GROUP OF TEN

Saving, Investment and Real Interest Rates

*A Study for the Ministers and Governors
by the Group of Deputies*

GROUP OF TEN   Rome, October 4, 1995

LETTER OF TRANSMITTAL

To the Ministers and Governors:

I have the honor to submit the Study of your Deputies on Saving, Investment and Real Interest Rates which you requested in Madrid in October 1994. At the time concern was expressed about the rise in real long-term interest rates, and the Deputies were asked to look into the relationship between high real interest rates and global saving and investment developments.

The analysis of this Study is based on an extensive examination and assessment of the literature on this topic. The study considers the policy and structural determinants of the observed secular changes in saving, investment and real interest rates in the world economy over the last thirty-five years. Particular attention is given to the effects of fiscal and monetary policies and to the role of financial liberalization, the determination of the inflation premium, and demographic influences.
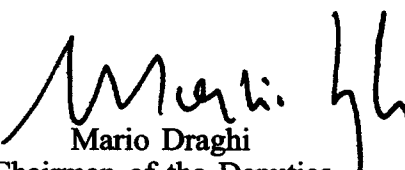
Mario Draghi
Chairman of the Deputies

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Saving, Investment and Real Interest Rates

EXECUTIVE SUMMARY

In the past few years, long-term interest rates in the G-10 countries have fluctuated sharply. These fluctuations in nominal interest rates have raised concerns about the behaviour and likely future evolution of real interest rates, and the associated implications for economic growth and welfare. In particular, some observers have expressed the view that real interest rates have returned to - or even exceeded - the high levels experienced during the 1980s.

Whether a surge in real long-term interest rates should be a concern to policy makers depends on the answers to a number of questions. Will the rise prove to be transitory? Is the new level of rates unprecedented or unsustainable? Is the rise a result of an increase in the demand for finance stemming from high rates of return on domestic investment or from the capital needs of developing and formerly socialist economies? Is it induced by a decline in public and private saving? Or does it reflect increases in risk premia demanded by investors?

This study looks at these questions in a long-term context, in order to distinguish cyclical movements from secular trends. Chapter 1 sets out stylized facts on the recent and secular behaviour of saving, investment, and interest rates. Chapter 2 looks at structural and policy influences on these variables over the past 35 years and considers prospects for the future. Policy conclusions are drawn in the third and final chapter.

The first question considered is the proper measurement of real interest rates. The difficulty of measuring real interest rates derives principally from the need to estimate expectations of future inflation. This study provides evidence that long-term inflationary expectations may differ significantly from recent inflation performance. Financial market concerns about future inflation appear to explain a significant proportion of the cross-country differences in nominal interest rates. These rates are higher in countries that have experienced prolonged periods of high inflation in the past, particularly if these countries have large fiscal deficits and high or rising public debt levels.

For countries with a history of high inflation, lack of credibility tends to boost the inflation premium in nominal rates. Market participants' doubts about the willingness or ability of the authorities to sustain their commitment to price stability may lead to higher nominal interest rates until success in defeating inflation is convincingly demonstrated on a lasting basis.

In some countries, one of the reasons for the rise in real interest rates on government debt and bank deposits was the existence in the 1960s and 1970s of administrative controls that kept these rates artificially low. In these countries, part of the rise is due to the removal of these controls which had distorted the operation of the market. Nonetheless, for the G-10 as a whole, the abolition of administrative controls on interest rates and portfolio composition does not appear to be the main reason for the rise in measured real interest rates.

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After allowing for the effects of inflationary expectations, inflation uncertainty, and the phasing out of administrative controls, *there appears to have been a trend increase in the real interest rate of around 100 basis points in most G-10 countries over the past 35 years, to about 4 percent presently.* This study endorses the view that this common trend mainly reflects the interaction of secular developments in saving and investment behaviour.

In the area of saving, there is clear evidence of a downward trend. *National saving rates have declined by nearly 5 percent of GDP since the 1960s in the G-10 countries and are now below 20 percent of GDP on average. The drop is due mainly to a reduction in the saving rate of the public sector.* But private saving has also declined as a percentage of GDP in most G-10 countries. This latter outcome can be attributed to offsetting factors. Falling dependency ratios, rising fiscal deficits, and higher rates of depreciation on physical capital have tended to raise gross private saving rates, but slower economic growth, rising wealth, increased social insurance coverage, including unfunded pension systems, and the relaxation of credit rationing on households all have worked to reduce private saving rates.

The observed downward shift in the saving rate is of policy concern in itself, independently of its impact on the real interest rate. From a long-term perspective, low saving at the global level constrains investment, economic growth, and employment growth. Also, in a short-term perspective, low saving renders the economy more vulnerable to adverse shocks, insofar as it reflects financial fragility of households and firms.

Investment too has shown some tendency to decline as a share of GDP, but this decrease is less pronounced than the drop in saving rates. On the public sector side, investment rates have been roughly constant in the G-10 countries. Private investment rates have fallen, to varying degrees, in all countries since the 1960s. To be sure, market deregulation has tended to increase the opportunities for productive investment, and should have contributed to raising its efficiency. However, the effect on desired investment appears to have been more than offset by other factors, such as the slowdowns in the rate of growth of total factor productivity and labour force growth.

In all, it would appear that the secular rise in the real interest rate is due to a decline in the saving rate – driven largely by fiscal deficits – which has outweighed a parallel reduction in desired investment. The temporary decline in long-term rates in 1993 can be explained in terms of revisions in expectations about the severity and duration of the recession, which were more than completely reversed during the course of 1994.

Some of the increase in real interest rates during 1994 could have its origin in greater demand for investment finance. Based on the relative performance of equity and bond markets, it is possible to argue that expected future profits were rising. However, the volatility of equity markets is too great to be able to quantify the importance of this factor with any reasonable precision.

Despite the growing importance of non-industrial countries in world financial markets, *it does not appear that capital demands from developing and transition economies have been a major source of secular upward pressure on global real interest rates.* There was a dramatic increase in capital flows to these countries in the first half of the 1990s, peaking in 1993, but, in terms of GDP, this largely represented a return to the pattern of the early 1970s. The marked increase in investment in developing countries over the last 25 years has been largely self financed. Furthermore, even with the surge of the past few years, net capital flows to developing and transition countries amount to less than

5 percent of private saving in the G-10 countries, compared to the 16 percent absorbed by G-10 public deficits.

Because of the globalization of financial markets, countries need no longer rely so heavily on the savings generated within their own borders to finance their investment. Nor are they constrained in their choice of saving instruments by what is on offer at home. Globalization has two other profoundly significant implications for economic policy. Firstly, *the effects on real interest rates of changes in fiscal deficits are now spread across all countries integrated into the global financial system. This means that countries collectively have an interest in the soundness of fiscal policies.* A second and equally significant implication of global financial integration is that *countries pursuing unsustainable economic policies will pay sizable risk premia.* Consequently, there are concrete and important rewards from correcting past mistakes and persisting in policies aimed at price stability and fiscal prudence.

In terms of policy prescriptions, the arguments above point to the key role of fiscal policy in influencing the level of saving and real interest rates. There is evidence that changes in public deficits lead to an offsetting change in private saving, but the offset is far from complete. Thus *a reduction in public deficits will unambiguously raise national saving. Fiscal consolidation can also be expected to put downward pressures on interest rates.* Although past empirical studies have often failed to reveal a clear and strong link between public deficits or debt and interest rates, this is probably because the effect has been masked by the globalization of financial markets and by factors tending to reduce investment demand. Indeed, more recent studies linking global public debt to world interest rates find evidence of a sizable effect. But even at the national level, fiscal consolidation should tend to lower the interest rate, as long as it reduces concerns about fiscal sustainability.

There are other compelling arguments in favour of fiscal consolidation. In many countries, high debt levels make public finances vulnerable to adverse shocks and threaten fiscal sustainability. It would also be desirable to reduce debt levels before rising dependency ratios increase fiscal pressures on public pension and medical programs. *This study recommends that fiscal policy should aim to reduce the debt-to-GDP ratio in times when the economy is not subject to adverse shocks.* Consolidation of the debt ratio should be rapid enough in normal years to outweigh any temporary setbacks during cyclical downturns, *so that debt ratios may decline secularly toward more prudent levels.*

This study acknowledges that the allocation of fiscal consolidation between expenditure cuts, reduced transfer payments, and higher tax revenues is a political decision that should be based on the social valuation of various government programs, the cost to taxpayers and any distortions or inefficiencies that are either introduced or corrected by these taxes and programs. However, there are both theoretical and empirical reasons to believe that *deficit reduction achieved by expenditure cuts will raise national saving more than deficit reduction achieved by higher taxes.* Among the forms of taxation commonly employed, *an increase in taxes on consumption should tend to raise national saving more than an equivalent rise in taxes on income.*

Since governments bear responsibility for publicly provided pensions, they need to anticipate the demographic changes that are likely to occur. Over the next 10-20 years, the entrance of the baby-boom generation in G-10 countries into their highest saving years should contribute positively to national saving. However, as this generation begins to

retire – around 2005 in Japan and 2015 in Europe and North America – there will be a significant downward impact on both private and public saving. Estimates of the direct effect of these demographic trends on the financial balances of the public sector of G-7 countries show a deterioration that varies between 1 and 9 percent of GDP. *This points to the need to generate additional savings to finance publicly provided pensions and to reform pension and health care systems in those cases where benefits are out of line with the requirements of fiscal sustainability.*

Demographic trends in the developing countries could offset those of the industrial countries over the next fifty years, so that world saving rates might actually rise. Even if saving rates in developing countries were to remain unchanged, the combination of their higher growth rate and higher saving rate would at least partly offset the fall in industrial country saving rates. At the same time, the investment needs of emerging countries are also likely to grow at a rapid pace. The experience of the successful middle-income countries, especially in Asia, suggests that rising investment rates, by stimulating growth, lead in turn to higher saving rates. *Thus, there is no presumption that the growing investment needs of emerging economies will create undue pressures on world interest rates.*

CHAPTER 1

Factual Background: Developments in Saving, Investment, and Interest Rates

I. Recent developments and influences on interest rates

(a) Developments in Nominal and Real Interest Rates

The recent past has witnessed dramatic movements in both nominal and real long-term interest rates. Having fallen to levels well below their average of the past few years in 1993, they rose sharply to unusually high, but not unprecedented, heights in 1994. However, in the first part of 1995 they fell back significantly. Three factors have been noteworthy about these developments. Firstly, the swings have been larger than would appear to be justified by underlying inflation trends, recent monetary policy actions, and cyclical developments. Secondly, the movements have occurred more or less simultaneously in a wide range of countries in highly different circumstances, presumably because of the extent of international financial market integration. Finally, although nominal and real rates have moved in tandem, the swings in real rates have been much more muted.

