

**REAL INTEREST RATE TRENDS: THE INFLUENCE OF SAVING,
INVESTMENT AND OTHER FACTORS**

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The authors would like to express their thanks to colleagues at OECD for helpful comments and to Sheena Bohan, Jackie Gardel and Anick Lotrous for their assistance in the preparation of the paper. Special thanks are due to Thomas Egebo who contributed to the assessment of non-OECD demand for saving.

INTRODUCTION

This paper examines the implications for real interest rates of developments in global saving and investment. Looking back, for most of the **1980s** saving and investment were relatively low by earlier standards. At the same time, real interest rates were relatively high. The persistence of higher real interest rates has been taken as an indication that welfare-enhancing investment is being constrained. The paper considers what the main factors were behind the higher real interest rates of the **1980s**. Using this as a base, the paper then looks forward to consider the possible effects of prospective changes in the demand for funds from regions outside the OECD and of pressures on the supply of saving – from the flow of government saving in the short to medium term and from the consequences of demographic changes in the longer term – on the real interest rate. In discussing past and prospective developments, the paper draws on and synthesises a range of previous work in this field.

The paper is structured as follows. Section I gives a broad overview of past trends in saving, investment and real interest rates. In Section II, the behaviour of real interest rates is examined to consider why they were higher in the **1980s**. This section takes as a starting point the view that the real interest rate is one channel through which ex-ante imbalances between saving and investment are equilibrated. Given the medium-term focus of the paper, important short-run influences on real rates – particularly monetary policy – are given less emphasis. An important determinant of the response of real interest rates to changes in saving and investment is the real interest elasticity of saving and investment; this is therefore examined. The section then goes on to examine specific factors that may have influenced the broad trends in real interest rates over time.

The paper turns to prospective influences on real interest rates in Section III. On the government-saving side, under announced policy settings, and given a number of assumptions about the path of the global economy, net government borrowing by OECD countries should be reduced by around 2 per cent of OECD GNP by **1996**. An assessment of the possible increase in non-OECD demand for funds concludes that this may have only a modest impact on global real interest rates given the likely order of magnitude involved. Finally, taking a longer-term view, the paper considers the role of demographic factors, in particular the ageing of the populations of many countries. It is suggested that the response of private saving is very uncertain but may be less strong than sometimes argued in the literature. Furthermore, even if saving is reduced, any incipient pressures on real interest rates will be eased by potential reductions in desired investment. The conclusions in Section IV review this material, discuss the issue of whether high real interest rates are cause for concern and consider the policy implications that may follow.

I. TRENDS IN SAVING, INVESTMENT AND REAL INTEREST RATES

A. World saving and investment rates

1. *The global picture*

World saving and investment rates fell sharply at the beginning of the 1980s. Despite some increase recently, they remain around 2 percentage points of world GDP below their average level in the 1970s and, judged by partial data on earlier years, have also been lower than in the 1960s. With the OECD accounting for about three-quarters of world saving and investment, the broad trends in the world aggregate have been similar to the trends in OECD countries.

The behaviour of saving and investment in the non-OECD region has varied considerably between country groupings, reflecting significant variations in the economic structure and stages of development (Chart A). Moreover, non-OECD saving has been intimately linked to what has happened to oil prices and production. Thus, the decline in non-OECD saving in the early 1980s was largely due to a sharp fall in saving rates amongst the *OPEC countries*, with the share of OPEC saving in world saving declining rapidly after peaking in 1981. Non-OECD saving increased sharply after 1986 and at the end of the 1980s was higher than at any time since 1970.

The external positions of most non-oil developing countries were put under pressure in the early 1980s both by oil and other commodity-price developments and in many cases by growing debt burdens that increased further as interest rates rose sharply. In Latin America, the onset of the debt crisis was associated with a squeeze on both investment and saving in the early 1980s, but some recovery took place towards the end of the decade. In Africa, saving and investment rates declined during the 1980s. Saving rates in the Asian NIEs rose by around 7 percentage points of GDP during the 1980s to around 36 per cent of GDP in 1988, while investment rates declined from their peaks of the early 1980s. These opposing trends led to the large external surpluses in the NIEs in the second half of the 1980s.

2. *The situation in OECD countries*

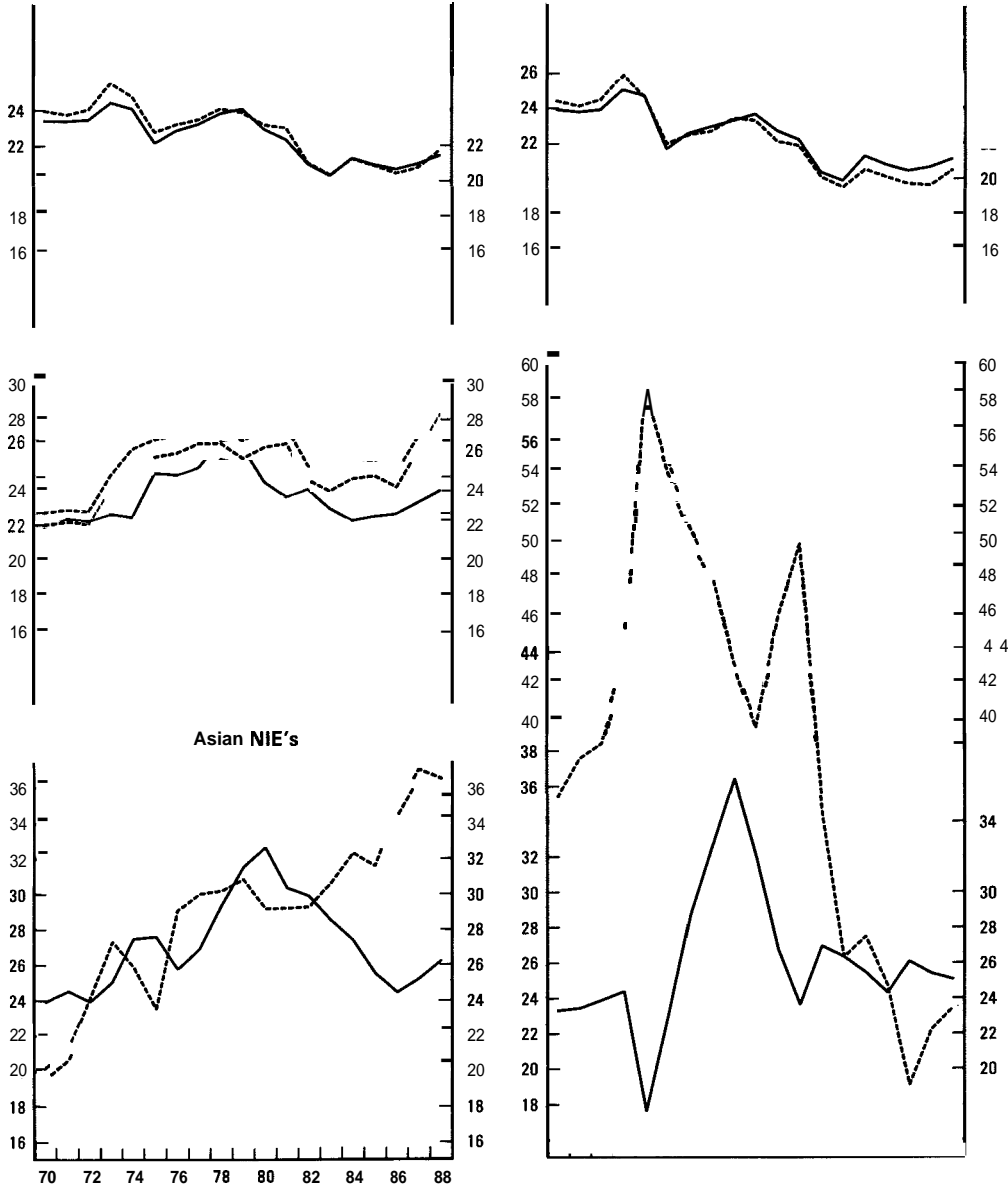
For the OECD region as a whole, the ratio of gross national saving to GNP in the 1980s was on average around 3 percentage points below that of the 1960s and 1970s. The corresponding declines in the gross national investment ratio were between 2 and 2½ percentage points even though the investment ratio rose in the second half of the 1980s (Chart B). Rates of net saving and investment fell even more because of increases in depreciation.

A notable feature of the decline in *saving ratios* since the 1960s is that it has been associated with a decline in the rate of *government saving* (Table 1). In many cases, the decline in government saving accounts for most of the decline in gross national saving and in some cases offset increases in private saving. Likewise, the main factor behind the rise in saving ratios in the past few years has been a turnaround in government saving (with a reduction in the rate of government dissaving).

The rate of *private-sector gross saving* (household saving plus business saving) has been relatively stable over time. In many cases, the average gross private saving ratios in the 1980s were little different from the average for the 1960s. In a number of

Chart A. Investment and saving ratios
Percentage of GNP

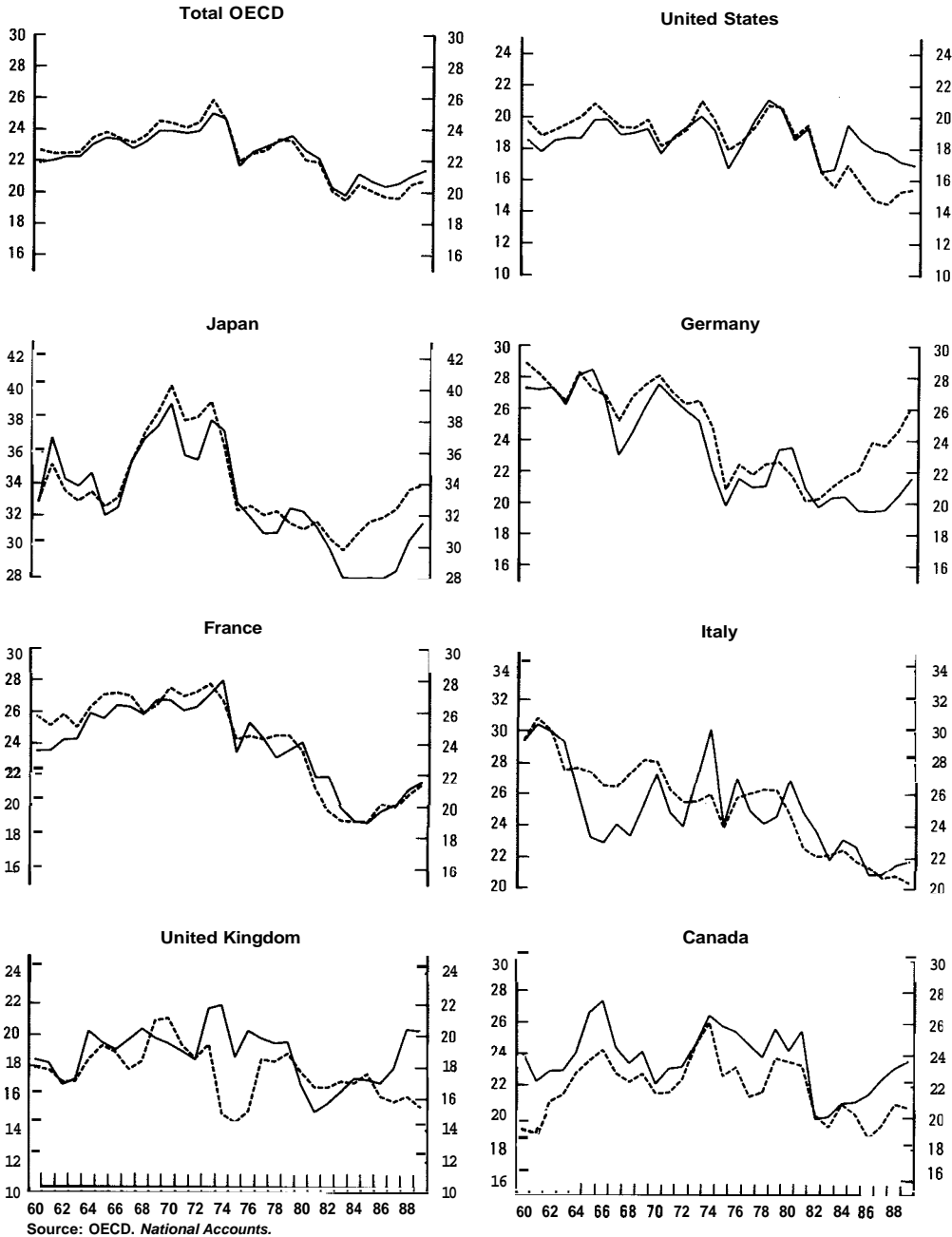
— Gross investment
- - - Gross saving



Sources: World Bank and OECD, *National Accounts*.

