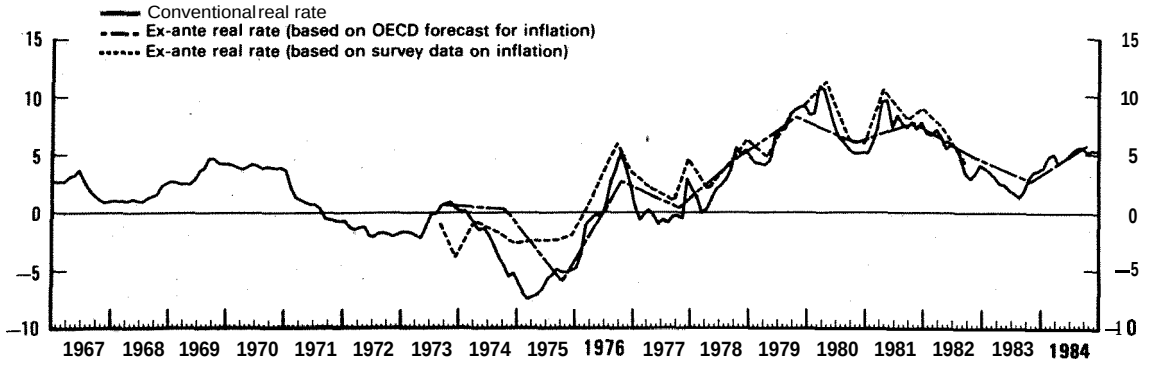
# INTEREST RATE BEHAVIOUR IN BELGIUM

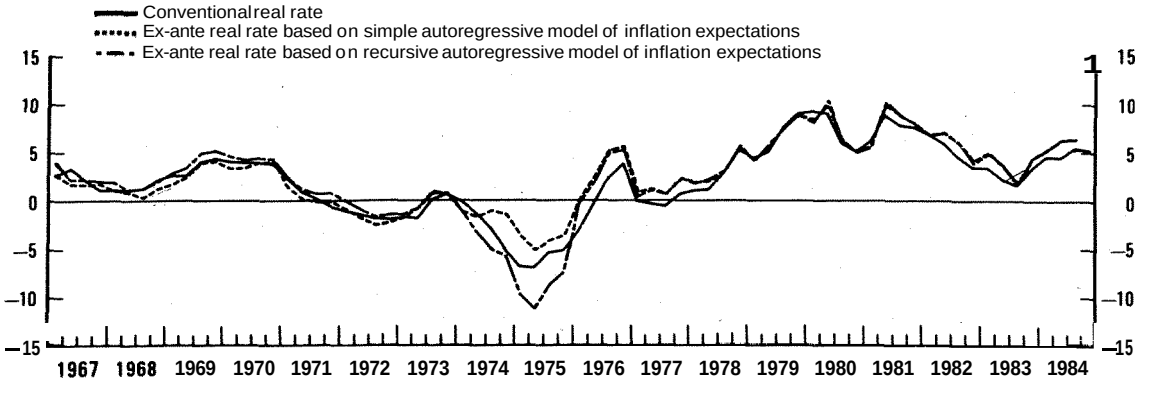
Percent

## Nominal interest rates

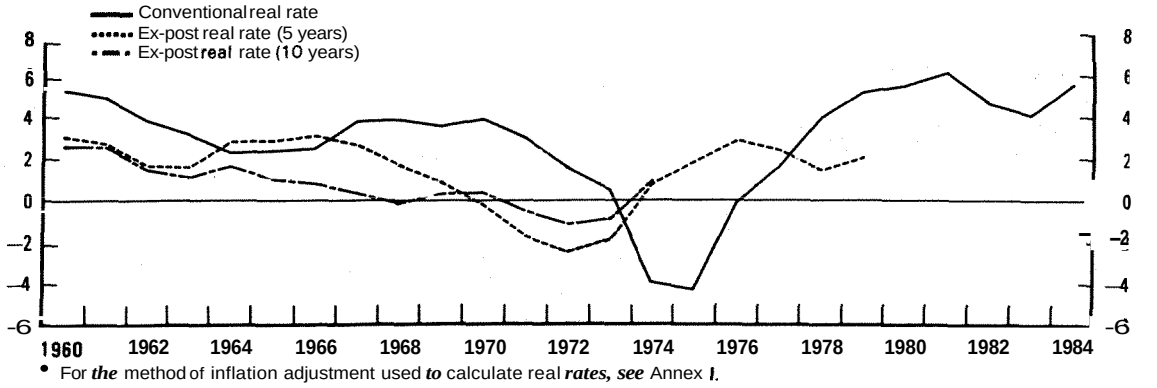



## Short-term real interest rates*




## Long-term