Of the many different interest rates observed in each country, this study focuses on long-term interest rates on central government bonds. Long-term rates are generally considered to be more relevant than short-term rates in the saving and investment decisions of consumers and firms, and they are less strongly affected by monetary policy reactions to cyclical factors. 10-year bonds are chosen to maximize data availability and comparability across countries[1]. By focusing on government bonds in national currencies, the effect of default risk is minimized, although the effects of inflation and exchange rate risk remain.

Chart 1 displays the nominal interest rates on 10-year government bonds in the G-10 countries over the past two and a half years. In 1993 nominal rates declined in all G-10 countries, though the drop was most pronounced in the two countries – Italy and Sweden – with the highest rates. This general trend was reversed in 1994 when rates rose sharply. The increase in interest rates between end-1993 and end-1994 ranged from about 100 basis points in Japan and Switzerland to around 400 basis points in Sweden.

The increase in long-term rates in 1994 appears dramatic. It was clearly sharper than in corresponding periods of price stability. But there are three reasons for not being overly concerned. Firstly, long-term interest rates had declined markedly at the end of 1993. In the course of that year, mutual funds and other institutional investors which had earlier not been active in this market shifted large sums into international bonds. Substantial purchases by highly leveraged investors imparted further momentum to this

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[1] Constant 10-year maturity bonds are not available for all countries, especially during the 1960s and 1970s. In those cases the closest available proxy is used, typically an average yield on bonds with a range of maturities around ten years.

CHART 1 – 10-Year Government Bond Yields
1993Q1-1995Q3

━━ United States
── Japan
- - -- Germany
━-·· France
━ ━ United Kingfom
······ Italy

━━ Canada
── Belgium
- - -- Sweden
━-·· Switzerland
━ ━ Netherland
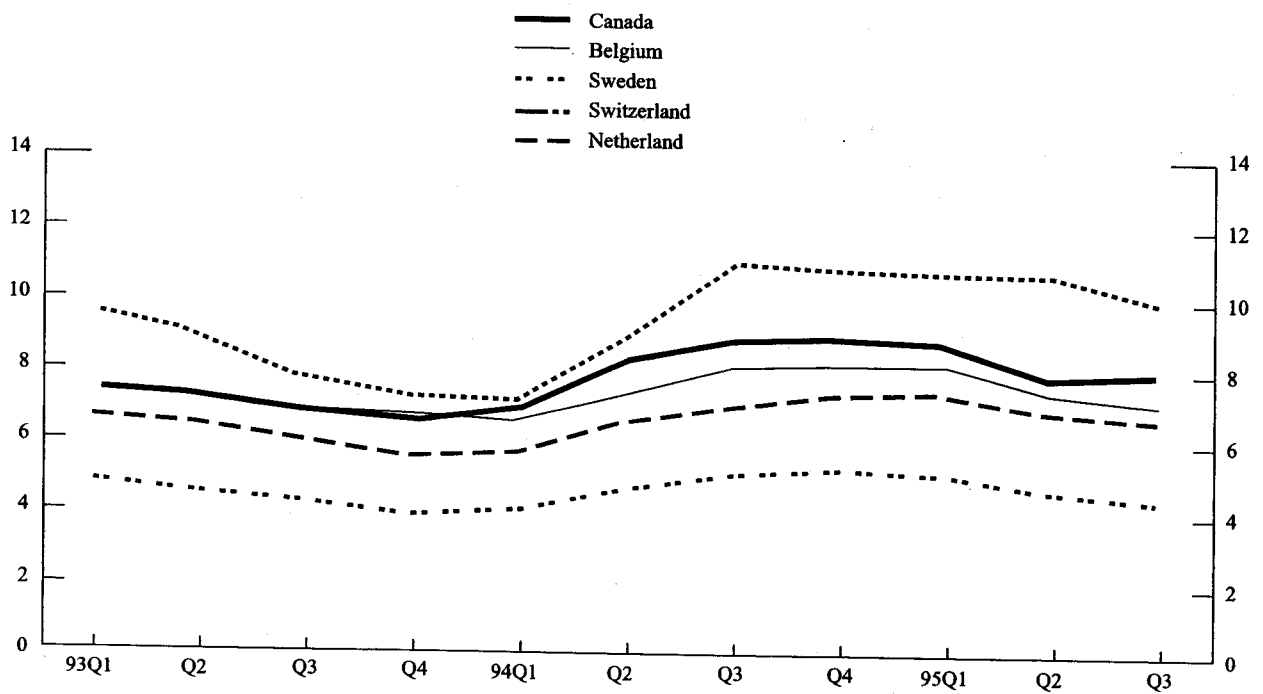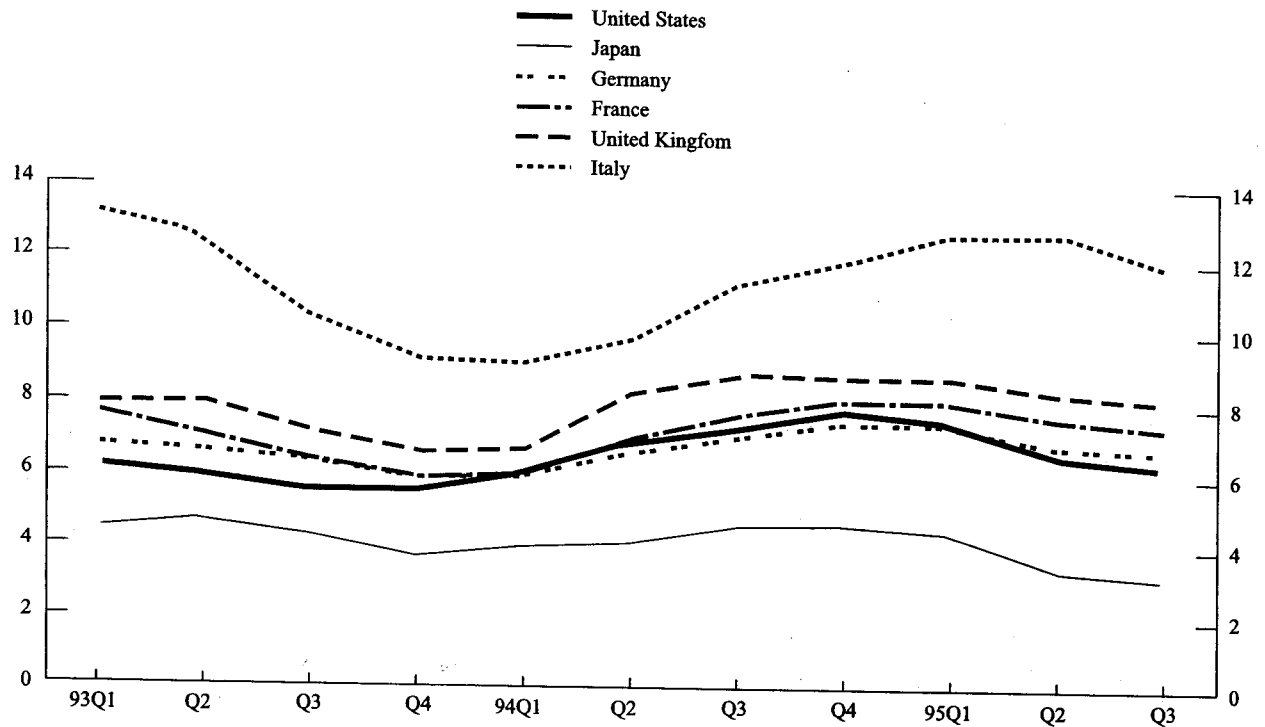
Source: Bank for International Settlements

trend. Secondly, the prospects of a longer and more broadly based cyclical recovery added momentum to the upward correction in yields by adding to demand for investment finance and feeding concerns about continued price stability. Thirdly, measured real rates did not rise to unprecedented levels. In many countries they had been at similar heights in the late 1980s and dropped in the wake of the cyclical slowdown of the early 1990s.

During 1995 there has been a clear and fairly general reversal of the earlier rise in long-term bond rates in most G-10 countries. In all but two countries, interest rates in the third quarter of 1995 had returned to within 50 basis points of their levels in the first quarter of 1993. In Japan and Italy, interest rates fell about 150 basis points over this period, although it should be noted that the Italian interest rate remains the highest in the G-10. As of September 29, 1995 the levels of nominal interest rates in G-10 countries ranged from 2.9 percent in Japan to 12.0 percent in Italy.

BOX 1

The Real Interest Rate: A Definition

The *ex ante* real interest rate on a bond is defined (approximately) as the expected nominal interest rate minus the expected inflation rate over the life of the bond. The approximate ex post real rate is simply the actual interest payment rate minus the actual inflation rate. The exact formula is $(1+r)=(1+i)/(1+\pi)$, where ρ is the real rate, i is the nominal rate, and π is the inflation rate. For interest rates and inflation rates of 10 percent or less, the approximation is very close. All real rates calculated in this study use the exact formula.

This study is primarily concerned with the *ex ante* real long-term interest rate, since saving and investment are based on the expected future rate of return. Henceforth, the term "real interest rate" will refer to the ex ante rate unless otherwise specified.

Unfortunately, it is not possible to observe the ex ante real interest rate directly. The stated nominal interest rate on a bond generally is not equal to the expected nominal interest payment, due to the possibility that the issuer may default. However, for central government bonds in G-10 countries the probability of default is exceedingly low, and it shall be ignored in the remainder of this study. The expected inflation rate also is not observed. In this study we shall consider alternative estimates of the expected future inflation rate in computing measures of the *ex ante* real interest rate.

In some countries there exist long-term government bonds that are indexed to the level of consumer prices. The real rate of return on these "index-linked" bonds provides an alternative estimate of the real long-term interest rate. The major difference between the real return on index-linked bonds and the *ex ante* real interest rate on conventional bonds of the same maturity is that holders of conventional bonds are not automatically protected against inflation. They may consequently require an inflation-risk premium that holders of index-linked bonds do not[2]. Thus, one might expect the ex ante real interest rate on conventional bonds to exceed that on index-linked bonds. Estimates of the size of the difference – the inflation-risk premium – range from 0 to 150 basis points, and it may vary over time[3]. (Note that index-linked bonds carry the same default risk, exchange-rate risk, and other non-inflation risks as conventional bonds.)