Chart B. Investment and saving ratios in OECD countries
Percentage of GNP

— Gross investment
 - - - - Gross saving



	Saving			Investment			Saving	Investment
	Total	Private	Public	Total	Private	Public	Total, level 1989	
United States	-3.4	0.6	-4.0	-1.0	0.1	-1.1	15.4	17.0
Japan	-2.8	-1.4	-1.3	-5.1	-6.0	0.9	34.0	31.5
Germany	-4.8	-0.6	-4.2	-5.9	-4.6	-1.4	26.2	21.6
France	-5.8		..	-4.4			21.3	21.5
Italy	-6.2	2.4	-8.6	-3.6	-3.1	0.5	20.3	21.8
United Kingdom	-1.8	1.3	-3.1	-1.5	1.2	-2.3	15.5	20.3
Canada	-1.2	4.0	-5.1	-2.0	-0.4	-1.6	20.6	23.6
Austria	-3.4	1.2	-4.5	-3.1	-0.9	-2.2	26.2	26.2
Belgium	-5.6			-4.6			21.1	20.0
Denmark	-7.8			-6.4			18.1	19.4
Finland	-1.0	2.1	-3.0	-0.5	-1.0	0.4	26.2	29.5
Greece	-1.8	9.4	-11.2	-1.1	-0.6	-0.4	14.9	19.7
Iceland	-6.7			-5.1			17.3	19.0
Ireland	0.2			3.9			22.6	21.1
Netherlands	-4.7	0.6	-5.2	-7.1			24.3	21.4
Norway	0.3	-0.1	0.5	-1.8	0.7	-1.1	25.5	25.3
Portugal	1.3			4.7			27.3	29.6
Spain	-4.2			-4.1			22.3	25.5
Sweden	-6.7			-5.7			19.1	21.9
Switzerland	-0.9	0.0	-0.9	-5.0			32.3	28.3
Turkey	4.3			4.9			23.4	21.8
Australia	-4.0			-1.8			22.5	26.3
New Zealand	-0.9			1.1			18.4	25.2

Source: OECD, National Accounts.

countries, however, private-sector saving ratios fell sharply during the 1980s. These declines were largely due to a fall in the household saving ratio, a development linked in most cases to financial-market liberalisation. Disinflation in the early 1980s was also important, at least in reversing the inflation-induced bulge in saving during the 1970s. While there is a behavioural link between inflation and saving, trends in household saving (and private saving) may be altered if adjustment is made to correct measures for the holding gains and losses due to inflation (for a discussion of measurement issues concerning saving and investment, see box on measurement issues).

Most countries have experienced a fall in their *investment ratio* since the **1960s** and 1970s. In general, the bulk of this decline was associated with a fall in the investment ratio of the private sector. There are notable exceptions such as the United States and the United Kingdom where the fall was predominantly in the government sector. Private-investment ratios have risen sharply in the past few years but mostly remain below the levels of earlier decades.

B. Real interest-rate movements

Real interest rates were higher in the 1980s than in the previous two decades. This conclusion appears to be relatively robust, irrespective of the chosen measure of real interest rates (see box on measurement issues, page 117).

Both short-term and long-term real interest rates were extremely low and sometimes negative in the 1970s and in most cases in the OECD area several percentage points below their 1960s levels (Table 2). A notable exception was provided by real interest rates in western Germany, where long real rates never fell below 1½ per cent and short real rates remained positive. The trough in real interest rates in the mid-1970s roughly coincided with the peak in inflation rates around that time. Real rates rose quickly thereafter and particularly steeply in the late 1970s and early 1980s. This steep rise in real rates occurred in each of the major seven economies with peak real rates in the United States exceeding those in the other major economies.

The behaviour of real interest rates across countries seems to have diverged during the early 1980s (Charts C and D). In Europe and Japan, real interest rates increased to about 5 per cent at the start of the 1980s and stayed at this level throughout the decade. The sharper increase in the United States was followed by a considerable decline after 1984, and real rates there were somewhat lower at the end of the decade than in the other major economies.

Over the longer run, one would expect trends in the real return on financial assets to be similar to real yields on physical capital, after allowing for differences in risk and tax treatment. In the short run, however, differences in real yields on financial assets and yields on physical capital can be, and have been, substantial. For example, while real interest rates increased rapidly to peak levels between the late 1970s and early 1980s, profitability hit a low point in most countries at that time. As a crude gauge of developments for rates of return in physical investment, real share price indices, pre-tax marginal rates of return and gross *ex-post* rates of return in the business sector are shown in Charts E, F and G. Except for Japan, all show similar developments. All fall, for instance, during the 1970s and increase sharply from the early to **mid-1980s** and the shape of the curves is in general also similar to those for real interest rates discussed above.

II. THE BEHAVIOUR OF REAL INTEREST RATES

A plausible explanation of the evolution of real interest rates in the 1970s and 1980s would emphasise the following points:

- In the 1970s, financial-market regulations inhibited changes in nominal interest rates in response to inflation. Hence, fluctuations in inflation tended to be reflected in real interest rates. As inflation increased, real interest rates fell.
- In the early part of the 1980s, the stance of monetary and fiscal policy, against a background of progressive removal of interest rate and quantitative restrictions on financial intermediaries in a number of countries, contributed to the high real interest rates at the time.

Table 2. Nominal and real interest rates¹

	1960s average		1970s average		1980s average	
	Real	Nominal	Real	Nominal	Real	Nominal
United States	1.52	4.16	-0.50	6.54	3.68	8.77
	2.60	5.18	1.31	8.39	6.20	11.24
Japan	-	-	-1.96	6.76	4.34	6.48
	3.70	8.99	-0.19	8.46	4.78	6.76
Germany	2.09	4.83	1.92	6.95	4.03	6.84
	3.85	6.67	3.16	8.16	5.00	7.70
France	-	-	-0.63	8.83	4.10	10.93
	2.17	6.35	0.21	9.92	5.57	12.24
Italy	-	-	-	-	4.53	15.40
	1.72	5.52	-3.79	10.35	4.07	14.54
United Kingdom	-	-	-2.56	10.40	5.56	12.15
	2.86	6.68	-1.34	11.49	5.00	11.52
Canada	2.56	5.36	1.21	8.31	5.65	11.62
	3.16	5.82	1.26	8.67	5.86	11.66
Austria	-	-	-0.13	6.08	3.24	7.08
	3.70	7.24	2.15	8.44	4.45	8.20
Belgium	1.67	4.75	1.06	7.88	5.75	10.54
	3.11	6.29	1.42	8.47	5.98	10.58
Denmark	-	-	-	-	5.50	11.72
	2.27	7.98	4.03	14.28	7.87	14.07
Finland	-	-	-0.94	10.00	5.63	12.64
	2.96	7.91	-2.07	9.14	4.42	11.14
Greece	6.06	8.50	-1.11	11.46	2.73	21.48
	4.84	7.19	-2.70	9.96	-0.36	18.26
Iceland	-3.98	6.97	-19.16	13.01	-0.44	29.00
	-0.79	9.52	-15.15	18.25	-2.27	34.38
Ireland	-	-	-4.46	9.52	3.98	12.24
	1.98	6.63	-1.84	12.46	5.24	13.01
Netherlands	-0.51	3.63	-1.79	5.53	4.16	6.86
	1.61	5.65	0.98	8.40	5.63	8.17
Norway	-	-	-	-	5.04	12.90
	0.81	5.08	-1.16	7.27	4.75	12.32
Portugal	-	-	-6.29	9.74	1.50	19.20
	-	-	-4.33	11.59	5.31	23.31
Spain	-	-	-	-	5.18	15.05
	-	-	-3.96	10.67	4.57	14.43
Sweden	-	-	-	-	3.49	12.05
	1.79	5.92	-0.78	8.68	3.72	12.09
Switzerland	-0.28	3.40	-2.18	3.02	1.20	4.68
	-0.02	3.96	-0.14	5.08	1.33	4.71
Turkey	-	-	-	-	-15.82	35.75
	-	-	-	-	0.78	50.00
Australia	-	-	-1.71	8.89	6.42	14.57
	1.84	5.97	-1.92	8.62	5.53	13.59
New Zealand	-	-	-1.71	10.60	6.42	8.15
	1.74	5.27	-4.27	7.72	3.00	13.85

1. Figures for long-term rates are in bold face. For methods of calculation see text.

Source: OECD, *Main Economic Indicators* and Secretariat estimates.