real interest rates*



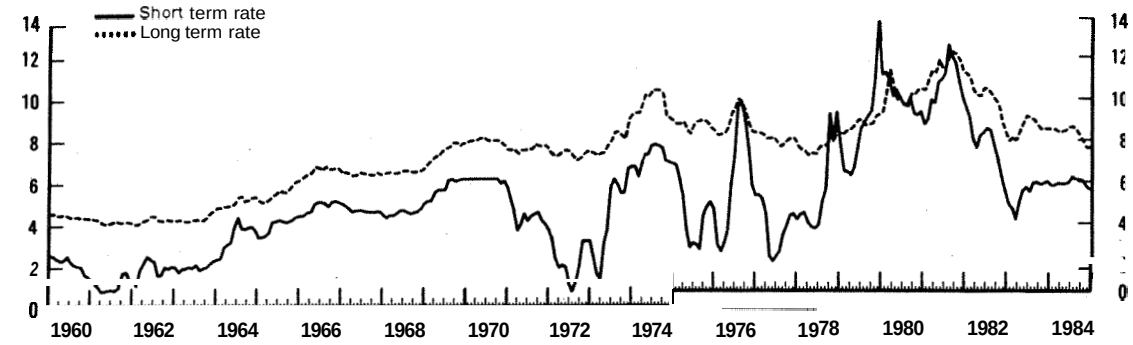

* For *the* method of inflation adjustment used *to* calculate real *rates, see* Annex I.

**CHART 9**

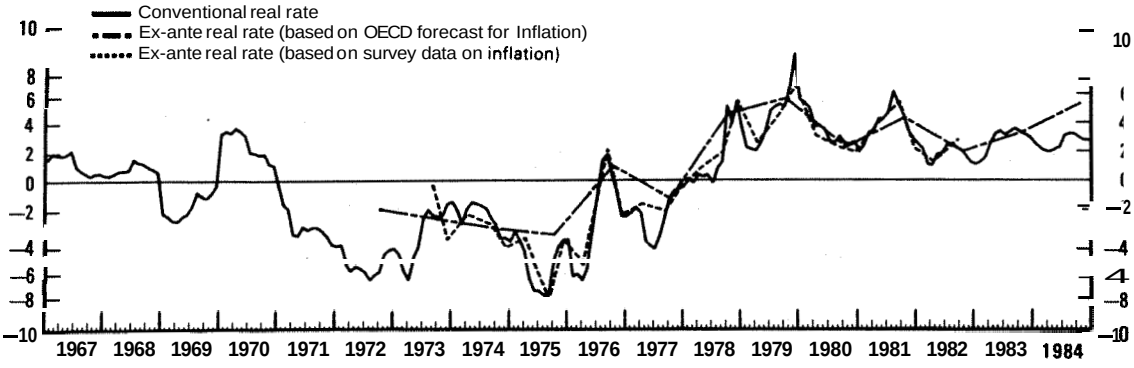
# INTEREST RATE BEHAVIOUR IN THE NETHERLANDS