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[2] There are two additional sources of discrepancy between the real return on index-linked bonds and the *ex ante* real interest rate on conventional bonds. Firstly, index-linked bonds are only imperfectly indexed, as there is a lag between the last indexing observation of the price level and the maturity date of the bond. This lag is eight months in the United Kingdom, and somewhat less in the other countries with index-linked bonds. Secondly, index-linked bonds are typically traded in less liquid markets than conventional bonds, which may engender a liquidity premium in index-linked bond yields compared to conventional bonds. Both of these factors are likely to be quite small, and they tend to reduce the difference in real yields that arises from the inflation-risk premium.

[3] Levin and Copeland (1993) estimate a slightly negative risk premium, while Breedon (1995) estimates a risk premium as high as 170 basis points. In a presentation at a conference hosted by Stanford University's Center for Economic Policy Research on April 21, 1995 titled 'Should the Federal Government Issue Inflation-Indexed Bonds?' John Campbell presented a range of estimates that focused on 50-75 basis points.

As discussed in Box 1, the difficulty in measuring real interest rates is essentially that of estimating expected inflation. Over the past two years, consumer price inflation has been roughly constant or declining in most G-10 countries. In addition, surveys of financial market participants indicate very little change in long-term inflation expectations in most G-10 countries[4]. On the surface these observations suggest that real rates have fluctuated as sharply as nominal rates. However, the yields on index-linked bonds suggest either that movements in real interest rates have been far more muted than movements in nominal rates or that inflation-risk premia have been highly volatile.

Movements in the interest rates on index-linked bonds have been only about a third to a half as large as movements in nominal rates. In the United Kingdom, which has the only large and liquid market for index-linked bonds in the G-10, the interest rate on 10-year index-linked bonds increased by 60 basis points between the end of 1993 and the end of 1994 while the nominal interest rate increased by 210 basis points. In Canada, over the same period the interest rate on index-linked bonds increased by 110 basis points while the nominal interest rate increased by 190 basis points[5]. In Sweden the rate on index-linked bonds increased by 100 basis points between April 1994 – when index-linked bonds were first introduced – and April 1995, while the nominal interest rate increased by nearly 300 basis points[6].

Similar differences in the rates of interest on index-linked and nominal bonds can be observed for periods when interest rates fell such as 1993 and the first half of 1995. During these periods, nominal interest rates fell by more than interest rates on index-linked bonds.

Overall, the evidence from index-linked bonds points to a fall in real interest rates of 50 basis points during 1993, followed by a rise of about 100 basis points in 1994, and – in Canada and the United Kingdom – a fall of nearly 50 basis points in early 1995[7]. As of September 29, 1995 the indexed real long-term interest rates of Canada, Sweden and the United Kingdom, were 4.7, 5.4, and 3.6, respectively. It is important to remember, however, that the real interest rates on conventional bonds may differ from the real rates on index-linked bonds primarily due to inflation-risk premia. If these premia are highly variable, then the real interest rate on conventional bonds may have fluctuated by more than the real interest rate on index-linked bonds.

Before embarking on an examination of the various forces that have influenced interest rates over the recent past, and secularly since the 1960s, it is worth noting that this study has taken the view that interest rates are linked to economic fundamentals and the public's expectations thereof. Another explanation for the high level of nominal interest rates places more emphasis on the behaviour of financial operators[8]. According

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[4] According to various issues of Consensus Forecasts, surveys of 10-year inflation expectations in most G-10 countries fluctuated well within a 1 percentage point range during the past two years. The usefulness of published surveys in measuring market expectations is a hotly debated topic in the economics literature.

[5] The only existing Canadian index-linked bond matures in 2021.

[6] The yield movement refers to the 20-year index-linked bond that was introduced in April 1994. Later in 1994 a 10-year bond was issued.

[7] The Swedish indexed rate has shown little change in 1995. The Canadian indexed rate has risen about 25 basis points since its low point in June 1995.

[8] See Ciocca and Nardozzi (1995).

to this view, financial market equilibria need not be anchored to the 'real' economy. Rather, they reflect the judgement of investors, validated through self-fulfilling expectations. Because this judgement is shaped by conventional elements – such as inertia, instinct, desire – interest rates can move to a different 'equilibrium', without intervening changes in economic fundamentals.

(b) Underlying Factors

Three forces appear to have had an important influence on interest rates over the past couple of years. Uncertainty about the future level of inflation buoyed up nominal rates in 1994 and caused measures of real rates based on recent inflation to rise. Monetary policy actions, acting in part through inflationary expectations, also affected interest rates. The final factor was shifting sentiments about the timing, geographical coincidence, and strength of the recovery.

(i) Inflation Uncertainty

Uncertainty about future inflation bolstered nominal interest rates during 1994. This conclusion is based on the behaviour of interest rates on index-linked bond rates, which rose much less than nominal rates, and the strong correlation between the magnitude of recent nominal interest rate movements and the inflation performance of each country over the past 15 years.

In Japan and Switzerland, two countries with a history of low inflation, nominal interest rates fell and rose by 100 basis points or less in 1993 and 1994. These movements are of roughly the same size as the movements of indexed real interest rates noted in the previous section. Other countries saw larger swings in nominal interest rates over this period. The two countries with the largest interest rate movements, Italy and Sweden, also had the highest average inflation rates over the previous 15 years.

One explanation of these observations is that inflation-risk premia are larger and more volatile in countries with a history of high inflation. An alternative hypothesis is that the process by which markets form expectations of future inflation is subject to volatile swings that are not well captured by published surveys.

Evidence in favour of the inflation-risk premium explanation is provided by movements in the implied volatility of major government bond futures contracts, as evidenced by the options prices on these contracts. Implied volatility was much higher in 1994 than 1993, supporting the view that inflation uncertainty increased[9]. In addition, the observed monthly volatilities of long-term interest rates increased during 1994 in most G-10 countries, although these volatilities remained far below their previous peaks[10].

For countries which have experienced high inflation in the past, the above analysis leads to the following interpretation of the gap between nominal and real interest rates over the past two years: as the recovery from the recent recession proved slower than

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[9] See Ganley and Noblet (1995).

[10] Monthly volatilities are measured as the standard deviations (over 12-month intervals) of monthly average interest rates from *International Financial Statistics*.

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expected in 1993, and inflation stayed low, market concerns about future inflation sub-sided. When the pace of recovery exceeded expectations in 1994, and fiscal deficits continued to loom large in many countries, markets again became concerned about future inflation and exacted an inflation premium, either in the form of higher expected inflation or an increased inflation-risk premium.

(ii) Monetary Policy

Changes in the monetary policy stance of G-10 countries varied considerably during 1994, reflecting differences in the cyclical position of countries. In some countries, interest rate decisions were also influenced by changes in foreign exchange market pressures. Monetary conditions were eased in Germany, where policy-related interest rates fell by over one percentage point in 1994. Similar adjustments took place in France, the Nether-lands, Belgium and Switzerland, while monetary conditions remained relatively stable in Japan, Italy, the United Kingdom, and Sweden.

By contrast, monetary policy became much more restrictive in Canada and the United States. Starting in early February of 1994, the U.S. monetary authorities began to raise short-term interest rates in a series of small, but frequent, steps. Between end-1993 and end-1994, the U.S. federal funds rate increased by 250 basis points. Similar action by the Canadian authorities followed closely. The intention of the Federal Reserve was to prevent a rise in inflation that would have required even greater monetary stringency at a later date. Other things being equal, a tightening of present monetary policy should lead to expectations of lower future short-term rates, and – since long-term rates are a weighted average of expected short-term rates – a corresponding decline in long-term rates, provided that the market does not discount the future too rapidly. However, in 1994 the rise in short-term rates in the United States was accompanied by a sharp increase in long-term rates.

This apparently perverse reaction can be attributed to market concerns that the U.S. monetary authorities were acting too slowly, and might thereby allow inflation to increase in the future, relative to earlier expectations. This position is supported by the timing of the increases in long-term bond rates and the nature of the subsequent correction. U.S. long-term interest rates began to increase three months before the Federal Reserve began to tighten. Moreover, long-term interest rates have fallen in the United States (and other countries) during 1995 as reports of slowing growth have dampened inflationary expectations.

(iii) Cyclical Influences on Real Interest Rates

In principle, real interest rates with very long maturities should not be affected by temporary cyclical fluctuations. In practice, a cyclical upturn may last for an appreciable portion of the life of a 10-year bond. Moreover, there is some evidence that even 30-year real yields have a significant cyclical component, possibly because it is difficult for financial markets to distinguish in advance which shocks will turn out to be cyclical and which shocks will prove to be permanent[11].

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[11] Three factors have prevented a better understanding of the cyclicality of real long-term interest rates. Firstly, for most countries and time periods it is extremely difficult to isolate the inflation premium built into nominal interest rates. Secondly, monetary shocks create the opposite correlation between real interest rates and output than most other cyclical shocks. Thirdly, it is difficult to distinguish secular and cyclical shocks.

The evidence presented above from index-linked bond yields and from nominal bond yields in countries with low inflation, points to first a fall and then a rise of 50-100 basis points in the real interest rate during 1993 and 1994. A plausible explanation for these movements is that the unexpectedly slow recovery of 1993 caused markets to revise downward their expectations of future investment demand and that the return to a more normal recovery in 1994 was associated with an upgrading of expected future investment needs[12]. While this movement in the real interest rate is large enough to be significant, it does not appear unusually large relative to past cyclical swings in real rates.

I. DEVELOPMENTS IN A MEDIUM- AND LONG-TERM CONTEXT

During the past 35 years there has been a secular increase in real interest rates in most G-10 countries; by most measures, this increase is on the order of about one percentage point, on average. Although this secular increase has, at times, been obscured by cyclical swings in real rates, the secular trend is significant. A rise in real rates from 3 to 4 percent is likely to have a substantial impact on the present discounted value of future streams of earnings and hence investment decisions, as well as on the trade-off between present and future consumption and saving decisions.

(a) Real Interest Rates

In the absence of both direct measures and reliable indicators of expected inflation, real interest rates are conventionally measured by subtracting one or more years of recorded inflation from the nominal interest rate. The choice of past inflation, future inflation, or smoothed inflation has implications for the short-run turning points, but it has little effect on the long-run trend in the measured real interest rate[13]. Table 1 lists decade averages of the 10-year bond rate for each G-10 country deflated by a two-year backward moving average of the inflation rate of the consumer price index.

In every country measured real interest rates were lowest in the 1970s; they were also higher, in every country, in the 1980s than in the 1960s and 1970s. Trends diverged in the 1990s: measured real rates rose further in three countries (France, Italy, and Canada), fell, relative to the 1980s, in three other countries (the United States, Germany, and Japan), and were roughly unchanged in the remaining five countries.