Chart C. Short-term interest rates and inflation
Per cent

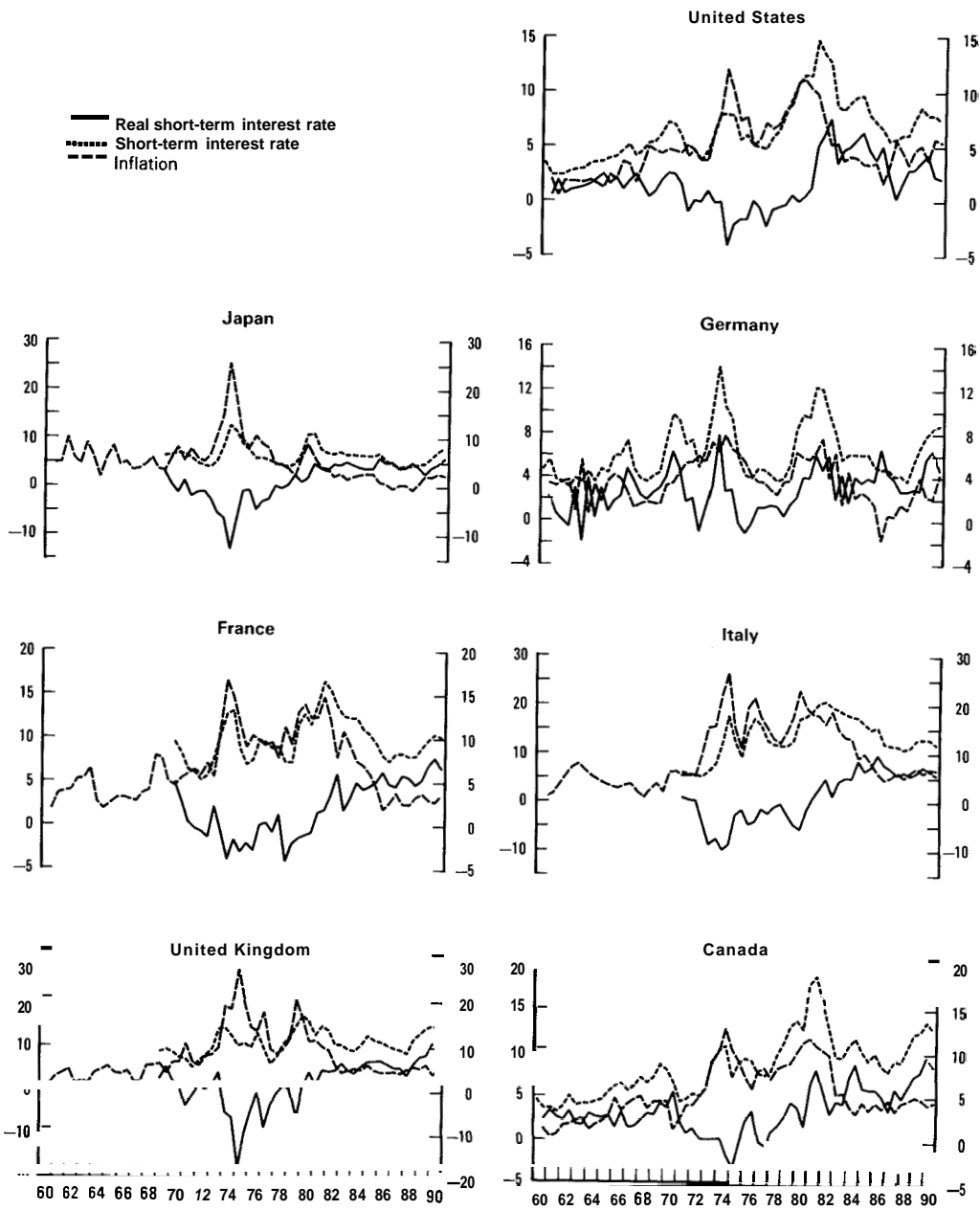
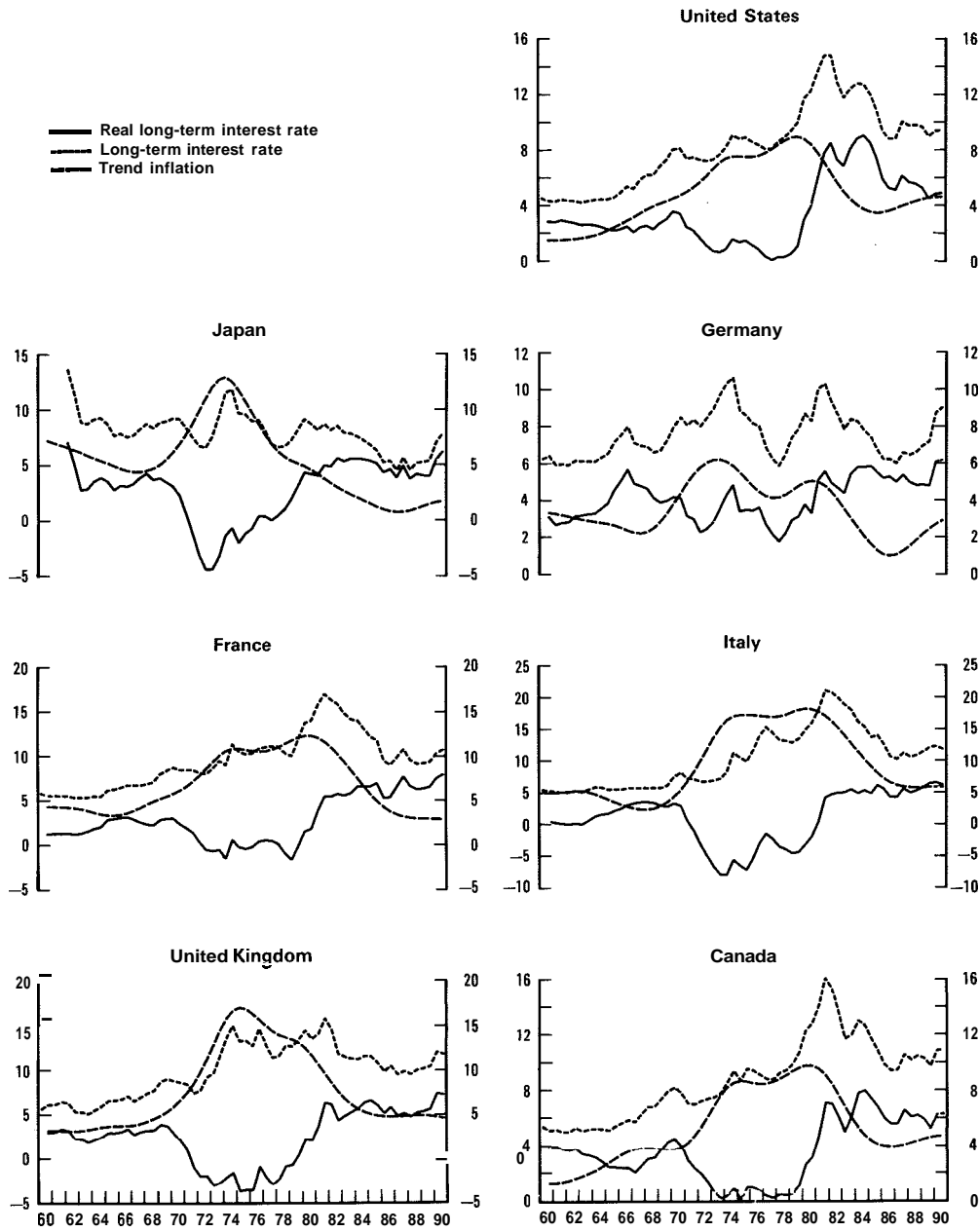


Chart D. Long-term interest rates and inflation
Per cent



Sources: OECD. *Main Economic Indicators* and estimates

MEASUREMENT ISSUES

Gauging the levels of and the returns to saving and investment gives rise to important measurement issues. Empirical counterparts to theoretical concepts are often not directly observable and sometimes the theoretical concepts may be ambiguous.

Measuring saving and investment

In principle, it is simple to measure saving and investment: that part of income which is not used for consumption, is saved, and that part of production which is not consumed, gets invested. Thus, measurement problems concerning saving and investment are related to measuring income and production, on the one hand, and consumption on the other. On this basis, the literature has provided a wide range of estimated saving and investment ratios, particularly in the case of the United States, (see e.g. Blades, 1983; Cullison, 1990; Eisner, 1990; Harris and Steindel, 1991).

The generally accepted theoretical definition of income is due to Hicks (1946). According to this definition, income over a given period equals the value of a consumption stream that would leave real net worth at the same level at the end of the period as at the beginning. Compared to traditional flow concepts of income, as exemplified by the internationally recognised System of National Accounts (SNA), this definition takes into account e.g. real capital gains and losses, including the depreciation of physical capital. Interpreted more widely, real net worth could be defined to include also environmental and raw-material resources (see Hartwick, 1990).

Measuring production is no easy task since it involves distinguishing (and valuing) activities that result in final output from activities that produce or constitute intermediate inputs. Traditional national accounts define production as final outputs sold in the market-place plus public sector output valued, *ad hoc*, at its input price. In doing so, a number of questionable decisions are made as to what constitutes intermediate and final output. Moreover, a whole range of activities go unreported such as household work and the underground economy.

Income and production will not always coincide. Thus, saving derived from the Hicksian income concept may not correspond to the flow of investment goods from production. For instance, if share prices go up while consumption stays unchanged, saving out of income as defined above will go up. However, there is no counterpart in accumulation of investment goods. There is, therefore, no "true" definition of saving. If the focus is on saving behaviour, the Hicksian income concept is appropriate. If the focus is on the flow of funds available to expand the capital stock, a different definition is warranted.

Even abstracting from the difficulties of determining income and production, it may be difficult to split these concepts into, on the one hand, consumption and, on the other, saving and investment. This has led in the standard national accounts to the different treatment of a good depending on the purchaser, e.g. a car bought by an enterprise is recorded as an investment while the same car bought by the household sector is recorded as consumption.

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Elmeskov *et al.* (1991) provided a number of adjustments to standard saving ratios across OECD economies. As an example of a correction of traditional income for real capital gains, figures for government and private sector saving were corrected for inflation-induced gains and losses on government debt. In most cases the effects were minor, but in a country like Italy, with both large government debt and significant inflation, the corrected private saving ratio was on average 6 percentage points lower in the 1980s than the conventional measure. Reclassifying public expenditure on education from consumption to investment (in human capital) led to upward adjustment of gross saving and investment ratios by around 5 percentage points in most countries. Treating purchases of consumer durables as investment led to roughly similar adjustments on a gross basis, but it was argued that adjustments to net saving and investment would be very small because of the rapid depreciation of durables. When research and development expenditure were treated as investment instead of as either government consumption or intermediate input in the business sector, an upward revision to the investment rate of about 2 percentage points on average, still on a gross basis, was reported. Taking account of depreciation could easily reduce saving and investment ratios by around 10 percentage points. It was noted that measurement of depreciation was a particularly weak spot in national accounts statistics. However, since the trends of saving and investment were only slightly affected by the adjustments, the picture of the 1980s as a period of weak saving seemed relatively robust.

Measuring the return on saving and investment

As with the levels of saving and investment, difficulties abound in measuring their return or cost. The difficulties can be split into the measurement of nominal returns or costs and the conversion of these into the real expected after-tax magnitudes that are of most interest as determinants of saving and investment decisions.

The nominal return on saving and investment depends heavily on the chosen asset reflecting, *inter alia*, the associated risk. Thus, there is considerable uncertainty as to the development of the cost of capital through the 1980s. In the discussion here the focus is put on real interest rates based on three considerations. First, the return on interest-bearing financial assets constitutes an important element of the opportunity costs of consuming or investing in fixed capital. Second, at the margin, financing through or placement in interest-bearing financial assets may be more important than for the average stocks of savings and capital. Third, while there may be important short-term differences between the development of returns on various assets, substitution between assets tends to reduce such differences over longer periods of time, although level differences may persist.

Among the factors complicating comparisons of nominal interest rates over time are financial regulations and taxation. The role of financial regulations in shaping real-interest developments is discussed in Section II.B). The main problem concerning taxation is that traditionally measured pre-tax interest rates no longer give a correct impression of the returns facing savers and investors. Moreover, by affecting saving and investment incentives, taxation also affects pre-tax interest rates. In many countries, taxation discriminates between types of investment and their financing, complicating the

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calculation of representative post-tax real interest rates (see e.g. OECD, 1990b; Dean et al., 1990; Fukao and Hanazaki, 1987). By discriminating between investment projects taxation acts to crowd out healthy investment in favour of less healthy, thus reducing the “quality” of investment. There is some evidence that tax reforms in the 1980s have acted to reduce distortions while the evidence concerning changes to overall investment incentives is somewhat mixed across countries. Given the variability of tax rates across economic agents and the associated difficulties of finding a representative tax rate, nominal interest rates have not been corrected for taxation in the current study.

There is considerable difficulty in measuring real interest rates since inflationary expectations are not directly observable. This difficulty increases with the maturity of the instrument under consideration since it is difficult to adequately measure long-term inflationary expectations.