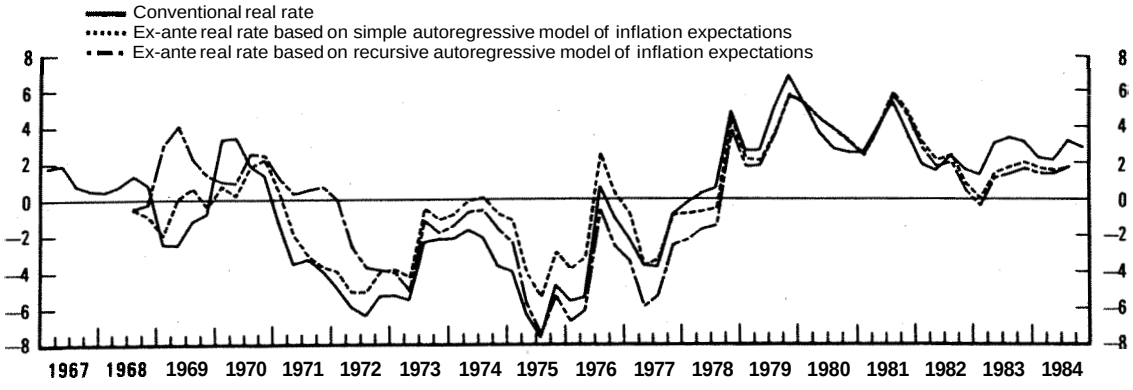
Per cent

## Nominal interest rates

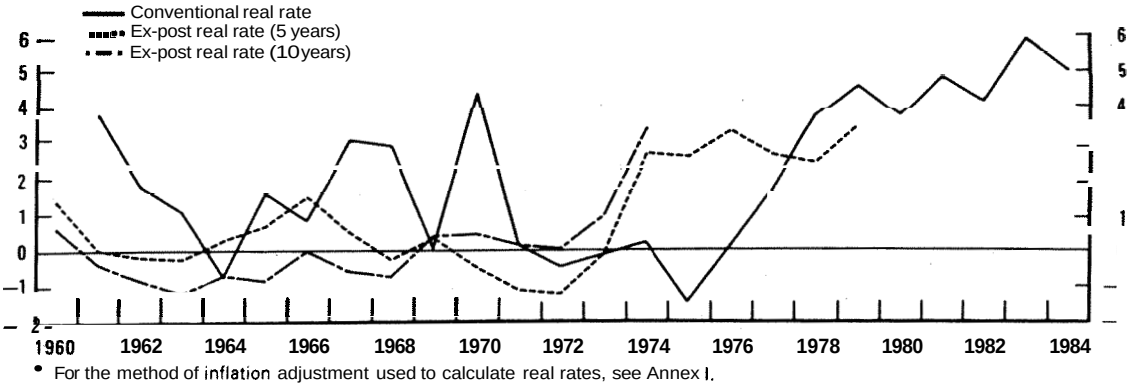



## Short-term real interest rates*




## Long-term real interest rates•



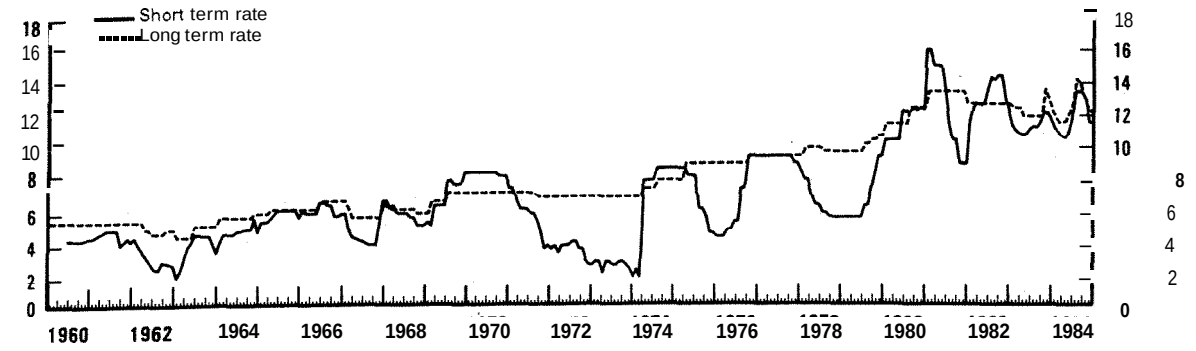

• For the method of inflation adjustment used to calculate real rates, see Annex I.