To help identify trends, it is useful to compare the 1960s with the 1990s. For the G-10 weighted average, measured real interest rates increased from 2.9 percent to 4.0

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[12] In the United States, the enactment of significant fiscal consolidation appeared to be a contributing factor to the fall of long-term interest rates in late 1993.

[13] These deflation methods encounter difficulties at the endpoints of the sample. Backward averages run out of data at the beginning of the sample and forward averages run out of data at the end of the sample. Smoothing techniques are sensitive to data at both endpoints. Both forward averages and smoothing techniques rely on information that was not available to the markets in which interest rates are determined. Because of the importance of the real interest rate at the end of the sample, and the concern about using unobservable information, this report focuses on measured real interest rates using backward averages of inflation.

Table 1 - Measured Real Interest Rates in G-10 Countries (1)

	1960-69	1970-79	1980-89	1990-94	1992	1993	1994	29-9-95 (2)
United States	2.5	0.7	4.5	3.3	3.2	2.9	4.1	3.4
Japan (3)	3.7	0.7	4.0	3.2	2.7	2.7	3.4	2.6
Germany	4.1	3.2	4.6	4.2	4.0	2.3	3.3	3.8
France	2.3	1.1	4.4	5.8	6.0	4.7	5.5	5.7
Italy	2.1	− 1.4	2.8	6.6	7.6	6.2	6.1	6.9
United Kingdom . .	3.2	− 1.0	3.9	3.8	3.1	3.5	5.3	5.0
Canada	3.3	1.3	4.7	5.7	5.0	6.1	7.5	6.3
Netherlands	1.6	1.0	5.0	5.0	4.8	3.2	3.8	4.0
Belgium	3.6	1.5	5.5	5.5	5.7	4.5	5.0	5.1
Sweden	2.1	0.1	3.8	3.9	4.4	4.1	5.4	6.7
Switzerland	0.9	0.4	1.3	1.5	1.4	0.8	2.8	3.1
G-10 Weighted Average	2.9	0.8	4.2	4.0	3.8	3.4	4.4	3.9

(1) A two-year backward moving average of inflation is used to proxy inflation expectations.

(2) Real rates for 29 September, 1995 are based on inflation through 1995Q2.

(3) Due to the unavailability of a market interest rate on Japanese government bonds prior to 1979, the table uses the average return on long-term Telephone and Telegram coupon bonds from 1961 through 1979. This series was recommended by the Bank of Japan. In 1980-84, yields on government bonds and Telephone bonds were essentially identical.

Sources: Interest rates are from OECD Secretariat and CPIs from *International Financial Statistics*. U.K. inflation is based on Retail Price Index excluding mortgage interest, supplied by the Bank of England.

percent over this period. In every country measured real interest rates increased significantly over this period with two notable exceptions: in Germany, measured real rates were roughly unchanged, and in Japan measured real rates fell by half a percentage point.

It is standard practice to define the real interest rate in terms of the CPI inflation rate. This definition is the appropriate one for analyzing saving behaviour, since saving is intended to provide for future consumption. All of the index-linked bonds issued by G-10 governments have been linked to the CPI. From the point of view of investment, however, it might make more sense to use the price of investment goods or the price of the output to be produced by the capital stock. Use of the GDP deflator instead of the CPI tends to increase the upward trend in measured real interest rates for most countries because the prices of capital goods and raw materials began falling relative to consumption goods in the 1980s. Measured in terms of the GDP deflator, real interest rates appear to have risen by about 2 percentage points from the 1960s to the 1990s.

The sharp divergences in measured real interest rates across G-10 countries in the 1990s are somewhat surprising, but they are not necessarily inconsistent with the growing integration of capital and goods markets in these countries[14]. There are essentially four reasons why measured real rates may vary across countries, even if capital markets are fully integrated:

[14] Still, the section on globalization below notes several studies that find a high and increasing correlation of real interest rates across countries.

 – If capital markets adjust faster than goods markets, or if goods markets are imperfectly integrated across countries (e.g., some goods are not traded internationally), shocks and policy changes will cause real interest rates to deviate across countries temporarily in conjunction with real exchange rate movements. For example, a looser monetary policy will at first lower short-term (nominal and real) interest rates, and cause the (nominal and real) exchange rate to depreciate. Over time, as inflation catches up to the higher level of monetary expansion, the real exchange rate and the real interest rate rise back to their original levels.

 – Faster-growing countries that are catching-up with more developed ones will tend to have appreciating real exchange rates and lower real interest rates (measured in terms of consumer prices). This effect is due to more rapid technological progress in the sector of internationally traded goods, which raises the relative price of non-tradable goods; since the price of tradables is determined in world markets, these countries will tend to experience a higher rate of inflation, leading to an appreciating exchange rate and lower real interest rates. This effect may have been significant in the 1960s, but it is not likely to have played a major role among the G-10 countries over the past two decades.

 – Inflation-risk premia are significant and may vary across countries.

 – We cannot measure inflation expectations properly: recent averages of inflation are not accurately capturing the expected inflation rates perceived by market participants, especially in countries that have had large changes in inflation rates over time. Other factors that may influence expectations of future inflation include the past history of inflation, the level and growth rate of government debt, the level of unemployment, and the degree of central bank independence.

In general, the countries with the highest measured real interest rates in the 1990s experienced the largest declines in average inflation between the 1980s and the 1990s. This suggests that countries are not judged solely on their announcements or their recent performance but on their inflation experience over a longer time period. In other words, it appears that countries can achieve credibility only slowly by the dint of consistent and successful action over a period of years. Without such credibility, they seem destined to pay an inflation premium that raises nominal interest rates and measured real rates.

The three countries with the lowest and most stable historical inflation rates – Germany, Japan, and Switzerland – all experienced temporary increases in inflation in the early 1990s. If markets expected inflation in these countries to decrease in the future, the measured real interest rates would be understating the true real interest rates in the 1990s.

The best empirical measure of the real interest rate in the absence of inflation risk is the real yield on index-linked bonds. The three countries with index-linked bonds (United Kingdom, Canada, and Sweden) have all experienced large decreases in inflation between the 1980s and the 1990s, which suggests that their conventionally-measured real interest rates may be overstated. As of September 29, 1995, the real interest rates on index-linked bonds in these countries were all substantially lower than the measured real interest rates reported in Table 1. The index-linked rates for the United Kingdom, Canada, and Sweden were 3.6, 4.7 and 5.4 percent, respectively. In each case, the real index-linked rate is more than 100 basis points lower than the measured rate using the nominal interest rate and recent inflation.

Unfortunately, no G-10 country had index-linked bonds in the 1960s or 1970s. However, it may be useful to compare recent index-linked bond yields with the measured

real interest rates for the 1960s from Table 1. The relatively stable inflation rates of the 1950s and 1960s imply that the measured real interest rates for the 1960s shown in Table 1 may be reasonably close to the expected real interest rates that prevailed. Comparing these rates with the average interest rates on index-linked bonds in the early 1990s implies that the real interest rate increased by 80 basis points in the United Kingdom, 120 basis points in Canada, and over 300 basis points in Sweden[15].

Altogether then, the measured real interest rates of Table 1 appear to be overstating the secular increase in the ex ante real interest rate in many countries and understating the secular increase in a few countries. The evidence is consistent with an average secular increase in the ex ante real interest rate, net of inflation risk, of around 100 basis points between the 1960s and the 1990s. While this increase is not especially large relative to the annual fluctuations of long-term interest rates, it does represent a significant and sustained increase in economic terms, as it implies a one-third increase in the real rate of return on a large fraction of outstanding financial assets over the past 35 years.

BOX 2

Historical Real Returns on Debt and Equity

The cost of capital for corporate investors reflects not only the return on bonds, but also the return on equity. Hence, the overall cost of capital may not have risen as much as the rise in real interest rates would suggest because of a possible reduction in the equity premium. For the United States, the United Kingdom, France, and Italy, historical data on real holding-period returns on equities and government debt are available for the past 100 years[16]. The correlation of rates of return across countries and instruments is quite high because the war years and the 1970s were characterized by low rates of return in all four countries for most instruments. There does not appear to be an obvious secular trend in any series. Real rates of return on long-term debt in the 1980s and 1990s are higher than at anytime from 1940 to 1979, but in the United States, the United Kingdom, and Italy they are roughly equal to the rates that prevailed in the 1890s, the 1920s, and the 1930s. Only for French debt returns does it appear that the 1980s and 1990s are above the historical experience.

One hypothesis that has been advanced to explain the apparently high returns on debt in recent years is that the premium on equity returns over debt returns is shrinking[17]. Proponents of this view note that in the United States the equity premium was around 2-3 percent before 1929 and that it subsequently rose to 6-7 percent. They argue that the stock market crash of the Great Depression left a lasting impression on investors that is only gradually receding. Over time, they argue that the premium on equities has been declining and that it will continue to decline in the future. This decline would be expected to bid up the return on debt and bid down the return on equity, leaving the overall cost of capital unaffected. Unfortunately, the volatility of stock prices is so great that even decade averages of real holding yields or earnings-price ratios are too variable to be able to support or reject this hypothesis convincingly.

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[15] The Swedish 10-year index-linked bond was observed only in 1995.

[16] Holding-period returns are defined as the *ex post* return to buying an asset at the beginning of the period and selling it at the end of the period. The concept of holding-period returns is used here for both debt and equity in order to allow greater comparability. It is important to recognize that holding-period returns may deviate significantly from the *ex ante* returns expected by investors when they purchase an asset.

[17] See, for example, Blanchard (1993).

Historical Real Holding-Period Returns

	Short-Term Debt				Long-Term Debt				Equity			
	US	UK	FR	IT	US	UK	FR	IT	US	UK	FR	IT
1890s	5.8	2.4	2.5	3.6	4.5	4.2	3.6	6.1	7.2	6.7	2.8	2.9
1900s	2.6	2.3	2.8	2.2	0.5	− 1.3	2.6	4.3	6.7	0.1	5.3	3.3
1910s	− 1.1	− 6.0	− 9.0	− 7.3	− 4.0	− 11.5	− 12.2	− 8.6	− 1.2	− 5.7	− 7.9	− 2.8
1920s	4.4	8.8	0.1	− 1.9	8.8	7.0	4.2	− 0.4	18.2	11.0	8.6	2.4
1930s	2.1	− 0.2	− 0.9	2.4	6.9	6.2	0.3	5.2	− 1.1	6.5	2.7	9.6
1940s	− 5.3	− 1.5	− 21.8	− 30.0	− 2.9	− 0.4	− 21.8	− 28.0	2.1	2.6	− 11.4	12.0
1950s	− 0.6	− 0.8	− 1.8	− 0.6	− 3.3	− 3.4	1.6	2.3	17.0	13.0	17.8	20.0
1960s	1.4	1.7	0.8	0.2	− 0.7	− 1.5	4.2	0.9	5.2	5.7	− 0.3	0.8
1970s	− 0.6	− 4.8	− 1.2	− 3.8	− 2.1	− 4.5	− 1.9	− 4.8	− 1.1	− 1.3	0.8	− 12.0
1980s	3.0	4.7	4.1	0.6	6.7	7.4	8.1	2.4	10.7	14.0	12.4	14.0
1990s	1.1	6.2	7.3	3.5	8.2	6.3	12.1	8.2	6.5	6.6	13.0	− 6.3
All ..	1.1	1.0	− 2.4	− 3.6	1.6	0.6	− 1.1	− 2.1	6.2	5.2	3.0	1.8

Sources: Contributions by E. Dubois (France Economics Ministry), J. Gagnon (U.S. Federal Reserve), S. Hay (Bank of England), and F. Panetta (Bank of Italy) to the G-10 Working Group.