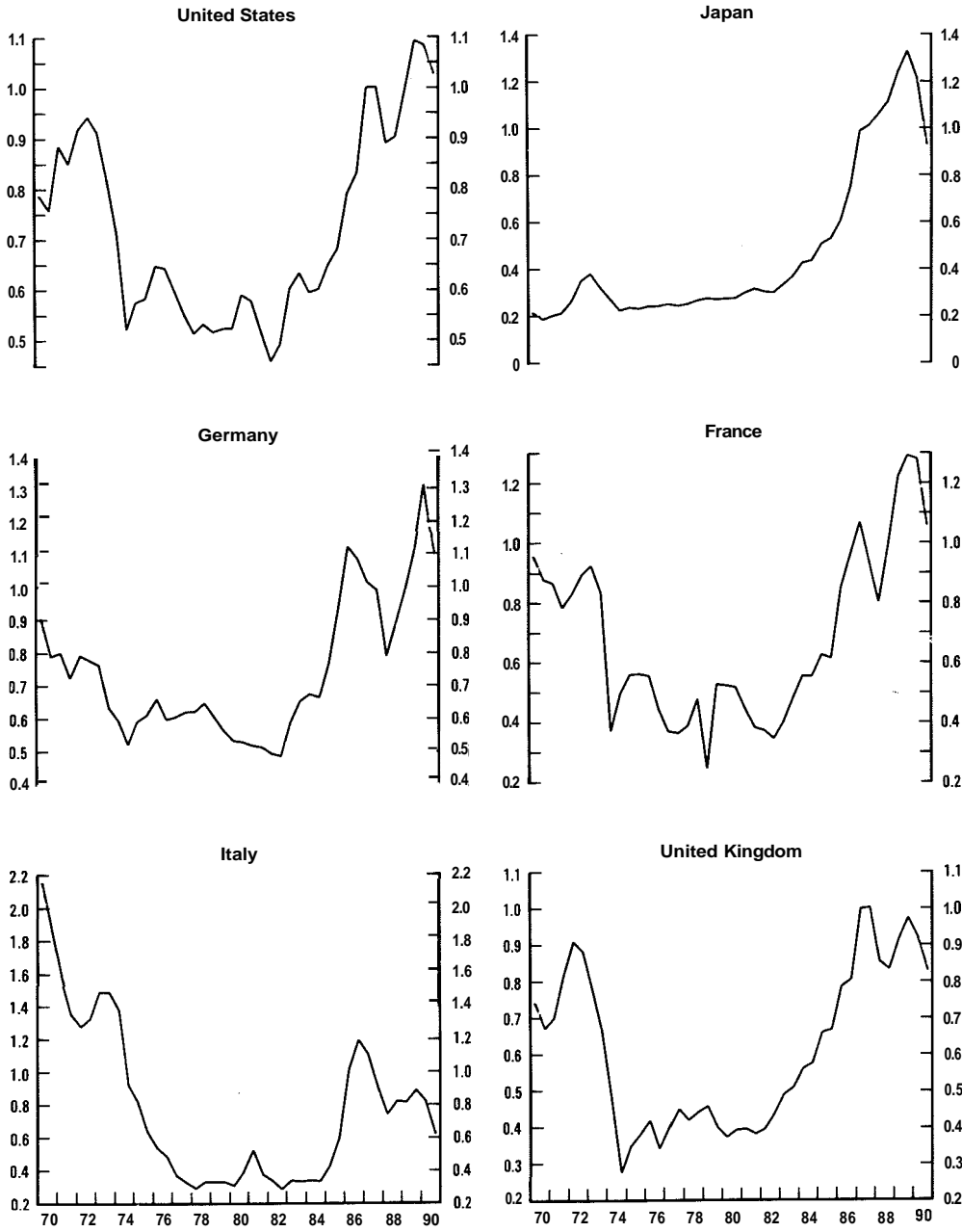
Real short-term interest rates are calculated here by subtracting from the current 90-day nominal interest rate the annualised inflation rate realised in the following quarter. This implicitly assumes that inflationary expectations are realised each quarter. Others have generated short-run inflationary expectations from auto-regressive models (for example, Blanchard and Summers, 1984; Atkinson and Chouraqui, 1985; and Barro and Martin, 1990). The choice of technique is unlikely to alter the longer-term trends in the data although it may affect the timing of turning points (Atkinson and Chouraqui, 1985).

The calculation of a real long-term interest rate is more problematical. Atkinson and Chouraqui (1985) calculated the ex-post real return on holding a long-term financial asset over the life of the asset. However, doing so entails a loss of observations at the end of the data period. Here a proxy for long-term inflation expectations is calculated which uses both forward and backward-looking information. The proxy is the low-frequency component of consumer price changes as generated by the Hodrick-Prescott filter (King and Rebelo, 1989). Using these measures, the short-term and long-term real interest rate series for the major seven economies are presented in Charts C and D, while a summary for other countries is provided in Table 2.

- After declining from their peaks in the early 1980s, real rates remained higher than earlier in many countries. This persistence seems to have been underpinned by lower saving rates and, increasingly through the decade, by a rise in desired investment.

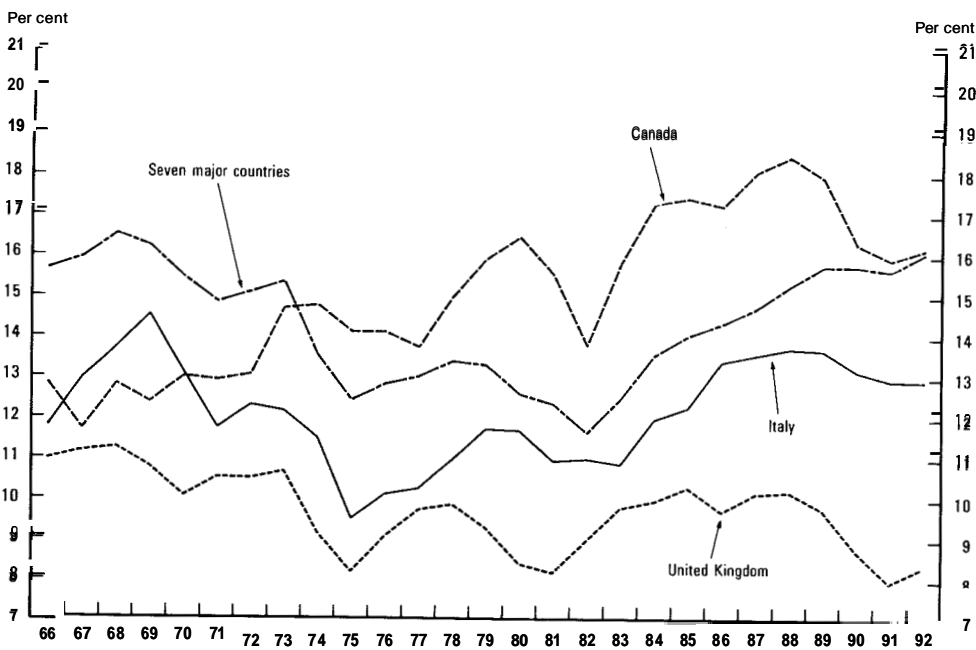
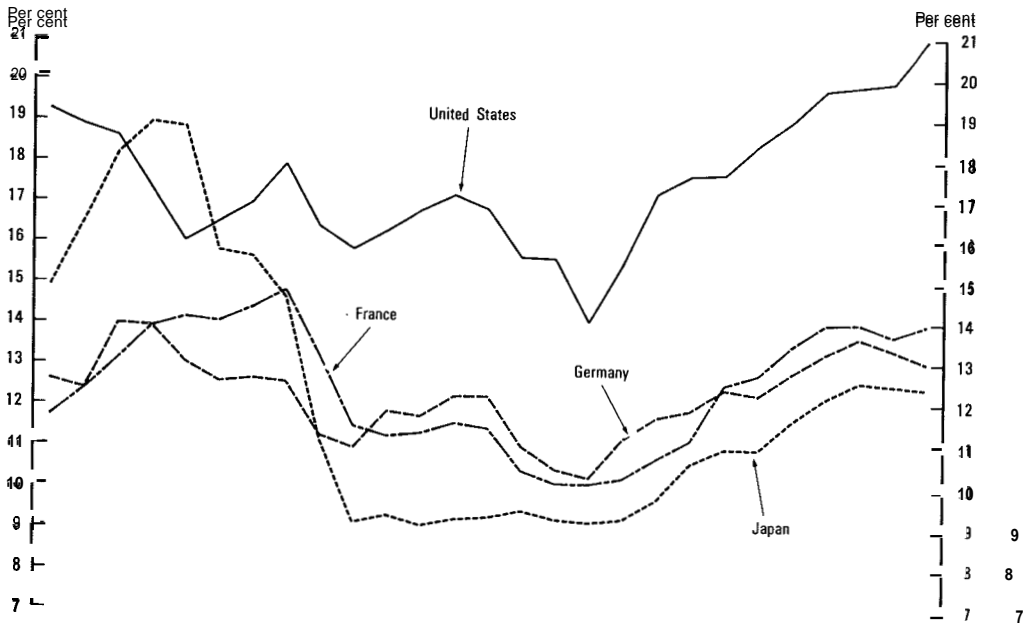
While past developments can be explained in terms of standard theories, such explanations are difficult to verify empirically. Indeed, the interpretation of events sketched out above is not universally accepted in the literature. There are a number of factors, including non-observability of expected inflation, that may account for the lack of empirical understanding of real interest rates. Ultimately, to explain longer-term trends of real interest rates, one must determine the influence of exogenous factors on saving and investment. However, the behaviour of saving and investment is not well understood and does not always appear to correspond to standard models.

Chart E. Real stock prices (1)
Indices 1987 = 1



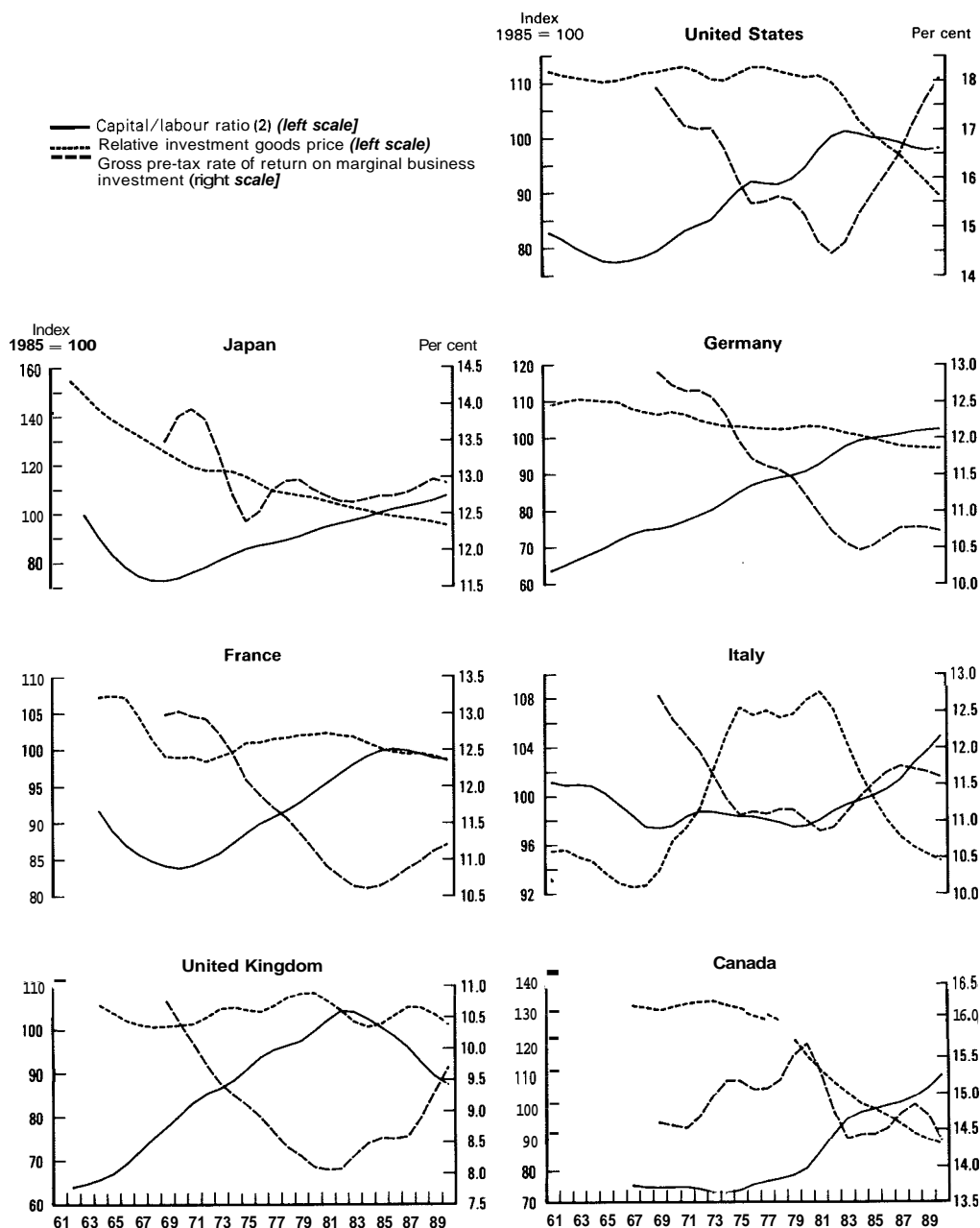
1. Share price index divided by the GDP deflator.
Sources : OECD, *Main Economic Indicators; Economic Outlook*, No. 49

Chart F. Gross rate of return in the business sector (1)



1. Gross operating surplus as a per cent of the business sector gross capital stock.
Source: OECD, *Economic Outlook*, No. 49.