**CHART 10**

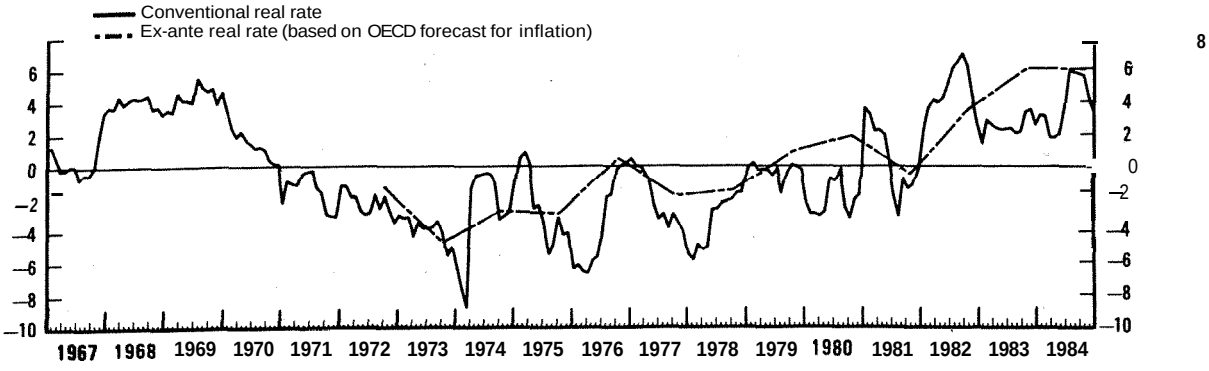
# INTEREST RATE BEHAVIOUR IN SWEDEN

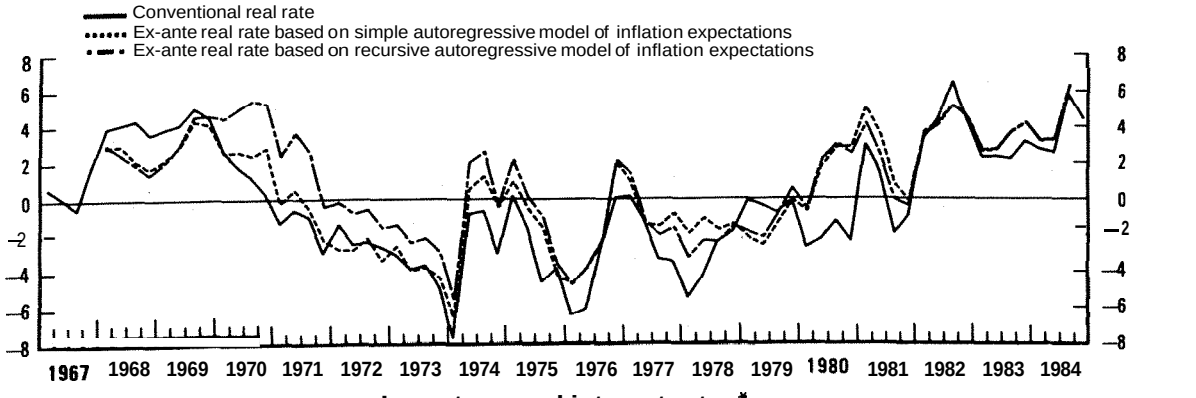
Per cent

## Nominal interest rates

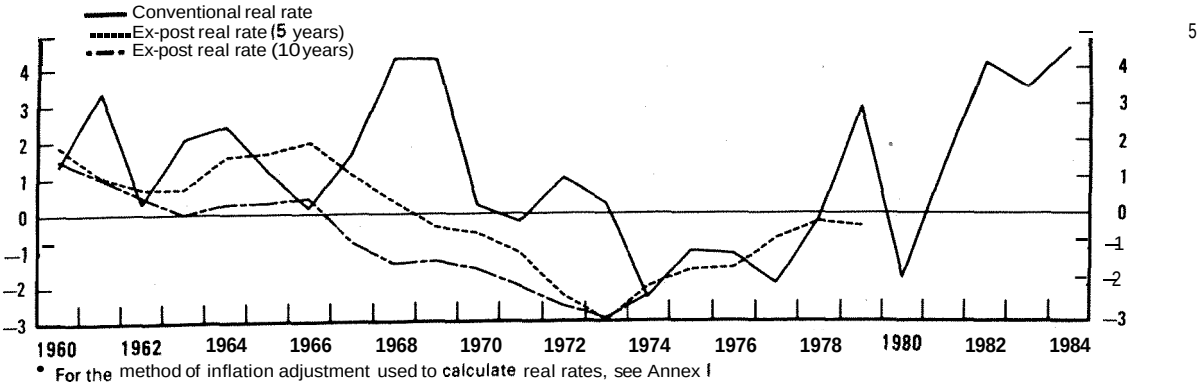