Siegel (1992) constructs 30-year centred moving averages of the real 1-year holding-period returns of U.S. equities and debt back to 1802. He finds a secular decline in the real rate of return on debt from around 7 percent in 1802 to -1 percent in the 1950s and 1960s, followed by a sustained increase in the 1970s and 1980s to a level of 3 percent by 1990[18]. Siegel finds essentially no secular trend in real equity returns, although there are prolonged swings around an average real return of 6 percent. Siegel's estimate of the equity premium in the United States is consistent with the hypothesis of a high premium after the Great Depression and a declining premium since World War II, although the equity premium jumps up in the last five years of the sample, 1986-90. Prior to 1985, the narrowing equity premium was due to both falling equity returns and rising debt returns. Since 1985, both debt and equity returns have risen, but these estimates are particularly sensitive to the lack of future data for smoothing at the endpoints of the sample.

Overall, the data are consistent with a falling equity premium, but the variability in rates of return is so great that it may take another 20 or 30 years before we can be sure of this conclusion.

In order to get a longer-term perspective on real interest rates, Chart 2 plots measures of the (unweighted) average real long-term government bond yield for the G-10 countries over the past 100 years. These real interest rates are measured using 1) a three-year backward moving average of inflation, 2) a three-year forward moving average of inflation, and 3) a smoothed inflation rate[19]. Although there is no apparent trend in any of these series, it is true that the 1980s average is at the high end of historical experience. On the other hand, since the evidence presented above indicates that these measures of inflation expectations contain significant errors for the period 1960-94, it may be equally inappropriate to use them to gauge real interest rates in some earlier periods. For example, the two world wars surely caused large errors in inflation expectations that are not well captured by any of these procedures. Ignoring the war decades, the average measured real interest rate of 3.8 percent prior to 1950 was almost identical to the 3.9 percent observed in the 1980s (using past averaged inflation).

Looking outside of the industrial countries, two recent studies have examined the very high measured real interest rates in many developing countries that have liberalized

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[18] The 30-year averaging is truncated by as much as 15 years near the endpoints of the data, so the sharp rise in the last 10 years may prove to be spurious if rates of return decline in 1991-2005.

[19] The smoothed inflation rate is based on a Hodrick-Prescott filter of the CPI. The latter two series are not plotted for the 1990s because they are sensitive to assumptions about the inflation rate after 1994.

their financial markets in the 1980s and 1990s[20]. Both of these studies point to the slow adjustment of inflation expectations as the primary factor for almost every country. Factors that are also important for some countries include: large fiscal deficits; the interaction of distressed borrowers with moral hazard in the banking system; and, for successful stabilization programs, an increase in productive investment opportunities.

(b) Saving and Investment Trends

Since the 1960s, saving and investment rates have declined in the industrial countries and risen in the developing countries. Even though G-10 saving rates have fallen by more than fixed investment rates, there does not appear to have been a marked decrease in the G-10 aggregate current account balance.

(i) G-10 Countries

In 1994, average gross national saving of G-10 countries stood around 20 percent of GDP. This represents a decline of nearly 5 percentage points (based on fixed country weights) relative to the average level prevailing in the 1960s. In terms of net saving (net of depreciation), the fall has been even more pronounced: a drop of about 7 percentage points since the 1960s. The saving rate of the G-10 taken as a whole – that is measured on the basis of moving GDP country weights – has not declined as much. That is because countries with higher saving and growth rates, notably Japan, have increased their share contribution to overall saving over this period. Thus, on the basis of moving country weights, the gross saving rate has dropped by less than 2 percentage points and the net saving rate by just under 5 percent percentage points, since the 1960s[21].

The trend decline in national saving in the G-10 broadly began after the first oil shock and was linked, in all countries, to a drop in public-sector saving, which accounts for about three-fourths of the overall decline in average national saving rates in the G-10 since the late 1960s (based on fixed country weights). If moving weights are used, the decline in public saving actually accounts for all of the decline in the G-10 saving rate since the late 1960s. These general observations, however, mask some important differences among countries. For G-10 countries in Europe and North America, the decline in public saving rates was concentrated at different times – mostly in the 1970s for European countries and in the 1980s for the United States and Canada. A further deterioration took place in most countries in the 1990s. Japan experienced one of the largest falls in public saving in the 1970s, but, in contrast to other countries, was able to reverse this trend in the latter part of the 1980s, and even managed in some years to improve its fiscal balance relative to the early 1970s.

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[20] See Galbis (1993) and Rodriguez (1994).

[21] Statistics on saving are subject to a number of measurement and conceptual problems. As defined in national accounts, for instance, saving relies on a somewhat arbitrary distinction between consumption and investment goods. Spending on consumer durables is classified as consumption in the year in which it takes place, even though the associated consumption stream stretches over several years. Spending on education and training, as well as health, is similarly treated as consumption, when in fact it is, in part, investment in human capital. A reclassification of these expenditures would raise the level of saving and possibly change its behavior over the cycle. However, it is unlikely that it would alter significantly the observed long-term downward trend in the saving rate of the G-10.

Private saving has fallen in most G-10 countries relative to the levels prevailing in the 1960s and early 1970s. The largest declines have been observed in Italy, Japan, and the United States, followed by Germany and France. Still, Japan's private saving rate remains, by far, the highest in the G-10, and Italy's is the third highest. By contrast, private saving rates in the United Kingdom and the smaller G-10 countries rose over this period; the most significant increases were registered in Sweden and the United Kingdom, the two countries with the lowest private saving rates in the late 1960s and early 1970s.

It should be noted that private and public saving, as measured in the national accounts, are distorted by the effect of inflation on the net financial liabilities of the public sector, i.e. net debt plus reserve money. By eroding the value of these liabilities, inflation causes a net transfer of resources from the private to the public sector. The private sector is compensated for the inflationary erosion of its debt holdings through higher interest rates. But whereas this inflationary component of interest payments is counted as private income and saving, the offsetting losses in the real value of debt and monetary holdings are not accounted for in the national accounts. Private saving is therefore overstated by the inflationary erosion of net debt and reserve money, and public saving is understated by an equivalent amount.

Estimates of this bias, i.e. the amounts by which private saving may be overstated (and public saving understated), are provided in Table 4. As expected, the bias is largest in the 1970s and 1980s. In general, it does not appear to affect unduly the comparison between saving rates in the 1960s and the present. The one notable exception is Italy, where the rise in the debt ratio has caused the inflationary distortion of private saving to increase by as much as 4 percentage points of GDP since the late 1960s.

CHART 2 – G-10 Real Long-term Interest Rate
(unweighted average)

Past Inflation

Smoothed Inflation

Future Inflation
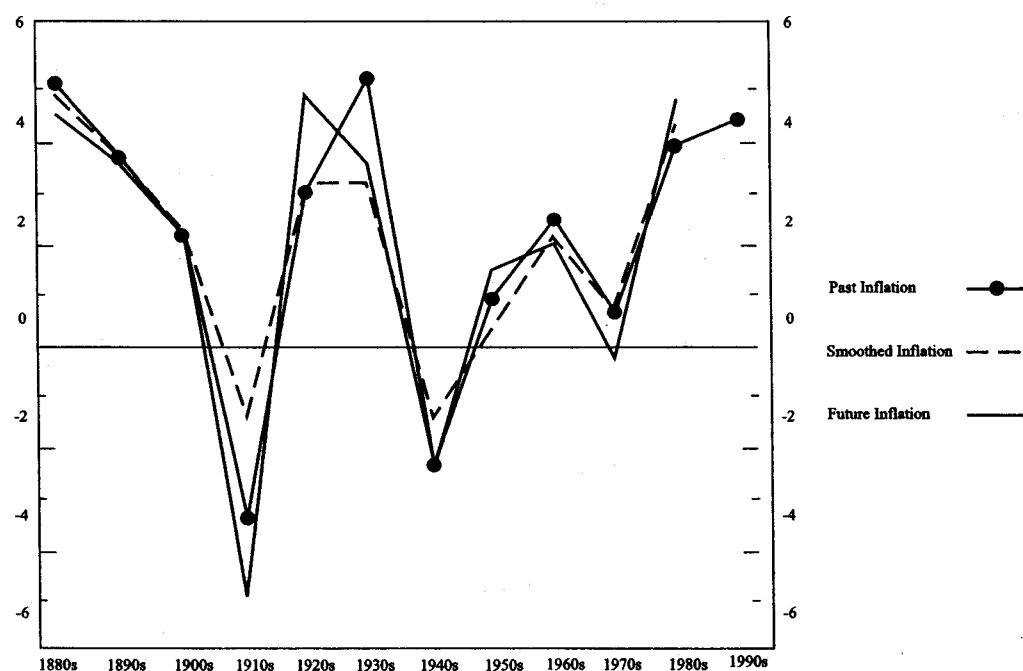
Source: E. Nalin, Swedish Ministry of Finance

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Table 2. Saving and Fixed Investment in the G-10 Countries
(in percent of GDP)

Gross saving

	decade averages			1990	1991	1992	1993	1994
	1960s	1970s	1980s					
United States	20.1	19.8	17.8	15.6	15.7	14.6	14.9	16.2
Japan	34.4	35.3	31.8	34.6	35.1	34.0	32.5	31.1
Germany	27.3	24.4	22.4	24.9	22.5	22.0	20.6	21.0
France	26.3	25.9	20.4	21.5	20.9	19.8	18.7	19.4
Italy	28.3	26.0	21.8	19.6	18.6	17.2	18.0	18.8
United Kingdom	18.5	17.9	16.5	14.3	13.5	12.8	12.7	15.0
Canada	21.5	22.4	20.1	16.4	13.9	12.8	13.3	14.8
Belgium	22.6	23.2	16.7	21.0	21.1	21.1	21.6	22.0
Netherlands	27.6	24.9	23.0	26.0	24.8	23.5	23.2	24.6
Sweden	24.0	21.1	17.3	17.7	15.8	13.4	12.2	13.7
Switzerland	30.1	29.7	29.9	33.1	31.6	29.7	29.4	29.8
G-10 average 1/fixed weights	24.5	24.1	21.4	21.0	20.5	19.5	19.2	19.9
moving weights	22.8	23.6	21.4	21.6	21.4	20.6	20.4	21.1