Chart G. Return to capital and capital intensity of production (1)



1. Three-year moving averages.
 2. Labour measured in efficiency units.
 Source: OECD estimates.

A. The sensitivity of saving and investment to real interest rates

The choice of the framework in which to analyse the behaviour of real interest rates depends on the question at hand. In the short run, it is convenient to consider the behaviour in an IS/LM context, with adjustment to changes in saving and investment (and policy) being equilibrated through both shifts in the real interest rate and output. Over the medium term, with output determined by supply and with prices flexible, the real rate is usually viewed as equilibrating saving and investment. Both approaches are useful for explaining the evolution of real interest rates in the 1980s whereas the latter framework is more relevant for the medium-term scenarios considered in Section III. In either case, the extent to which the real interest rate responds to shifts in policy or the supply of and demand for saving depends on the real-interest elasticity of expenditure.

Most recent attempts to estimate the responsiveness of **consumption** decisions to real interest rates have followed an approach based on intertemporal optimising behaviour of the consumer'. In general, it has been difficult to find a significant relationship between the real interest rate and consumption. Hall (1989) surveyed the relationship between consumption and real interest rates and concluded that it was very weak. In an earlier paper, Hall (1988) had examined a number of data sets over different time periods and found evidence that the elasticity was low – it might even be zero and was probably not above 0.2². Furthermore, there is little evidence that differences in the rate of growth of consumption across countries can be explained by differences in real interest rates or other proxies for **ex-ante** real returns (Carroll and Summers, 1989).

Evidence derived from estimating traditional consumption functions tends to be a little more supportive of a weak but significant relationship between consumption and the real interest rate. Boskin and Lau (1988) suggested that the elasticity was zero in 1972 and 0.1 in 1980, and Tullio and Contesso (1986), in a study of eight economies, found in most cases that the real interest elasticity was small but significant. Results for the United Kingdom (Dicks, 1988) also support such a conclusion³. One reason for the apparent low interest elasticity may be that real interest rates have offsetting income and substitution effects on saving, although the income effect is likely to have been affected by the rapid increase in household debt in recent years.

While changes in real interest rates may not result in intertemporal substitution, they may alter household saving to the extent that they influence the value of private wealth. Most studies show a significant inverse relationship between saving and wealth (see OECD, 1990a and references cited therein)⁴. Thus, if changes in real interest rates significantly alter the value of wealth – by altering the discounted present value of future income or changing asset prices – they may result in shifts in saving.

Most empirical models of **business-investment** behaviour take as a starting point the neo-classical model of investment demand. Firms are assumed to choose the capital stock that minimises production costs. Within this framework, the desired capital stock is a function of expected output and the price of capital relative to labour⁵. The capital intensity of production will be inversely related to the relative cost of capital. However, a short-run relationship between business investment and the cost of capital has been very difficult to establish⁶.

Other forms of investment, such as housing and consumer durables (which in a national-accountssense are regarded as consumption) do appear to be more interest-sensitive. In the short run, supply and demand for housing are rather sensitive to

financial-market conditions, especially to the availability and cost of credit. In a number of countries, financial-market deregulation during the 1980s induced a more competitive environment for housing finance and reduced the importance of credit availability (Egebo *et al.*, 1990).

Taking these results at face value would suggest that adjustment to an *ex-ante* saving-investment imbalance calls for large changes in real interest rates. However, there may be other factors equilibrating saving and investment in the short to medium run:

- Output may respond positively to investment. Thus, a rise in investment may simultaneously boost output and saving. Furthermore, more rapid output growth may be conducive to higher saving, thereby reducing the need for an adjustment in real interest rates⁷.
- Autonomous shocks to saving or investment may be partly offset via government budgets, at least in the short term. This may happen through the reaction of automatic stabilisers such as income-dependent taxes and transfers. Moreover, the stance of fiscal policy may itself be changed in response to changes in saving and investment*.
- For individual economies, changes in external balances may act to cushion, but not completely insulate, real interest rates from domestic influences.

In the longer run, sensitivities of expenditure components with respect to real interest rates may be larger than indicated by available empirical estimates that typically are based on relatively short time periods.

B. Specific factors behind the development of real interest rates

1. Regulation of financial markets

i) Direct regulation of interest rates

As noted earlier, real interest rates have been higher in the 1980s than earlier. However, the behaviour of real interest rates in the 1970s rather than in the 1980s appears to be unusual. The interaction of regulations on nominal rates and the rapid acceleration of inflation at the time may have resulted in abnormally low real interest rates.

Evidence from data mainly drawn from the 1960s and 1970s tended to show that real interest rates were not stable and that this instability was primarily due to inflation; there was a significant negative correlation between inflation and real interest rates (Mishkin, 1981 and 1984). Such an inverse relationship is also evident in Charts C and D. One explanation for this negative correlation was that regulations inhibited adjustments of nominal interest rates to inflation (Carmichael and Stebbing, 1983). This is consistent with the fact, noted earlier (and as shown in Mishkin, 1984 and Browne and Fischer, 1991), that interest-rate behaviour in Germany seems to be a case apart with nominal rates having tracked inflation more closely throughout the entire period. Germany was one of the few countries without interest-rate regulations during the 1970s.

Since the deregulation of financial markets, nominal interest rates and inflation appear to have been more closely linked. Deregulation has resulted in a wider range of

financial assets paying market-related returns, enhancing the role of prices in clearing financial markets⁹. Inflationary expectations have, therefore, been more rapidly and fully reflected in nominal rates in the 1980s. The increased sensitivity of nominal rates to inflation is reflected in the fact that the term structure of interest rates seems to have provided little guidance on future inflation in the 1970s but to have contained significantly improved information value concerning future inflation in the 1980s (Browne and Manasse, 1990). Also, during the 1980s, there has been a shift in the objectives of most central banks. Monetary policy has placed greater emphasis on controlling inflation (relative to the 1970s) and has therefore become more closely geared to inflationary pressures.

ii) Regulation and household borrowing behaviour

In addition to enhancing the adjustment of nominal rates to inflation, financial liberalisation may have directly affected real interest rates by changing, at least temporarily, the saving propensity of the household sector. Recent evidence indicates that the extent to which households are liquidity constrained has declined with financial liberalisation in a number of countries during the 1980s¹⁰. Consumers can now more readily adjust saving to temporary fluctuations in income. These findings are consistent with developments in countries that have experienced some form of financial deregulation – the United States, the United Kingdom, the Nordic countries, Italy and Australia are prime examples. In these countries, there was a sharp rise in household borrowing and a decline in household saving. Many households took on more debt both to consume and to acquire assets, notably housing. Tax systems of some countries distorted incentives in favour of borrowing, thereby providing additional impetus to a build-up of household debt once constraints were relaxed. As additional demand pushed up asset prices, households were able to borrow further and were further induced to save less. A number of factors suggest that this last factor may now be unwinding. The rise in asset prices has ceased, or is being reversed, in a number of countries so that the incentive to borrow to buy assets, such as housing, has diminished. Income growth has also slowed considerably, especially in the countries where financial liberalisation has been important, limiting the capacity of individuals to carry higher debt. Finally, the lending criteria of financial intermediaries may have tightened, thus limiting new borrowing. These factors help explain why the decline in household saving in some countries, to the extent that it was related to increased borrowing for asset acquisition, has reversed.

2. Fiscal policy

The decline in *ex-post* saving ratios since the 1960s and 1970s in most countries has been associated with a decline in government saving. The extent to which a reduction in government saving affects real interest rates depends on the response of the private sector. If “Ricardian equivalence” holds, then consumers will anticipate the future tax implications of current government deficits and increase their saving – reduced government saving will be offset by increased private saving. In this case, lower government saving will have limited effects on economic activity and real interest rates apart from the consequences of the government’s direct absorption of resources. The empirical evidence on this issue is mixed but does not support a one-for-one offset of private saving for public saving. Nicoletti (1988), for example, found that the offset was considerably lower than one for most OECD countries. A fiscal deficit may, there-

fore, result in a fall in national saving, thus requiring a rise in real interest rates, other things being equal, to re-equilibrate saving and investment.

Despite the apparent weakness of “Ricardian” behaviour, the link between fiscal policy and the real interest rate has been difficult to establish empirically. Most reduced-form studies have found little evidence of a relationship between nominal or real interest rates and fiscal policy¹¹. For example, identifying the contribution that expansionary fiscal policy in the United States in the **1980s** made to the rise in real interest rates has proved difficult. In Barro and Martin (**1990**), fiscal variables are insignificant in the real interest-rate equation. Van Wijnbergen (**1988**) found that expansionary fiscal policy could not explain the rise in world real rates in the period **1979-81** but that after **1982** fiscal policy resulted in real interest rates being considerably higher than they would otherwise have been. Nevertheless, most simulation studies that focus on the beginning of the **1980s** find that the movement of real interest rates at the time can be largely accounted for by fiscal and monetary policy. Knight and Masson (**1988**) attributed half of the rise in U.S. real interest rates to expansionary U.S. fiscal policy. Drawing on simulation results from a range of macroeconomic models, Hooper and Mann (**1989**) argued that the disinflationary stance pursued by the Federal Reserve from late **1979**, coupled with the expansionary fiscal stance in the United States, played a role in the increase of real interest rates throughout the **OECD**¹². The policy mix seems to have been more important for the rise in real interest rates in the early **1980s** than other factors, for instance oil price shocks or increases in investment opportunities.

Even though the fiscal balance may not have large effects on private saving, the structure of the tax system may influence saving and investment decisions. There are a number of channels through which tax systems might affect private saving (Dean *et al.*, **1990**):

- First, income taxes tend to reduce after-tax rates of return, hence encouraging current consumption. However, given the apparent relative insensitivity of consumption to real interest rates, it is difficult to conclude that this has had an important bearing on private saving.
- Second, tax incentives for certain forms of saving exist in most countries, although these incentives may simply change the form of saving rather than change the aggregate level of saving.
- Third, the interaction of the tax-deductibility of certain interest payments and financial deregulation may have encouraged borrowing and reduced the level of saving¹³.

3. Investment opportunities

An improvement in the return to capital has been mentioned by some as a reason for the higher real rates of the **1980s**. Blanchard and Summers (**1984**) noted that a surprising feature of the higher real interest rates of the **1983 to 1984** period was the coincident strength of global stock markets. They provided evidence that this increase in the rate of return to capital was driving both¹⁴. Barro and Martin (**1990**) also found global real interest rates to be positively related to stock-market returns, which they used to proxy returns to capital. These results are consistent with those presented by Feldstein and Summers (**1978**) who showed that a 1 percentage-point rise in the after-tax return to corporate capital adds 25 basis points to the real interest rate.

The studies by Barro and Martin (1990) and, to a lesser extent, Blanchard and Summers (1984) concluded that the higher real rates of the early 1980s were due to higher returns to capital. Nevertheless, Danker and Hooper (1990) found little evidence that the rate of return to fixed investment in the United States had increased significantly at that time. Examination of Charts E and F shows that the increase in real interest rates preceded the rise in stock returns and gross rates of return to capital in the early 1980s.

4. Saving or investment?

Can anything be said about the extent to which either saving or investment contributed to the higher level of real interest rates?

Some impression of the relative contributions of a decline in saving and a rise in returns to investment to the real interest rate may be gained from comparing rates of return and capital intensities of production. Chart G reports indicators of pre-tax marginal rates of return for the major seven countries based on the supply block of the OECD Secretariat's Interlink model¹⁵.