## Short-term real interest rates"




## Long-term real interest rates*

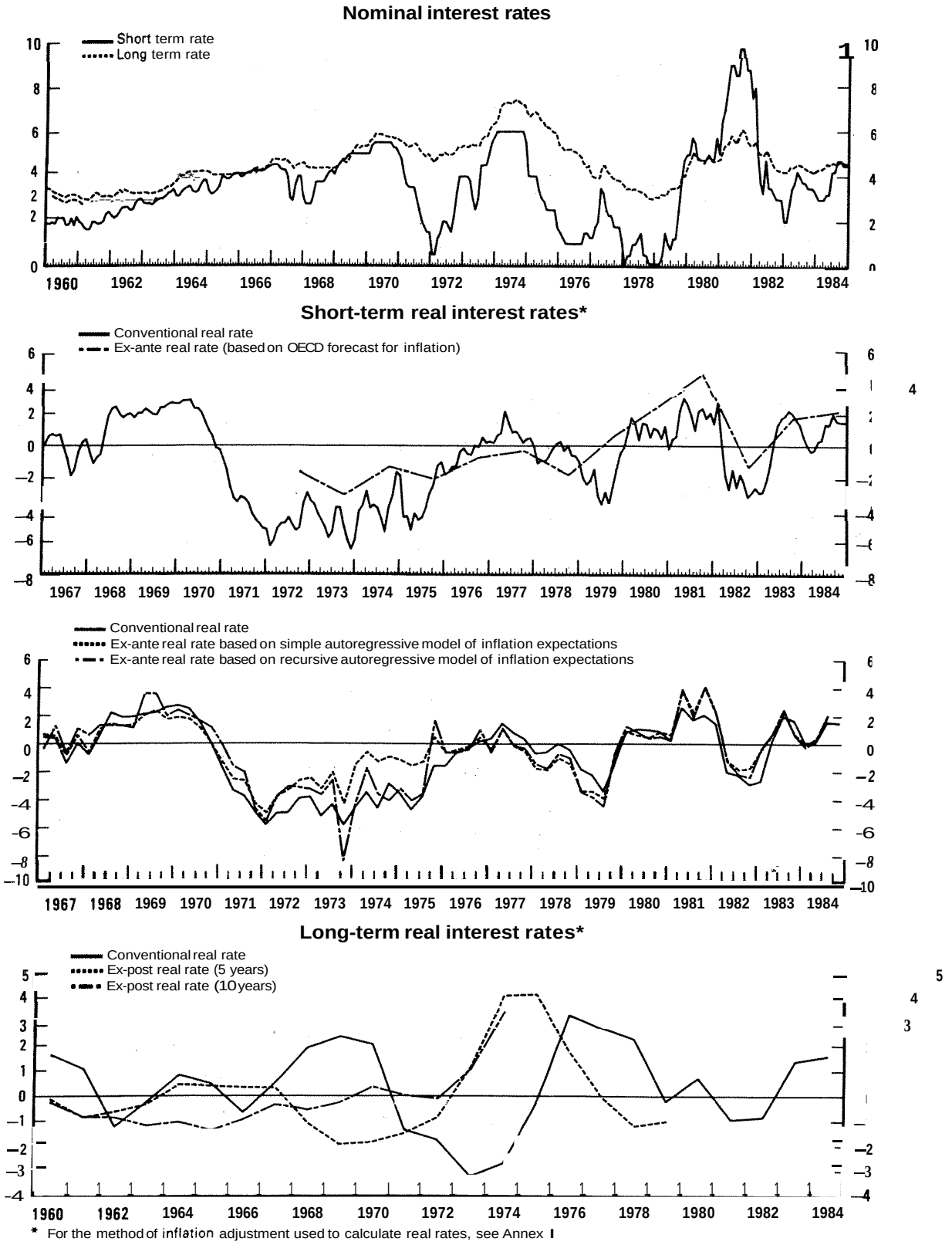



* For the method of inflation adjustment used to calculate real rates, see Annex I