Net saving

	decade averages			1990	1991	1992	1993	1994
	1960s	1970s	1980s					
United States	10.0	8.2	4.5	3.1	3.1	1.9	2.7	4.1
Japan	21.9	22.3	18.2	19.8	20.0	18.3	16.8	15.4
Germany	18.0	13.5	9.8	12.4	9.8	9.0	7.1	7.6
France	17.7	15.3	7.9	8.8	7.8	6.7	5.4	6.1
Italy	18.0	14.6	9.8	7.8	6.8	5.2	5.6	6.5
United Kingdom	10.0	7.4	4.8	3.2	2.4	2.1	2.4	4.7
Canada	9.7	11.3	8.4	4.5	1.7	0.4	0.9	2.6
Belgium	12.8	13.8	7.2	11.0	11.3	11.3	11.9	12.5
Netherlands	18.1	15.6	12.2	14.7	13.5	12.1	11.5	12.9
Sweden	13.2	10.2	4.7	4.5	2.6	0.0	-1.9	0.1
Switzerland	19.3	18.4	19.6	22.6	21.2	19.2	18.8	19.2
G-10 average 1/fixed weights	14.3	12.6	8.5	8.3	7.7	6.5	6.3	7.1
moving weights	12.8	12.1	8.6	8.9	8.5	7.4	7.3	8.0

Gross fixed investment

	decade averages			1990	1991	1992	1993	1994
	1960s	1970s	1980s					
United States	18.3	19.1	19.0	16.8	15.4	15.3	15.9	16.8
Japan	31.6	33.1	29.1	32.2	31.8	30.7	29.8	28.6
Germany	24.8	22.6	20.3	20.9	23.0	23.2	22.2	22.4
France	23.4	24.1	20.6	21.4	21.0	20.0	18.9	18.6
Italy	24.8	24.0	21.3	20.3	19.7	19.1	16.9	16.4
United Kingdom	18.0	19.2	17.5	19.5	17.0	15.7	15.0	15.0
Canada	22.4	22.8	21.4	21.1	19.7	18.6	17.8	18.2
Belgium	21.5	21.9	17.3	20.3	19.4	19.1	17.8	17.5
Netherlands	25.8	22.9	20.1	20.9	20.4	20.3	19.7	19.7
Sweden	24.1	21.3	19.4	21.5	19.4	17.0	14.3	13.8
Switzerland	27.5	25.2	24.5	26.9	25.6	23.7	22.5	23.5
G-10 average 1/fixed weights	22.6	22.9	21.2	21.1	20.3	19.8	19.4	19.5
moving weights	21.0	22.4	21.3	21.6	21.1	20.7	20.4	20.6

Net fixed investment

	decade averages			1990	1991	1992	1993	1994
	1960s	1970s	1980s					
United States	8.2	7.5	5.7	4.3	2.7	2.6	3.7	4.7
Japan	19.1	20.1	15.5	17.4	16.6	15.0	14.0	12.9
Germany	15.5	11.7	7.7	8.4	10.3	10.2	8.7	9.0
France	14.8	13.4	8.1	8.6	8.0	6.9	5.5	5.3
Italy	14.4	12.6	9.3	8.5	8.0	7.1	4.5	4.1
United Kingdom	9.5	8.7	5.7	8.4	5.9	5.0	4.7	4.7
Canada	10.6	11.7	9.7	9.2	7.5	6.2	5.5	6.0
Belgium	11.8	12.4	7.8	10.3	9.6	9.3	8.1	8.0
Netherlands	16.4	13.6	9.2	9.6	9.0	8.8	8.0	8.0
Sweden	13.3	10.4	6.8	8.4	6.1	3.6	0.2	0.2
Switzerland	16.7	13.9	14.2	16.5	15.3	13.2	11.9	12.9
G-10 average 1/fixed weights	12.3	11.4	8.4	8.4	7.4	6.8	6.5	6.7
moving weights	11.0	11.0	8.4	8.9	8.1	7.5	7.2	7.5

Source: OECD Secretariat.
1/ Weighted by GDP.

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Table 3. Public and Private Gross Saving in the G-10 Countries

(in percent of GDP)

	1965-69	1970-74	1975-79	1980-84	1985-89	1990	1991	1992	1993	1994
Gross Public Saving										
United States	-0.2	-0.6	-1.3	-2.5	-2.5	-2.5	-3.2	-4.3	-3.4	-2.0
Japan	5.4	6.5	2.2	2.8	5.7	8.4	9.0	7.8	6.0	4.2
Germany	4.6	5.2	1.4	0.9	1.6	0.6	0.6	0.7	0.1	0.6
France	5.1	4.7	2.6	1.5	1.4	2.5	1.4	-0.5	-2.6	-2.1
Italy	-0.8	-3.6	-6.2	-6.5	-6.3	-6.2	-6.1	-7.5	-5.9	-5.9
United Kingdom	4.8	4.3	0.0	-0.6	0.8	2.2	0.3	-3.3	-5.1	-4.3
Canada	3.7	3.2	-0.4	-2.9	-2.7	-2.6	-5.3	-5.9	-6.0	-4.1
Belgium	1.2	1.3	-1.9	-6.6	-5.4	-3.8	-4.7	-4.8	-5.1	-3.8
Netherlands	...	4.5	1.6	-0.8	-0.6	-2.3	-0.3	-1.4	-0.7	-0.6
Sweden	9.5	8.5	4.2	-2.9	2.1	4.7	-0.4	-5.4	-8.5	-8.9
Switzerland	7.8	8.5	8.1	8.4	9.4	8.8	6.8	5.2	4.7	5.1
G-10 average 1/fixed weights	2.4	2.2	-0.2	-1.0	-0.2	0.3	-0.3	-1.5	-1.7	-1.2
moving weights	1.9	2.0	0.0	-1.1	0.0	0.7	0.3	-0.8	-0.9	-0.5
Gross Private Saving										
United States	20.4	20.3	21.1	21.6	19.0	18.1	18.9	18.9	18.3	18.2
Japan	29.8	31.9	29.9	28.0	27.2	26.2	26.1	26.2	26.5	26.9
Germany	22.2	21.4	20.7	20.1	22.3	24.3	21.9	21.3	20.5	20.4
France	21.8	22.7	21.9	19.0	19.0	19.0	19.5	20.3	21.3	21.5
Italy	28.1	29.9	31.8	29.3	27.2	25.8	24.6	24.7	23.9	24.7
United Kingdom	14.3	14.5	17.1	17.6	15.2	12.1	13.1	16.1	17.8	19.3
Canada	19.1	19.7	22.4	23.7	22.1	19.0	19.1	18.7	19.3	18.9
Belgium	22.6	24.3	22.7	21.8	23.5	24.8	25.8	25.9	26.7	25.8
Netherlands	...	22.9	20.9	22.6	24.9	28.3	25.1	24.9	23.8	25.2
Sweden	14.3	14.4	15.2	19.2	16.3	13.0	16.2	18.8	20.7	22.6
Switzerland	22.8	23.9	18.8	19.6	22.5	24.3	24.7	24.5	24.7	24.7
G-10 average 1/fixed weights	22.4	23.0	23.1	22.7	21.3	20.7	20.8	21.0	20.9	21.1
moving weights	21.3	22.2	22.8	22.5	21.5	20.9	21.1	21.4	21.4	21.7

Source: OECD Secretariat.

1/ Weighted by GDP.

Table 4 - Inflationary Erosion of Net Debt and Reserve Money
(Annual averages, in percent of GDP)

	1965-69	1970-79	1980-89	1990-94	1993	1994
United States	1.4	2.1	1.6	1.4	1.2	1.1
Japan	0.1	0.6	0.7	0.4	0.2	0.1
Germany	– 0.0	0.4	0.8	1.2	1.7	1.4
France	—	0.8 (1)	0.7	0.6	0.6	0.6
Italy	1.1	8.2	8.8	6.1	5.6	5.0
United Kingdom	3.4 (2)	7.9	3.5	1.6	0.6	1.1
Canada	0.9	1.0	1.7	1.4	1.2	0.1
Belgium	—	4.5 (1)	5.0	3.5	3.5	3.0
Netherlands	—	2.1 (1)	1.0	1.8	1.7	1.9
Sweden	—	– 1.6	0.7	0.5	0.9	0.7

The estimated inflationary erosion of debt is overstated to the extent that debt is indexed or denominated in a lower-inflation foregn currency.

(1) 1971-79

(2) 1967-69

Sources: IMF *International Financial Statistics*; OECD Secretariat; and G-10 Secretariat estimates.

Since the 1960s, G-10 countries have also experienced a decline, albeit less pronounced, in fixed investment rates. Again this masks some important differences. In Japan, the drop in investment outpaced that of saving leading to a persistent current account surplus, while in the United States the opposite has occurred. Most other G-10 countries fit between these two extremes. In all, from the 1960s to 1994, the average G-10 fixed investment to GDP ratio has fallen by 3 percentage points, to under 20 percent in gross terms, and by nearly 6 points, to under 7 percent in net terms.

Despite the generalized decline in investment rates, the G-10 gross fixed investment rate calculated on the basis of moving country weights shows no discernible change since the 1960s. Again this is due to the rising weight being given to Japan's higher, albeit declining, investment rate and the decreasing weight being given to the lower U.S. investment rate.

It should be noted that the price of capital goods has been declining relative to the GDP deflator since the 1980s; therefore, in real terms, the gross investment rate has not fallen as much. However, there has also been a shift to shorter-lived assets, resulting in a higher depreciation component in gross investment. This effect has more than offset the impact of lower capital prices, leading to a decline in net real capital accumulation.

Altogether, there has been a sharp fall in saving rates of G-10 countries since the 1960s, originating primarily from the public sector. To a lesser degree, investment rates have also declined. To some extent this may reflect a contraction of desired investment demand. But the secular rise in real interest rates suggests that the decline in desired saving must have outpaced any likely decline in desired investment demand.