In the United States, the United Kingdom, Italy and France some increase in the marginal rate of return took place during the 1980s while developments were more muted in Japan and Germany. This rise is not necessarily evidence of investment being the driving force behind higher real interest rates. For instance, if lower saving had caused real interest rates to rise, one would expect to find a substitution away from the use of capital in the production process which, by raising the marginal product of capital, would have led to the observed higher return on capital. However, with the exception of the United Kingdom, there are no strong signs of such a substitution process taking place, although previous upward trends in the capital/labour ratio were broken in the United States and France¹⁶. Influences other than saving seem to have affected factor intensities, rates of return and desired investment and, in consequence, real interest rates.

The return on capital depends on the relative price of investment (capital) goods as well as the marginal product of capital. Chart G indicates that the relative price of investment goods fell significantly in the 1980s in the United States, Italy and Canada while it continued its trend decline in Japan and Germany. Taken in isolation, this factor could have had a significant positive effect on the marginal return on capital and, thus, investment demand¹⁷. However, this does not seem to be the full story either, since in this case capital intensities would be expected to have increased.

A pick-up in labour efficiency without a corresponding increase in real wages could raise the marginal return on capital, as a result of lower capital intensity, leading to a higher marginal product of capital. It is, however, difficult to discriminate between this explanation of trends in capital intensities and marginal returns and the explanation emphasising lower saving. Nevertheless, empirical evidence suggests that higher growth of labour efficiency as a source of increased investment demand played a relatively modest role – perhaps with the United Kingdom and, to a lesser extent, the United States as exceptions.

In conclusion, empirical evidence seems to suggest that no single explanation may account for developments in marginal returns and capital intensities across all countries. Pressure on real interest rates may have arisen from both the investment and saving side.

5. The inter-country perspective

In the absence of risk premia, *ex-ante* domestic real interest rates will differ from their foreign counterparts by the expected change in the real exchange rate. Thus, capital markets can be fully integrated yet real interest rates may differ across countries (Frankel, 1989 and Blundell-Wignall and Browne, 1991). In a regime of floating exchange rates, changes in *ex-ante* domestic saving-investment balances may affect domestic real interest rates even with fully integrated capital markets.

Most empirical studies show that real interest rates can differ across countries for extended periods but that there appears to be a long-term relationship between the real long-term interest differentials, the real exchange rate and fundamental influences that may condition expectations about the real exchange rate¹⁸. Short-term real interest rates seem to be more closely linked than long-term real rates. Summary statistics in Table 3 show that in many cases, the mean of the short-term real interest-rate differential is lower than that of the long-term differential and not significantly different from zero. Both long-term and short-term differentials appear, on average, to have been lower in the 1980s than in the 1970s. The increased variability of long-term real interest-rate differentials appears to be related to the increased volatility of the real exchange rate during the period of floating exchange rates.

What does this imply for the interaction of saving, investment and real interest rates in an individual economy? The fact that domestic real interest rates can diverge from world rates may partly account for the high correlation between domestic saving and investment noted by Feldstein and Horioka (1980) if the domestic real interest rate is not exogenous to changes in domestic saving and investment and if saving and investment are interest elastic. Thus, an *ex-ante* decline in domestic saving will be equilibrated by a rise in the domestic real interest rate (reducing the *ex-ante* saving-investment gap to the extent that saving and investment are interest-sensitive) and an appreciation of the real exchange rate, enabling part of the *ex-ante* saving-investment gap to be financed by foreign saving. This latter channel through the current account has tended to become more important, and consequently the correlation between domestic saving and investment has declined over time although it still remains high (see Dean *et al.*, 1990).

Domestic saving and investment patterns have changed considerably within countries during the 1980s. Much has been written on the causes of the rise and fall in current-account surpluses and deficits in the major three economies during this period. Changes in the policy mix during the 1980s and their likely effects on interest rates, exchange rates and differential output growth have been investigated by counterfactual simulations with macroeconomic models (Helliwell, 1990; Hooper and Mann, 1989; Shafer, 1988; Bryant *et al.*, 1989). Simulation results suggest that the combination of fiscal expansion in North America and contraction in most European countries and Japan in the first half of the 1980s accounts for between half to two-thirds of the divergent current-account deficits, partly through its direct effects on demand and partly through the effect of fiscal policy on real interest-rate differentials and exchange rates¹⁹. Given the large uncertainties in modelling monetary-policy effects on long-term interest rates and exchange rates, model results differ substantially when it comes to attributing the rise in the dollar to monetary policy or speculative behaviour.

Rates expressed relative to the **US**.

	1960s		1970s		1980s	
	Mean	Variance	Mean	Variance	Mean	Variance
Japan	-	-	1.47*	9.18	-0.55	4.34
Germany	-1.14*	1.05	1.50*	5.05	1.42*	1.99
France	-	-	-2.41*	5.52	-0.18	3.33
Italy	-1.24	1.11	-1.85*	0.81	1.20*	2.29
United Kingdom	-	-	0.14	3.34	-0.15	7.54
Canada	0.43*	0.82	1.10*	0.52	0.63	3.29
Austria	-	-	3.07*	10.19	-0.69	12.44
Belgium	0.88	2.20	5.10*	7.03	2.12*	5.97
Denmark	-	-	2.07*	18.73	-1.51*	6.56
Finland	-0.26*	0.36	2.65*	1.92	1.19*	2.20
Greece	-	-	-1.70*	2.80	-1.67*	2.89
Iceland	-0.56*	0.18	0.05	0.22	0.34	1.28
Ireland	-	-	-0.36	4.24	0.63	6.63
Netherlands	-1.20*	0.49	-0.84*	1.43	1.74*	3.52
Norway	-	-	-1.55	12.16	-1.95	6.86
Portugal	-0.51*	0.64	-0.11	3.62	0.21	2.57
Spain	-	-	-4.62*	12.89	-1.53*	9.50
Sweden	0.33	0.74	-2.71*	7.29	-1.67"	4.07
Switzerland	-	-	0.45	17.33	-1.76*	14.99
Australia	-0.37*	0.51	3.37*	6.07	1.78*	11.65
New Zealand	-	-	0.62	34.93	1.22	24.87
	-2.23*	0.50	4.01*	4.82	6.55*	13.36
	-	-	12.81*	399.7	18.67*	157.4
	3.39*	2.17	16.46*	85.75	8.47*	188.54
	-	-	3.97*	21.71	0.01	24.03
	0.62*	0.23	3.15*	1.24	0.96	7.56
	-	-	1.29	11.43	-0.33	5.11
	0.99*	0.77	0.32	2.91	0.57	2.86
	-	-	-2.13	9.77	-1.17	12.77
	1.74*	0.64	2.47"	1.11	1.45*	7.41
	-	-	5.79*	43.88	2.18	25.16
	-1.60*	1.92	5.64*	17.69	0.89	27.24
	-	-	2.95	22.54	-1.22	19.98
	0.84*	0.75	5.27*	10.18	1.63*	8.83
	-	-	0.87	11.08	0.17	10.67
	0.81*	0.27	2.09*	0.55	2.48"	4.62
	-	-	1.69*	9.62	2.62*	7.11
	2.62*	0.89	1.45*	3.73	4.87*	3.71
	-	-	1.21	14.36	-2.51*	7.33
	1.23*	0.25	3.23*	3.84	0.67	3.14
	-	-	5.31*	21.17	0.75	32.75
	0.86*	2.18	5.58*	3.40	3.19*	16.54

1. Long-term rates are in bold.

* Significantly different from zero at the 5 per cent level.

III. PROSPECTIVE INFLUENCES ON SAVING, INVESTMENT AND THE REAL INTEREST RATE

The previous section described some links between desired saving, investment and real interest rates. The strength of these links is open to substantial uncertainty but, nevertheless, changes in desired saving and investment are likely to impact on real interest rates. Without pretending to provide a complete coverage, the present section reviews a few important influences on future saving and investment which are likely to influence the course of real interest rates.

Two of the factors reviewed are of a medium-term nature. They represent influences on the supply of and the demand for saving which are essentially exogenous for private-sector agents in the OECD area. First, the supply of saving from the public sector is discussed. Second, increased demand for saving from outside the OECD area is discussed together with its potential effects. The third influence which is taken up, the impact of demographic changes on saving and investment, is of a more long-term nature. The medium and long-term character of the influences reviewed should not obscure the important short-term fluctuations in saving, investment and real interest rates, related to conjunctural developments. However, as discussed above, such fluctuations in real interest rates may better be viewed within a framework stressing the role of liquidity and monetary policy.

A. Government saving

The main factor behind the generalised rise in saving ratios in OECD countries at the end of the 1980s was the increase in government saving. Part of this recovery in government saving was cyclical in character, and since 1990 there has been more pressure on government budgets as OECD economies have slowed. Cyclical factors were important in contributing to the recent budgetary slippage in most countries, but in the case of Germany it was the costs of German unification which has led to the deterioration in the budgetary position.

The pressures on government saving and on interest rates further down the road will depend on whether the slowing of the OECD economies will, as assumed, prove short-lived, and whether the extraordinary pressures on the budgets of the United States and Germany can be contained. Assuming fairly steady progress in budget consolidation, prolongation of the short-term projections contained in the OECD's July 1991 *Economic Outlook 49* into the medium term may result in net government borrowing, projected at 2¼ per cent of OECD GNP in 1991, being brought back to close to zero by 1996. But this optimistic scenario is dependent on actual production being roughly in line with potential and no "accidents". This scenario would indeed lead to much-reduced public-sector claims on private saving and a gradual reduction in the OECD's claim on foreign saving²⁰. However, such an outcome would probably not leave much leeway for any substantial decline in real interest rates from the average level of around 5 per cent recorded in 1990, but it could at least ease the upward pressures²¹.

There are various pressures on fiscal positions over the medium term which may limit any reduction in government dissaving. Among these pressures are infrastructure

investment, the costs of environmental expenditures (including cleaning-up central and Eastern Europe²²), health care and the development of social security and public pension provision. The message from the review of some of these factors in Oxley *et al.* (1990) was that maintaining the budgetary gains of the 1980s, in terms of consolidating overall deficits, stabilising or reducing government indebtedness relative to GDP and restraining the growth of the public sector, would severely constrain fiscal policies in the 1990s.

A quantification of the medium and long-term benefits from increased public-sector saving was provided by Herd (1989), using the Interlink model. A permanent reduction in public expenditure by 1 per cent of GDP in most of the major OECD countries was considered. Based on a conservative interpretation of results from national econometric models, this was assumed to entail a fall in real interest rates of ¾ percentage point²³. Under the assumption that the permanent character of the budget improvement has high credibility, private saving and investment decisions can be expected to react relatively quickly to lower interest rates. Table 4 shows the cumulative changes in output over various time horizons under the assumption of high credibility. It appears that output not only returns rather quickly to its baseline magnitude following a permanent cut in public expenditure, but that it subsequently exceeds baseline on a permanent basis. The reason for this is that higher private investment in the wake of lower real interest rates gradually leads to the building up of a larger capital stock and, thus, increases potential output in the economy²⁴.

Table 4. The cumulative impact on output of a cut in government expenditure
Assuming high credibility of policy

	Percentage difference from baseline					
	Years after shock					
	1	2	4	6	8	10
United States	-1.3	-1.2	-0.7	2.1	3.2	4.0
Japan	-1.5	-2.1	-0.4	2.4	3.9	3.6
Germany	-1.7	-2.6	-2.2	-1.4	-0.7	0.2
France	-0.9	-1.7	-2.5	-2.8	-2.7	-2.1
United Kingdom	-1.5	-2.8	-2.4	-1.6	-0.9	0.2
Weighted average	-1.4	-1.8	-1.1	1.1	2.2	2.7

Source: Herd (1989).

B. Demand for saving arising outside the OECD area

The OECD area is by far the largest supplier to and demander from the pool of world saving but, nevertheless, prospective developments outside the area may affect the availability and price of saving. Recent developments and announcements indicate

that demand from outside the OECD area may increasingly compete with inside demand for available resources. This would contrast with developments through the 1980s when non-OECD countries provided the OECD area with an increasing amount of surplus saving – at least judged by the combined OECD current-account deficit.