CHART 11

# INTEREST RATE BEHAVIOUR IN SWITZERLAND

Per cent



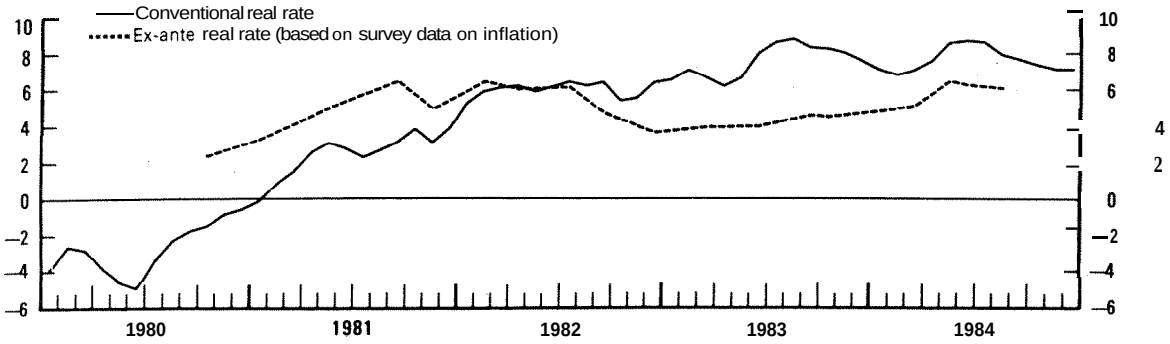

* For the method of inflation adjustment used to calculate real rates, see Annex I

CHART 12

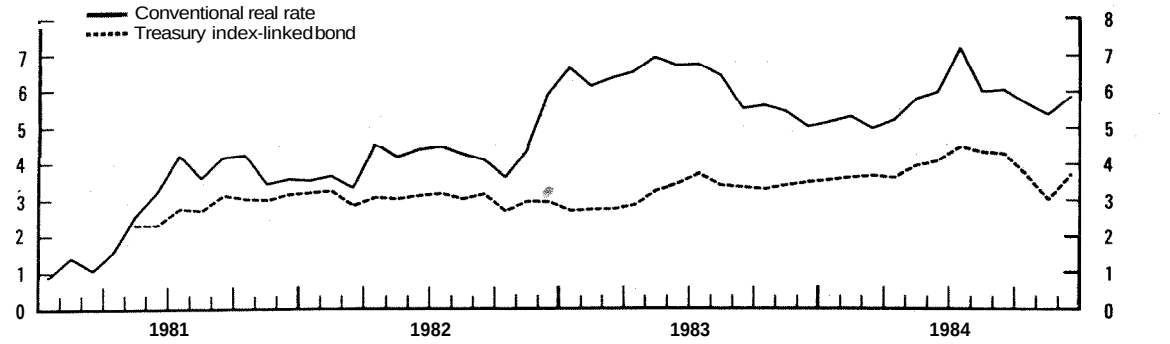
# ADDITIONAL MEASURES OF REAL LONG-TERM INTEREST RATES

Per cent

## United States




## United Kingdom




### NOMINAL INTEREST RATES USED IN CHARTS 1 TO 12

| | Short-term | Long-term |
|---|---|---|
| United States | 90-119 days prime commercial paper | 10-year government bonds |
| Japan | Call money | NTT subscriber bonds |
| Germany | 90-day interbank | Public sector bonds |
| France | Call money | Public and semi-public sector bonds |
| United Kingdom | 3-month Treasury bills | 20-year government bonds |
| Italy | 90-day interbank rate | Special Credit Institution bonds |
| Canada | 90-day finance company paper | Long-term government bonds |
| Belgium | 3-month Treasury bills | Long-term government bonds |
| Netherlands | 3-month Treasury bills | Long-term government bonds |
| Sweden | 3-month Treasury bills | Long-term government bonds |
| Switzerland | 3-month deposits with major banks | Long-term government bonds |

## ANNEX I

# THE MEASUREMENT OF REAL INTEREST RATES SHOWN IN THE CHARTS

Except for the rates on index-linked government bonds in the United Kingdom, shown in Chart 12, all real interest rate calculations are based on the nominal interest rates listed at the end of Annex I. Basic data for interest rates and Consumer Price Indices (CPI), where actual inflation is considered, are monthly. Quarterly and annual series are based on averages for the periods in question. Conventional real interest rates are shown in all charts. These are nominal interest rates less the percentage change in the CPI for the period in question during the previous year.