(ii) Other Countries

Saving and investment developments in other countries could also have affected world real interest rates. While the saving-investment trends of other industrial countries have followed closely those of the G-10, developing countries have registered, by contrast, important increases in both saving and investment since 1970.

The saving rate of developing countries rose from 19 percent in 1970 to 27 percent in 1994[22]. The most impressive increase was registered in Asia, where the saving rate rose by 13 percentage points from 1970 to 1994, with some countries even doubling their saving rates over the period. The performance of other developing countries has been more mixed; in Africa, for instance, the saving rate rose close to the level of Asia in the 1970s, but fell back to very low levels in the 1980s. The situation of transition countries in central and eastern Europe and the former Soviet Union is difficult to assess. The transition process appears to have led to a significant drop in national saving, originating from both the private and public sectors. However, the comparison with earlier periods is fraught with problems: much of the investment carried out in centrally planned economies was not productive and data were not based on standard national accounting conventions.

(iii) Determining Factors in Saving and Investment Trends

In attempting to explain private saving behaviour, economists have pointed to two related motivations: the desire to smooth out consumption over time and the desire to build up a target level of wealth. The desire to smooth consumption over time depends on changes in real interest rates which affect the relative attractiveness of consuming now or later. In practice, however, the ability of households to shift consumption across time periods may be constrained, making consumption decisions also dependent on changes in current income. A recent empirical study by the IMF, covering both industrial and developing countries, finds that most relevant economic variables identified in these models influence saving in the expected direction[23]. Lower dependency ratios and improved terms of trade tend to increase the private saving rate; whereas lower growth rates, higher per capita income (for industrial countries), and liberalized household borrowing regulations all tend to lower private saving rates. Other possible factors that were not examined in this study are the effects of the higher depreciation rate on physical assets and the increases in social insurance and (unfunded) pension coverage. With a given rate of net saving from the household sector, enterprises will respond to higher rates of depreciation by increasing their gross saving. Chapter 2 discusses various determinants of saving in more detail.

On the investment side, a rise in expected profitability and desired investment could, in principle, have contributed to the rise in interest rates. In fact, there is little evidence of such a phenomenon having occurred on a broad scale over the last 35 years. On the contrary, the slowdown in the rate of growth of total factor productivity, due in part to

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[22] Calculated using moving GDP weights based on PPP exchange rates.

[23] See Masson, Bayoumi, and Samiei (1995).

the post-war catching-up of Europe and Japan, should have reduced desired investment since the 1960s[24]. It is, of course, possible that markets have recently begun to expect a more rapid rate of technological progress in the future, leading to higher desired investment today. These issues are addressed in more detail in Chapter 2.

(c) Globalization

The discussion in the previous section relies implicitly on the notions of a world interest rate and an integrated capital market at the global (or G-10) level, where national saving and investment contribute to and draw from a common pool of capital. This section explores whether these notions are, in fact, reasonable.

Evidence from capital markets suggests that capital mobility has increased in the 1980s and 1990s, and that capital markets are becoming more integrated among industrial countries. During the 1980s, industrial countries eliminated the bulk of the remaining regulatory and tax barriers to international capital flows, and evidence from financial markets points to much stronger linkages across national financial markets, at least as concerns highly liquid and actively traded instruments[25]. This supports the notion of a global real interest rate, responding to factors, such as changes in desired saving or in the productivity of capital, at the global rather than national level. National risk premia and anticipated real exchange rate adjustments would explain deviations between this global interest rate and national rates[26].

Additional evidence of increased capital mobility comes from the observed decline in the saving-investment correlation among industrial countries. Estimates of the "saving retention coefficient" for G-10 (and OECD) countries – i.e., the degree to which differences in national saving rates are reflected in different national investment rates – have declined from the 80-100 percent range for the period 1960-1980, to the 60-70 percent range for the 1980s[27].

Still, saving and investment remain highly correlated. There is no consensus among economists as to the reasons for this. To some extent, the correlation could well reflect as yet imperfect capital market integration. Several observations would support this conclusion: the persistent home bias in portfolio decisions (reflecting in part better information in the home market), the imperfectly competitive nature of many retail financial markets, remaining segmentation in national capital markets (as between real and financial assets), and the fact that a large share of real assets are not traded. Indeed,

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[24] Total factor productivity growth is the component of output growth that is not explained by increases in labor and capital inputs.

[25] Remaining restrictions apply mostly to the ability of pension funds and insurance companies to invest in foreign securities.

[26] Evidence of capital market integration is provided by a number of recent empirical studies that find strong tendencies toward convergence in the short-term (real and nominal) interest rates of industrial countries. See Cavaglia (1992), Brunner and Kaminsky (1994), and Gagnon and Unferth (1995). There is also evidence of increased linkages of real long-term interest rates among the largest economies in recent years. See also Pain and Thomas (1995), Caramazza et al. (1986), Frankel and MacArthur (1988).

[27] See Feldstein and Horioka (1980), Feldstein and Bachetta (1991), and Obstfeld (1994).

CHART 3 – Developing countries and countries in transition national saving and investment
(In percent of GDP)

Developing Countries

— Saving   ·····Investment

Countries in Transition

— Saving   ·····Investment

Developing Countries: Latin America

— Saving   ·····Investment

Developing Countries: Asia

— Saving   ·····Investment

Developing Countries: Africa

— Saving   ·····Investment

Developing Countries: Middle East
and Europe
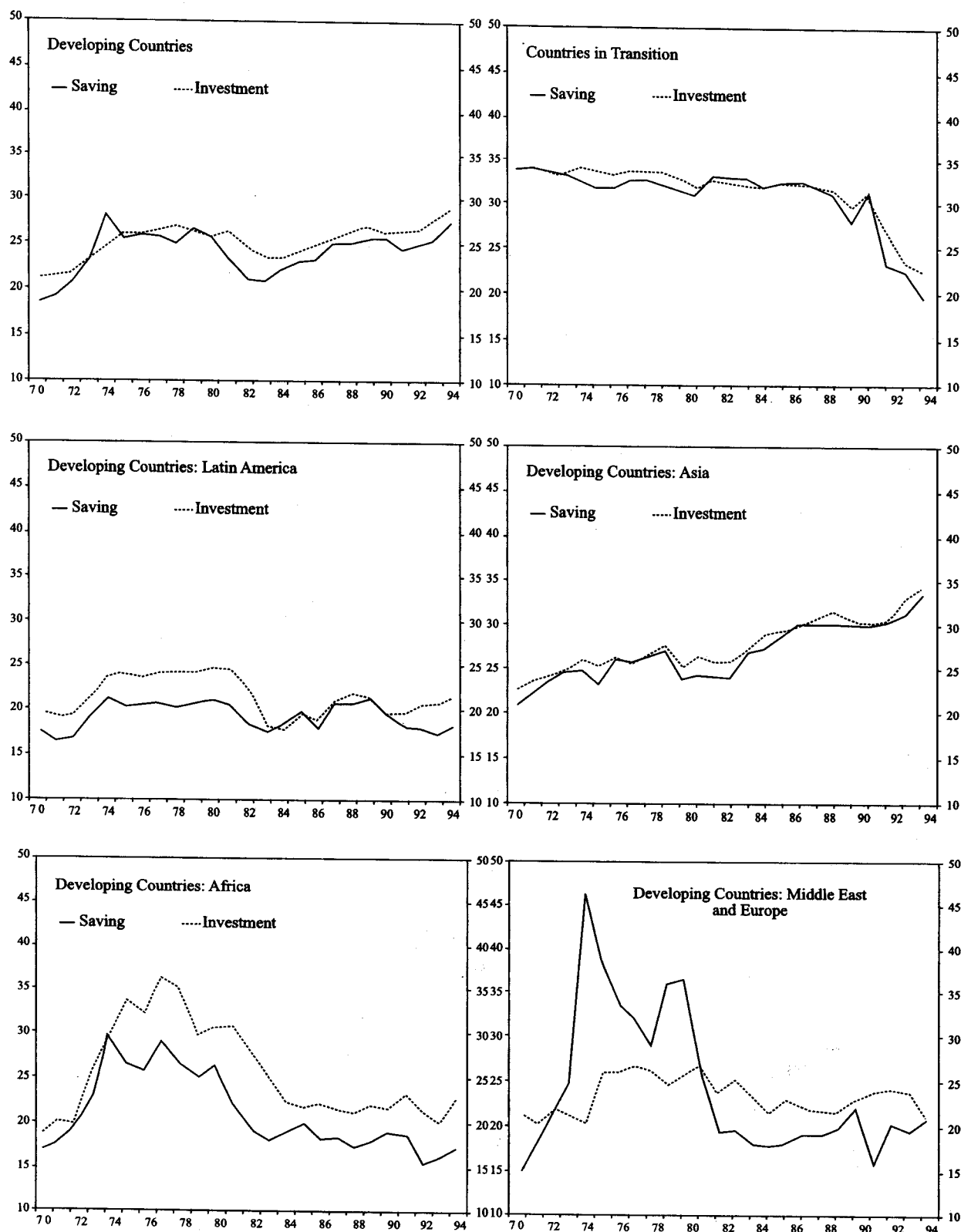
Source: IMF, World Economic Outlook, May 1995

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the observed correlation between corporate saving and investment and the fact that a large part of equity in self-owned businesses remains untraded imply that capital accumulation, to a large degree, is self-financed[28].

However, a number of other possible factors can explain, in whole or in part, the observed correlation between saving and investment. One possible explanation, corroborated by empirical evidence, is that the correlation is partly engendered by governments' attempts to avoid excessive swings in the current account and to adjust fiscal policy accordingly[29]. Another set of explanations relies on the presence of third factors, affecting saving and investment in the same direction. For instance, as discussed in Chapter 2, the slowdown of productivity and income growth in the G-10 in the 1970s appears to have contributed to the parallel fall in both investment and saving rates[30].

Surprisingly, saving-investment correlations have been found to be lower for developing countries than for industrial countries. Factors other than capital mobility per se could account for this finding. Developing countries, being less diversified than industrial countries, are more likely to experience swings in their saving-investment balance as a result of production or price shocks. This is most evident in the case of fuel exporters, for which the correlation is much lower than for other developing countries. Moreover, official assistance is often forthcoming to cover saving-investment imbalances[31].

Savings placed in highly liquid and actively traded instruments are highly mobile. The real returns earned by such assets, including real interest rates on government securities, are determined mainly at the global level in conjunction with temporary movements of the real exchange rate. Thus, a change in public saving in a G-10 country will affect domestic investment in the long run mainly through the effect on the global real interest rate – the larger the country, therefore, the larger the effect[32]. However, any changes in inflation expectations or risk premia induced by changes in fiscal policy will be reflected only in domestic nominal interest rates. Despite increased capital mobility, it is likely that domestic investment will continue to be financed in large part by domestic saving in industrial countries, and even more so in developing countries with limited access to international capital markets.