1. Sources of increased outside demand for saving

It has been difficult to assess the claims on world saving arising in the wake of the Gulf conflict. Preliminary estimates of damage to the Kuwaiti capital stock were in the range of \$50 – 100 billion, but seem to be revised downwards substantially as more information becomes available. Given huge Kuwaiti assets, financing may not be a constraint on reconstruction – though it will nevertheless be an additional claim on resources globally – but the speed at which reconstruction can take place may be limited by organisational and physical constraints. Uncertainties are much larger concerning reconstruction in Iraq, where the extent of damage is unknown and political developments are likely to play a very large role in determining the speed of reconstruction. Given already high indebtedness, payment of war reparations, extensive damage to the economic infrastructure and potential political instability, it is unlikely that private capital would be forthcoming to finance reconstruction in that country – at least outside the oil sector. In addition to repairing damage done in the two countries, demands on saving may also arise in connection with the rebuilding of stocks of military hardware. In sum, while initial estimates of demands for saving may have been much exaggerated (annual rates of \$20 billion were mentioned for Kuwaiti reconstruction alone), significant amounts could still be involved.

Increases in long-term real interest rates since 1989 have been associated with developments in central and eastern European countries (CEECs). As these countries reform and embark on a catch-up process, the argument runs, domestic saving will be insufficient to finance investment and a prolonged period of external deficit will result. However, over the short and medium term, before credible adjustments are clearly visible and a proper institutional framework in place, available financing is likely to act as a constraint on borrowing abroad by most of these countries²⁵. Moreover, while these countries adjust and change their institutional structure, their demand for outside saving is likely to be limited by their small absorptive capacity. For the Soviet Union, where demands for saving could potentially be very large, uncertainty about the direction of and political commitment to reform renders unlikely any major recourse to private OECD saving as a source of finance for domestic investment²⁶. Thus, in the short run these countries may not exert a major drain on OECD saving and most of the flow is likely to take place through official lenders. The order of magnitude involved in these official flows may be around \$5 to 7 billion annually over the coming couple of years and is unlikely to increase drastically thereafter.

Over the medium to long term and provided that the necessary structural reforms are indeed carried through, central and eastern European countries may embark on a process of catching up to OECD levels of real income²⁷. However, even if the CEECs do enter a catch-up process, it is unclear to what extent they will rely on outside saving. There seems to be a link running from high growth to high private saving, suggesting that a large part of investment needs could be met by domestic saving. The experience regarding the external balances of other countries going through such a process is far from uniform and, arguably, the financial environment will be different in the future due

to financial deregulation. Nevertheless, it seems likely that the more successful the catch-up process the easier the access to credit will be. Thus, creating a proper institutional framework giving the right incentives for investment and saving decisions is likely to help the achievement of both growth and whatever finance may be necessary. There are limits to sustainable foreign indebtedness, however, and some of the CEECs are already heavily indebted. Thus, continuous large deficits may not be compatible with low risk premiums. Abstracting from the Soviet Union, it seems unlikely that these countries, in the medium to long run, would run continuous deficits exceeding 3 to 4 per cent of their combined GDP – which would represent less than 1/4 per cent of OECD GDP but still correspond to something like \$20 to 25 billion annually at current levels of GDP.

In addition to demands for OECD saving arising from Gulf reconstruction and investment in central and eastern Europe, other non-OECD regions may also influence the future course of real interest rates. In a number of Asian NIE's important investment projects have been decided or are under discussion with the aim of improving infrastructure. Likewise, increased demands for saving may arise from Latin America, where economic policies appear to be under reorientation towards an increased role for market mechanisms and where, as a result, investment opportunities could be enhanced.

2. *The effects on the OECD area of outside demand for saving*

Demands for OECD surplus saving entail increased net exports and hence a positive demand shock in the OECD countries. In the short run, both output and inflation would react positively to such a shock. Over the somewhat longer term, however, output cannot deviate from the path of potential and inflation cannot take place unless validated by monetary policy. Thus, a shift to a sustained higher level of OECD net exports would have to be offset by lower domestic demand in the OECD countries – at least in the absence of positive supply effects. Real interest rates play a role as an equilibrating mechanism.

The main determinants of the rise in real interest rates needed to re-equilibrate saving and investment in the face of such an outside shock are the real interest-sensitivity of saving and investment and the reaction of fiscal policy to higher real interest rates. Because of high government net indebtedness in many OECD countries, a rise in real interest rates tends to increase budget deficits in the absence of specific actions to cut discretionary spending or raise taxes. If this effect is not neutralised, and unless saving and investment are very sensitive to real interest rates, the rise in real interest rates needed to re-equilibrate saving and investment in the face of even a minor outside shock could be potentially large.

Most empirical research suggests, as discussed above, that real interest changes lead to only modest changes in private saving. However, a temporary effect on saving may be exerted by revaluations of existing wealth due to changes in real interest rates. Thus, the rise in real interest rates needed to re-equilibrate saving and investment may increase with the duration of the shock. Considerable uncertainty attaches to the effects of income distribution on private saving. As noted above, government interest payments are likely to rise in the face of a positive outside demand shock, and to the extent that private saving out of government interest payments exceeds the private saving rate in general, this will mitigate the effect on real interest rates.

Over the shorter term, a high interest sensitivity in business investment will also help to cushion real interest rates in the case of an external demand shock. However, over time, lower business investment will negatively affect the capacity to generate output in excess of domestic demand. In consequence, the interest sensitivity of business investment may cease to cushion real interest rates in the case of a persistent shock. This effect on potential output should not, however, distract from the fact that investment is reallocated to more profitable use and that, as a result, real income is likely to benefit.

The OECD Secretariat's Interlink model embeds the mechanisms discussed above and has been used to simulate the impact of a permanent (ten-year) external demand shock amounting to $\frac{1}{4}$ per cent of OECD GDP. Assuming that monetary policy aims at stabilising the price level, real interest rates may have to rise by on average $\frac{1}{4}$ percentage point, if consumers save proportionally more out of interest income than other income and if discretionary outlays are reduced to offset the impact of higher interest rates on the government budget; real interest rates have to rise two or three times more if discretionary outlays are held unchanged. The largest share of the improved external balance comes via increased private saving, while the rest is a result of lower private investment. The country pattern of higher real interest rates depends importantly on the direction of the outside demand shock and, thus, on its origin, but the effect on average OECD real interest rates appears to be relatively insensitive to the country distribution. If consumers in their saving behaviour do not distinguish between interest income and other income, effects on real interest rates roughly double as a larger share of the improved external balance has to come from lower private investment.

C. Demographic effects

Population growth rates have declined in most OECD countries and further declines are expected well into the next century (see OECD, 1988a and Hagemann and Nicoletti, 1989). This will result in demographic changes that may alter the economic performance of OECD economies in the long run and have important implications for saving and investment. Other things being equal, the decline in the rate of population growth may result in a reduction in the rate of labour-force growth and an increase in the proportion of the population aged over 65. Assuming that there is no change in the age of retirement, the ratio of the elderly non-working population to the working population will increase. Most estimates foreshadow sharp rises in the dependency ratio in nearly every OECD economy in the coming decades²⁸. The potential impact of these changes on private saving have aroused considerable concern.

One of the implications of the permanent income/life-cycle models of consumer behaviour is that the path of an individual's consumption need not reflect the path of their income – consumption decisions reflect the discounted present value, but not the timing, of lifetime income. Typically, individuals are assumed to smooth their consumption over their lifetimes, saving little when young, increasing their saving as retirement approaches and dissaving thereafter. If individuals really do behave in this way and the elderly dissave, then, other things being equal, the aggregate private saving ratio might be expected to decline as the elderly make up a larger proportion of the population.

Based on a life-cycle framework, Auerbach et al. (1989) have simulated the effects of the foreshadowed demographic changes on national saving (private plus public)

using a general equilibrium model. Their simulations indicated that demographic changes would result in large falls in national saving in Japan and Germany over the next 60 years with smaller falls in the United States and Sweden. The decline in Japanese saving would be particularly rapid, reflecting the speed of population ageing²⁹. Masson and Tryon (1990) have also simulated the effects of demographic changes and have shown that, for the OECD area on average, such changes may increase real interest rates by around 3 percentage points above what they would otherwise have been in the year 2025, and by even more than that in Japan.

In general, however, neither the short-run nor the long-run implications of the life-cycle models appear to be borne out by the empirical evidence. Most studies show that, in the short run, consumption seems to be tied more closely to current income than the theory predicts³⁰. Moreover, the evidence to date of the effect on savings of demographic changes is rather mixed. Different kinds of evidence point to opposite conclusions, perhaps because many countries have not yet been greatly affected by these changes and, in general, demographic changes evolve slowly over time. As a generalisation, results from econometric studies, using aggregate data, support the view that an ageing population reduces private saving³¹. Studies that use more disaggregated data and examine saving behaviour by age cohort do not clearly support these results³². For example, Bosworth (1990) examined saving behaviour by age cohort in Japan and found that the difference in saving behaviour by age cohort was limited and was not large enough to have any impact on the aggregate saving ratio. For the United States, Carroll and Summers (1989) used consumer-expenditure survey data to show that consumption growth follows the path of an individual's income over their life. An implication of these findings is that individuals do not appear to consume relatively more of their current income when they are young (against the prospect of higher future income) and do not appear to dissave in old-age.

Public budgets may come under pressure as a result of ageing. Given present net asset positions of the sector, this is likely to entail a need for expenditure restraint and, in some cases, measures aimed at increasing revenue. Thus, other things being equal, it is almost certain that the contribution of each worker to funding a pay-as-you-go pension system will increase. This is inevitable because the output of a smaller workforce must support a larger dependent population. Hagemann and Nicoletti (1989) have shown for selected countries (Japan, Norway and Sweden) that the contribution rates of workers to pay-as-you-go pension systems will rise relatively sharply in the coming decades. Policy changes such as raising the retirement age, reducing the level of benefits or funding the system partly in advance will mitigate these costs somewhat. However, even with these changes, contribution rates may increase³³.

The extent to which demographic changes might increase real interest rates depends importantly on the induced response of investment and productivity. Slower labour-force growth means that the rate of investment required to maintain a given capital/labour ratio is reduced. Residential investment needs will also decline. Simulations conducted for the United States suggest that the potential for an increase in consumption per capita because of lower future investment requirements is substantial (Cutler *et al.*, 1990). Also, there may be an increase in the real wage and productivity as a result of the lower labour-force growth and the increase in the age (and experience) of the work-force. Auerbach *et al.* (1989) have shown that a rise in the real wage induced by demographic changes can considerably offset the rise in social-security contributions per worker. The response of productivity to an older, more slowly growing

work-force is uncertain. Some argue that an older work-force is less innovative, mobile and flexible than a younger one. However, there is some evidence of a negative correlation between productivity growth and labour-force growth (Cutler *et al.*, 1990 and Romer, 1990). If these endogenous responses in investment and productivity to demographic changes are significant, then the simulation results reported earlier may overstate the potential effects of demographic changes on real interest rates.

IV. CONCLUSIONS

This paper has examined the behaviour of saving, investment and real interest rates over the past few decades and has considered various factors – including developments outside the OECD area, government saving and demographic changes – that may influence their future path.

Global saving and investment rates were lower in the 1980s than in the previous decade. This decline was associated with a fall in saving and investment rates in the early 1980s in both OECD countries and certain parts of the non-OECD regions. Almost all OECD countries experienced falls in saving and investment. A striking feature of these trends is that in almost every instance the decline in national saving was associated with a decline in government saving. There is little evidence to suggest that private saving adjusted to offset this. On the investment side, declines in private investment were the prime factor behind the fall in national investment rates.