The following adjustments were used to derive the other series shown in the second and third panels of Charts 1-11:

*i)* OECD forecasts for the year-on-year change in the GDP deflator are taken as a measure of expected inflation. Forecasts published in the July and December issues of Economic *Outlook* are normally prepared by the OECD Secretariat during the spring and autumn, respectively. Nominal interest rates for the second and fourth quarters are therefore adjusted for these inflation forecasts and are presented in the charts. For Belgium, the Netherlands, Sweden and Switzerland forecasts are made on an annual basis only, so for these countries the charts show only one real interest rate per year (in the fourth quarter). No inflation forecasts were presented for any country in the December **1970** or July **1971** issues of ***Economic*** Outlook, for the United States in July **1973,** nor for the United Kingdom in December **1972.** Where possible, a national forecast was used instead [see Llewellyn and Arai, **(1984)**].

*ii)* Survey data on expected inflation has been collected for many years in the United States (Livingston survey), and since **1973** in Member countries of the European Economic Community (by the Commission of the EEC). The EEC data are only available to 1982. These data have been used to adjust nominal interest rates for the month in which the survey was taken.

*iii)* Two procedures based on autoregressive techniques have been applied to generate quarterly inflation forecasts which do not display systematic errors. These have been used to adjust nominal interest rates. The series labelled 'simple autoregressive model" is based on forecasts of inflation derived from a single equation estimated over the full sample period of the form:

$$dlnp = a, + \sum_{i=1}^{n} ß_i \, dlnp_{-i} \qquad [1]$$

This procedure is not fully consistent with the spirit of rational expectations, because the estimated coefficients based on data for the full sample period incorporate information that is known at the end of the period only, and cannot be available at earlier dates. The series labelled "recursive autoregressive model" uses forecasts based on equations derived from information available only at the time the forecasts were formulated. This involved re-estimating equation [1] above to incorporate the information that had become available during the forecasting period.

To determine the number of lags used in the estimated equations for each country the following technique was used: Equation [1] was estimated, for $n = 1,...12$, over the full sample period and over the shortest sample period availabe which would allow twenty degrees of freedom when twelve lags were employed. A Box-Pierce test for "white noise" was applied to the residuals [see Box-Pierce, (1970)]. For each country the number of lags selected was the smallest number which a) yielded an error process for which "white noise" could only be rejected with less than 10 per cent confidence for both long and short sample periods; and *b)* additional lags did not add significantly to the likelihood function for either long or short sample periods. For the United Kingdom this procedure yielded no satisfactory equation, so the short sample period was extended to allow twenty degrees of freedom if twenty lags were employed, and the procedure was repeated. The number of lags that resulted was as follows:

| | | | |
|---|---|---|---|
| United States | 7 | Canada | 9 |
| Japan | 12 | Belgium | 9 |
| Germany | 11 | Netherlands | 12 |
| France | 6 | Sweden | 8 |
| United Kingdom | 16 | Switzerland | 9 |
| Italy | 8 | | |

*Ex* post real interest rates, shown in the fourth panel of Charts 1-11, are the internal rates of return, R, derived from the following equation:

$$100 = \sum_{i=1}^{n} \frac{CF_i}{(1+R)^i} \quad ; \qquad [2]$$

where $CF_i$ is the nominal cash flow in year $i$, deflated by the *CPI*, associated with an investment of 100 in a fixed interest bearing financial asset held to maturity. The series for financial assets with a five-year term ends in 1979 and that for a ten-year term ends in 1974. This data was used to calculate the figures provided in line A of Table 8. Line B of Table 8 of the main text provides averages for returns on long term investments which had not matured in 1984. These returns were calculated as follows: the nominal cash flows on the asset in question from 1985 to maturity was discounted at the 1984 long term interest rate to derive its present value in 1984. Assuming that during 1984 interest was received and that the asset was sold for an amount equal to its present value, the nominal cash flow from the year of issue to 1984 was then deflated by the CPI. The internal rates of return were subsequently calculated as indicated above in equation [2].

The real interest rates presented in the Chart 12 are derived as follows:

*i)* Survey data for inflation expectations over a ten year horizon has existed in the United States since 1980 (Hoey survey). Long term interest rates are adjusted on the basis of this survey.

*ii)* Since 1981, index-linked government bonds have existed in the United Kingdom. While the possibility of some capital gain or loss exists if these are sold before maturity, they protect the holder from inflation by adjusting both interest payments and the principal for changes in the retail price index. Their yields are thus the best available measure of ex ante real interest rates. It should be noted that while non-residents may take advantage of this protection against inflation, they must accept the risk of real exchange rate changes themselves.

## ANNEX II

# DETAILS OF CALCULATIONS OF MAXIMUM PAYABLE INTEREST RATES PRESENTED IN TABLES 6 AND 7

### General methodology

The calculations in Tables *6* and 7 of the main text are based on a hypothetical investment in equipment which is expected to have a useful life of ten years. The investment expenditures take place in a single year and the asset is placed in service the following year. Physical depreciation thereafter results in a reduction in real pre-tax cash flow at a rate of 15 per cent per annum, and after ten years the equipment is assumed to be scrapped. A real salvage value, equal to 5 per cent of the original cost of the investment is assumed. This yields the following pre-tax cash flow, in real terms:

$$-I,\ RF,\ RF(1-d),\ RF(1-d)^2,\ldots,\ RF(1-d)^9 + 0.05(I); \qquad 1]$$

where:

*I* is the original investment expenditure:
*RF* is the real cash flow in the project's first year of service; and
*d* is the rate at which RF depreciates (taken to be 0.15).

The present value of the cash flow from the project can be equated to the cost of the project as follows:

$$I = RF \sum_{i=1}^{10} \frac{(1-d)^{i-1}}{(1+IRR)^i} + \frac{0.05(I)}{(1+IRR)^{10}}; \qquad [2]$$

where *IRR* is the investment project's real internal rate of return (i.e. the discount rate which would make the present value of the cash flow equal to zero). *IRR* has been set here at 0.1, which requires that RF be approximately equal to *0.261.*

To evaluate the project above a firm would need to take account of implications of inflation and taxation. The pie-tax cash flow is expressed in nominal terms by assuming that an average expected inflation rate will prevail over the life of the project. The OECD inflation forecast series employed to calculate ex ante real interest rates in Table 1 are used for this purpose. A nominal post-tax cash flow is derived by applying country-specific provisions of tax regimes on the assumption that, at the margin, the company undertaking the investment is fully subject to taxation at standard rates for large companies. In the United States, Japan and Germany this includes state or local taxation. Temporary surcharges in the United States during 1968-69 and in France during 1973 are ignored, whereas all surcharge which were in effect in Germany between 1968 and 1977 are taken into account. Depreciation allowances are used to reduce tax liabilities starting in the year in which the project is put into service, and the capital gain on the disposal of the asset as scrap is assumed to

be subject to tax in year ten. Depreciation schedules are assumed to be as advantageous to companies with a tax liability as the tax code permitted. No account is taken of special incentives for particular types of investment, industries or regions.

The discount rate which gives the nominal post tax cash flow a present value of zero is $r$ in the following equation:

$$I = \sum_{i=1}^{10} \frac{NCF_i}{(1+r)^i} \; ; \qquad [3]$$

where $NCF_i$ is the nominal post-tax cash flow in the $i$th year after the investment is undertaken. The maximum payable interest rate *(MPIR)* is derived on the assumption that the project is fully debt-financed, using the following formula:

$$MPIR = \frac{r}{1-tc} \qquad [4]$$

where $tc$ is the marginal tax rate on income against which interest payments are allowable as a cost. The assumption that the project is fully debt-financed implies that the cost of the project is sufficiently small in relation to the investing company's assets that debt/equity considerations are not a constraint.

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