Real interest rates appeared to be higher in the 1980s than in the previous 20 years. Real rates rose sharply at the beginning of the decade and, in most countries, there was no tendency for them to fall as the decade progressed. However, it is difficult to provide a uncausal explanation for the rise and persistence of higher real interest rates. Evidence from investment and saving studies indicates that the interest elasticity of these variables is low. *A priori*, this suggests that the response of real interest rates to *ex-ante* saving and investment shocks should be very large. This conclusion is difficult to reconcile with the behaviour of real interest rates, irrespective of how they are measured, implying either that other mechanisms equilibrating saving and investment were important or that sensitivities to real interest rates are stronger than generally found in the empirical research.

There are in any case difficulties in establishing an accurate measure of the real interest rate, in part because inflation expectations are not readily observed and institutional changes also complicate the comparison of real rates over time. This is because measured real interest rates were closely and negatively correlated with inflation in the past, particularly in the 1970s, as a result of regulations on nominal interest rates. The removal of such regulations and shifts in the stance and implementation of monetary policy have meant that nominal rates have become more responsive to inflationary expectations in the 1980s.

Looking at the broad trends in the data and bringing together empirical evidence from other studies, the paper has suggested an explanation of developments in the 1980s which emphasises the role of the policy mix at the beginning of the 1980s, and the balance between saving and investment later in the decade as the economies approached a situation marked by full use of productive capacity. The lower level of

national saving, primarily associated with lower government saving, together with the increasing profitability of investment in many countries, lead to the high level of real interest rates being sustained.

The outlook for real interest rates is difficult to assess because recent developments are clouded by marked cyclical differences between countries. Once these cyclical factors pass, real interest rates will be driven by more structural influences. The evolution of government budgets in the major countries and the demand for saving from outside the OECD region may be important factors. Provided that economic policies in OECD countries respond in an adequate way, the impact of increased investment needs of non-OECD regions on world real interest rates should not be exaggerated. Some of the economies in question are relatively small and may need, or be able, to finance a good deal of their investment domestically. There are significant pressures on government budgets in the OECD countries over the medium term and although a return towards zero net borrowing may be hoped for it may provide little scope for a reduction of real interest rates. Over the longer term, demographic changes may affect the paths of both private saving and investment, though the consequences for real interest rates are subject to considerable uncertainty.

Are the higher real interest rates that prevailed in the **1980s** and may continue to prevail a cause for concern? Judgements about whether high real interest rates are a problem are difficult to make and rest on the factors driving the real interest rate. Cyclical increases in real interest rates should not be a concern since they represent a normal equilibrating channel. Similarly, high real interest rates that reflect increased *ex-ante* investment need not be a concern *per se*. If the higher real rate brings forth extra saving, then the capital stock will be augmented with positive effects on potential output in the future. Furthermore, for a single economy with access to world capital markets, any *ex-ante* imbalance can be financed, in part, by net capital inflows.

Concerns about the level of real interest rates therefore mainly reflect concerns about the adequacy of saving. While questions about the optimality of savings can be tackled theoretically, it is difficult to find empirical yardsticks to judge whether saving behaviour – private and public – is optimal. This point is strengthened by the fact that the review of empirical evidence points to private saving behaviour being different from theoretical predictions. If it was established that higher saving was desirable, then an increase in public saving might be contemplated as a part of the solution. The arguments for increased public saving are strengthened in countries where structural budget balances are still in deficit and where the sustainability of government net-asset positions over the medium and long term may be questioned. The fact that there does not appear to be a full offset between private and public saving suggests that such a policy would increase national saving.

NOTES

1. See Hall (1989).
2. Similar conclusions can be found in Zeldes (1989).
3. A summary of the early literature can be found in Sturm (1983).
4. This is potentially very important. Assuming a propensity to consume out of wealth of 0.05 and an initial wealth income ratio of 5, a rise in the rate of interest from 10 to 11 per cent would increase the saving rate by 1 percentage point if half of wealth was of a consol-type and the other half did not respond to interest rates.
5. Real interest rates are only part of the cost of capital. The cost of equity, depreciation, taxation and relative price changes are also important factors. Taking these into account is likely to produce a much smoother trend in the cost of funds between the 1970s and 1980s.
6. Earlier work has shown that business investment is more closely related to fluctuations in output than other variables. Nevertheless, even this relationship seems weak. Many studies also show that there is a strong correlation between business investment and company profits (which are the major influence on business saving). This correlation may reflect the fact that companies face borrowing constraints limiting their cash flow. Higher levels of profitability ease these constraints and allow firms to use internally-generated funds to finance investment. One problem with this conclusion is that profits and output growth are also closely correlated. Therefore, it may be the case that the profit measure is merely capturing the effects of output growth. Ford and Poret (1991) provide an extensive discussion of these issues.
7. The relationship between output growth and investment is well documented in Ford and Poret (1991) while that for saving and growth can be found in Modigliani (1970) and Bosworth (1990). However, the direction of causality between saving and growth is difficult to establish.
8. Bayoumi (1989) stressed this point as a main reason for the close correlation between saving and investment over time.
9. For a description of some of the main elements in this development, see Blundell-Wignall and Browne (1991).
10. Bayoumi (1990) and Blundell-Wignall *et al.* (1991).
11. See Evans (1985 and 1987), Henderschott and Peek (1989) and Barro and Martin (1990). The Congressional Budget Office (1987) and Bernheim (1987) summarise much of the literature in this area.
12. These results are broadly consistent with those in Sachs (1985). Danker and Hooper (1990) noted that while real rates of return on fixed investment did not rise much in the United States, real returns on financial assets did. They suggested that this was due to the mix of U.S. fiscal and monetary policy.
13. Tax deductibility for consumer interest payments is, in itself, not a tax distortion but serves to enhance symmetry of the tax system. However, three caveats apply. First, in many countries

corresponding income is not, or only partly, taxed. Second, deductibility of the full costs of borrowing imply an effective tax subsidy for consumption of financial services. From a symmetry point of view, only the part of interest payments which is compensation to the creditor should be deductible. Third, for a small open economy in a fixed exchange-rate regime, nominal interest rates will be determined from abroad. To the extent that tax rules abroad **do** not provide for interest deductibility, domestic deductibility could lead to *after-tax* rates below the social optimum. See Carroll and Summers (1987) for a comparison of the experience in Canada and the United States.

14. To test for the influence of the rate of return to capital on real interest rates they regressed investment on a number of lags of output and examined the residuals when the equation was used to forecast for 1983 to 1984. Under the hypothesis that there was no increase in the return to capital, high real rates would imply that investment should be low, given output, and the forecast errors should be negative. The resulting positive errors led the authors to conclude that the return to capital had increased.
15. For all countries except Japan the figures are based on a three-factor nested production structure using capital, labour and energy as inputs (Jarrett and Torres, 1987). For Japan, the figures are based on a recently-estimated two-factor CES-function. The elasticity of substitution between capital and labour of 0.63 was estimated on the basis of a derived equation for optimum labour demand using the Johansen technique for estimating cointegrating equations.
16. These observations are conditional on the assumptions behind the Interlink supply block, including the assumption that technical progress is labour augmenting. However, to the extent that technical progress is capital augmenting, capital/labour ratios measured in efficiency units would trend upward more than the measures shown.
17. The fall in the relative investment-goods deflator in the 1980s may have resulted from both a higher rate of technical progress in the investment-goods sector than elsewhere as well as changes in relative factor prices. In the latter case, the argument assumes that capital intensity is lower in the investment-goods sector, which in an environment of wage restraint and higher real interest rates may bring about a fall in the relative output price. In this sense, the relative investment-goods price is not exogenous to the determination of real interest rates but may be influenced by changes in real interest rates.
18. For example, Blundell-Wignall and Browne (1991) find a cointegrating relationship between cumulated current accounts (a proxy for risk premia), the real exchange rate and real long-term interest differentials. Similar findings are reported for the inclusion of terms-of-trade effects or a wider range of monetary, fiscal, current-account and real productivity measures (Adams and Chadha, 1990).
19. Hooper and Mann (1989) survey a large number of estimates, which attempt to apportion the change in the U.S. trade deficit to the underlying causes, relative price changes and differences in growth of economic activity. While differing in detail, most studies agree that the rise in the dollar was at least as important as differences in demand growth for explaining the deterioration of the U.S. trade balance up to the mid-1980s. Similar exercises by the OECD (1988b and 1990c) attribute \$64 billion out of a total change of \$199 billion in the real trade balance between 1980 and 1985 to relative price changes and the rest to other factors, mainly relative income growth differentials.
20. The picture as regards prospective world savings flows is very obscure, because a world current-account discrepancy of over a \$100 billion means that both the OECD and non-OECD regions are simultaneously in deficit.
21. Real interest rates are measured here by long-term nominal interest rates and a weighted average of past and present changes in GDP/GNP deflators. The OECD average is, somewhat arbitrarily, calculated using GDP/GNP weights.

22. A recent study argued that environmental conditions in central and eastern Europe may be somewhat better than generally thought (see Hughes, 1990).
23. The Interlink model, as well as the national models considered, imply that increased government saving is not fully offset by lower private saving in expectation of a lower tax pressure in the future, i.e. that Ricardian equivalence does not hold.
24. The responsiveness of investment to real interest rates in Interlink is relatively high, as compared with the impression from the empirical work surveyed earlier.
25. An exception from this rule is the integration of the five new Länder in Germany.
26. To the extent that funds are put at the disposal of the Soviet Union by OECD governments, this may lead to an indirect tapping of private OECD saving.
27. The necessary and sufficient conditions for catching up are not clear from economic theory and experience, particularly among developing nations, has shown that it is far from an automatic process. Among the conditions which have been identified by the literature can be mentioned: openness to trade, investment in human capital and infrastructure, a stable demographic development and political stability.
28. The increase in the dependency ratio will be muted in the near term in many countries because of a reduction in the proportion of the population aged under 15.
29. The simulations of Auerbach *et al.* (1989) indicate that net national saving in Japan could fall from around 21 per cent in 1990 to around 3 per cent in 2030 measured as a share of net domestic product. For Germany a fall from around 20 per cent in 1990 to around 3 per cent in 2050 was simulated. However, since unification, the structure of the German population has been altered significantly. Thus, these simulation results have probably been overtaken by recent events. By comparison, simulated falls of 5-6 percentage points between 1990 and 2030 for the United States and Sweden may seem small.
30. See Flavin (1981) and Hayashi (1982 and 1985). A number of reasons have been suggested for this result. They rest on: consumers being liquidity constrained (so that they cannot borrow and consume against future income) (see Hayashi, 1985 and Hubbard and Judd, 1986); consumers following rule-of-thumb type behaviour such that they consume a certain proportion of current income (Carroll and Summers, 1989); or consumers being myopic. Estimates suggest that from 20 to 50 per cent of consumers in a range of countries do not or cannot base consumption decisions on future income (Hayashi, 1985; McKibbin and Richards, 1988; and Carroll and Summers, 1989). Recent evidence indicates that the extent to which consumers are so constrained has declined with financial liberalisation in a number of countries in the 1980s (Blundell-Wignall *et al.*, 1991). Bayoumi (1990) also found that consumers may have become more forward-looking following deregulation in the United Kingdom.
31. See Feldstein (1980), Modigliani and Sterling (1983) and Heller (1988). Also, Dean *et al.* (1990) constructed a synthetic indicator of demographic and social influences on saving ratios; it showed that these factors seem to provide a partial explanation of the differences in household saving behaviour across countries in the 1980s.
32. See Miren (1979), Kurz (1984), Kotlikoff (1988), Carroll and Summers (1989), Edey and Britten-Jones (1990) and Bosworth (1990).
33. It may also be the case that the interaction of demographic factors and social-security systems alters the private saving ratio by reducing the saving of all cohorts. Improvements in social-security payments may influence the decision of younger generations about how much they need to save for retirement. Various empirical studies in the United States and the Nordic countries suggest that improved social-security provisions for the elderly have discouraged private saving.

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