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[28] See Goldstein and Mussa (1993).

[29] See Bayoumi (1990) and Summers (1988).

[30] Other such factors are terms-of-trade shocks, catching up from a low level of wealth (for instance post-war Japan and Europe), and population growth. Real exchange rate movements due to imperfect goods market integration can also induce a correlation between saving and investment. See Frankel (1992).

[31] See Dooley et al. (1987), Montiel (1993), and Goldstein and Mussa (1993).

[32] See Ford and Laxton (1995) and Smith (1995).

CHAPTER 2

Structural Influences on Saving/Investment and the Consequences and Prospects for Nominal and Real Interest Rates

I. ECONOMIC POLICIES

(a) Monetary Policy

(i) Nominal and Real Interest Rates

In the short run, monetary authorities can influence real short-term interest rates. This is simply because inflation in most countries tends to adjust slowly. Accordingly, the central bank can influence the real short-term interest rate by its actions in the money market.

However, the interest rate relevant for most investment decisions is the real long-term rate. This rate is less subject to control by the monetary authorities because nominal long-term interest rates respond to both current and expected future short-term interest rates. Beyond the near future, expected future short-term rates rise or fall one-for-one with changes in expected inflation. Thus, monetary policy can influence the real long-term interest rate only to the extent that it can influence the real short-term interest rate over a significant time horizon. In the long run, monetary policy determines the level of nominal interest rates by virtue of its control over inflation, but it does not control the level of real interest rates.

The formation of long-run expectations in the face of a persistent shift in the inflation rate is likely to be a gradual process during which the financial markets learn about central bank intentions. Even after the economy has stabilized at a new higher level of inflation, markets may not rule out the possibility of returning to the previous inflation rate, especially if it had persisted for a long time prior to the recent experience. Conversely, after a disinflationary episode, markets may harbour some concerns about a return to high inflation. These concerns will be intensified if a large fiscal deficit or a high unemployment rate is perceived to raise the temptation for the central bank to engage in stimulative monetary policy.

The foregoing analysis suggests that the recent inflation rate may not be a good proxy for long-term inflation expectations when inflation has undergone large changes in the preceding few years. Empirically, it appears that the inflation premium in nominal interest rates is strongly correlated with a country's experience with inflation over the previous decade or more. Other factors, such as fiscal deficits, exchange rate policies, and central bank independence may play a significant role as well.

Chart 4 shows that the nominal long-term interest rates of the G-10 countries in the 1990s are more strongly correlated with their inflation experiences over the past 15 years

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than they are with contemporaneous inflation. This chart supports the view that inflation expectations and any inflation-risk premia are better proxied by a long average of past inflation rates. If the differences in nominal interest rates across G-10 countries largely reflect differences in inflation expectations or inflation risk premia, the real interest rates net of inflation risk may in fact be quite similar across G-10 countries. Real interest rate equalization is one implication of increasingly integrated international trade and capital markets.

These observations suggest that nominal interest rates may gradually fall over the next few years in countries where inflation has fallen recently, provided that these countries maintain their current low levels of inflation.

(ii) Saving and Investment

In the short run, stimulative monetary policy may increase both saving and investment. Investment is stimulated directly by the reduction in the cost of capital and indirectly by the increase in demand. Saving is discouraged by the lower real interest rate, but the income effect of higher output tends to increase the volume of savings even if the saving rate falls. These effects are relatively powerful, but they are only temporary, as even a sustained increase in the growth rate of the money supply cannot permanently change the real interest rate.

In the long run monetary policy affects saving and investment only through the distortionary effects of high and variable inflation. Inflation distorts saving and investment both directly as a tax on nominal assets and indirectly through non-neutralities in the tax code. These non-neutralities lead to saving and investment decisions based on tax considerations rather than the true economic benefits to society. For example, taxation of nominal interest income tends to reduce the real after-tax return on household savings in high-inflation countries, which may lead to a lower household saving rate.

High inflation is nearly always associated with more variable and uncertain relative prices. This uncertainty makes it more difficult for firms to distinguish unprofitable investment projects from profitable ones, which results in a less productive capital stock. By increasing uncertainty about the future, high and variable inflation may increase precautionary saving, but it would do so only by reducing economic welfare. On the other hand, by increasing uncertainty about the effective rate of return on saving, variable inflation may discourage saving directly. Such distortionary effects have significantly depressed saving and investment in some developing and transition economies with extremely high and variable inflation rates. For G-10 countries, the level and variability of inflation over the past 35 years is much lower than in most developing economies, and it is more difficult to detect a substantive effect on aggregate saving and investment. Barro (1995) finds a small, but cumulative, negative effect of inflation on growth, implying that high inflation tends to deter saving and investment. On the other hand, Ando, Guiso, and Visco (1994) do not accord a significant role to inflation in explaining Italy's national saving rate. Aside from its effect on aggregate saving and investment, inflation has had a significant effect on the allocation of saving and investment across asset types and across countries, primarily through its interaction with the tax system. These effects are discussed in the section on taxation below.

(*b*) Fiscal Policy

As discussed in Chapter 1, the fiscal situation of most G-10 countries deteriorated markedly following the first oil shock. During most of the 1970s, the ensuing inflation eroded the value of public debt and thus helped to contain the rise in debt ratios; but persistent high public deficits, coupled with higher real interest rates and lower growth, engendered a rapid rise in the debt ratio of most countries during the 1980s. By 1994, net debt averaged 41 percent of GDP in the G-10, more than double the level of the 1970s (Table 5).

This section first discusses the contribution of public saving (or budget deficits) to national saving; second, it draws out possible differences between the effects of tax increases and expenditure reductions; third, it explores the implications of fiscal adjustment for interest rates; fourth, it reviews measures of fiscal sustainability; fifth, it raises some issues regarding the adoption of fiscal rules; and lastly, it reviews the evidence of the effects of capital income taxation and the after-tax rate of return on private saving behaviour.

(i) *Interaction Between Public and Private Saving*

Whether changes in public saving affect national saving depends on the induced response of households. One hypothesis is that, since government borrowing is merely postponement of taxes, financing public spending by taxes or by borrowing should have the same effect on the private sector – this notion is generally referred to as Ricardian equivalence, after David Ricardo who first advanced this possibility. Another way of expressing the equivalence is that public dissaving should be compensated fully by increased private saving, as households accumulate assets in order to pay for the expected future taxes. Even though those alive today may not pay the taxes needed to service the public debt, concern for future generations raises the possibility that individuals have an infinite horizon, in which case government deficit changes could be offset entirely by private saving behaviour. The assumptions needed for full Ricardian equivalence to hold are very stringent and probably unrealistic[33]. However, the real issue is an empirical one: to what extent is there an offset – perhaps only an incomplete one – in private saving of government deficits or government dissaving?

The empirical literature on the private saving offset to government deficits (or dissaving) has generally concluded that a full offset (Ricardian equivalence) is rejected by the data[34]. Existing evidence for industrial countries indicates that each dollar increase in the government deficit is associated with an increase in private saving of about 0.5 to 0.6 dollars. Thus, national saving decreases by 40 to 50 percent of any rise in the public

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[33] They include: 1) successive generations linked by altruistically motivated transfers; 2) perfect capital markets, thus absence of liquidity constraints; 3) nondistortionary taxes; and 4) rational and farsighted consumers.

[34] See, for example, the survey by Bernheim (1987). On the other hand, Seater (1993) concludes that the evidence supports the Ricardian hypothesis, although he recognizes that different government behavior could reduce the Ricardian offset in the future.

sector deficit. Similar results have been obtained for developing countries. A recent study undertaken at the IMF finds that private saving responds more closely to public dissaving, rather than the government deficit, which includes public investment[35]. The study tests for Ricardian equivalence in both industrial and developing countries and finds an offset coefficient that is significantly less than one, though it varies with the income level of the countries and the time period considered.

The empirical results imply that an increase in public saving will raise national saving despite some offset from private saving. This finding confirms that the decline in public saving rates in G-10 countries has been the most important single cause of the overall decline in national saving since the 1960s. Although there is an offset, national saving would have been higher in the G-10 countries if public saving had remained unchanged.

(ii) *Public Expenditures vs. Taxation*

It is not only the level but also the composition of changes in public saving that matters. Tax increases and expenditure cuts may not have the same effect on private saving. Expenditure cuts may free resources to the private sector, with a positive impact on private saving, whether or not they change the deficit. The IMF saving study cited above indeed finds evidence that an increase in public saving through expenditure cuts leads to a smaller offsetting decrease in private saving than an equivalent increase in taxes. According to the estimates, national saving increases by 90 percent of any cut in government spending, compared to 50 percent of any increase in taxes[36]. While there are reasons to believe that these estimates may overstate the long-run differential effects of taxes and spending cuts on national saving, the direction of the effect is clear[37].

This differential effect also can arise because taxes distort the economic decisions of households, depressing income and thus saving. There is a long tradition in the economic profession of recommending consumption-based taxes over income taxes[38]. Consumption-based taxes, like the VAT, do not discourage saving and investment; the same applies to taxes that apply solely to labour income, rather than more broadly based taxes on both labour and capital income. Higher saving increases the capital stock and raises income in the long run. Most forms of taxation do, however, distort households' decisions to work, and may thus also depress income and saving[39]. The question of which tax is less distortionary is in the end an empirical one. The complexity of the interactions does not make it possible to resolve the question by direct estimation. Instead, economists

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[35] See Masson, Bayoumi, and Samiei (1995).

[36] This result is backed by economic theory: in macroeconomic models where households have a finite time horizon, a permanent balanced-budget reduction in taxes and government consumption does not lead to a fully offsetting increase in private consumption; households will save part of the increase in disposable income contributing to a faster rate of capital accumulation and, in the long-run, to a higher capital stock and a lower real rate of interest. See Blanchard and Fischer (1989).

[37] Theory predicts that temporary changes in government expenditures ought to have a greater effect on national saving than permanent changes. The empirical estimates do not distinguish between permanent and temporary changes.

[38] See Fisher (1937), Kaldor (1955), Kay and King (1978) and Meade (1978).

[39] See Boskin (1978), Feldstein (1978), and King (1980).

CHART 4 – Nominal Interest Rates and Inflation
(average interest rates, 1990-94)

Interest Rate

IT

SD

CA   UK

FR BE

NE GE

US

JA   SZ

Current Inflation[1]

Interest Rate

IT

SD

CA   UK

BE   FR

NE GE

US

JA   SZ

Historical Inflation[2]
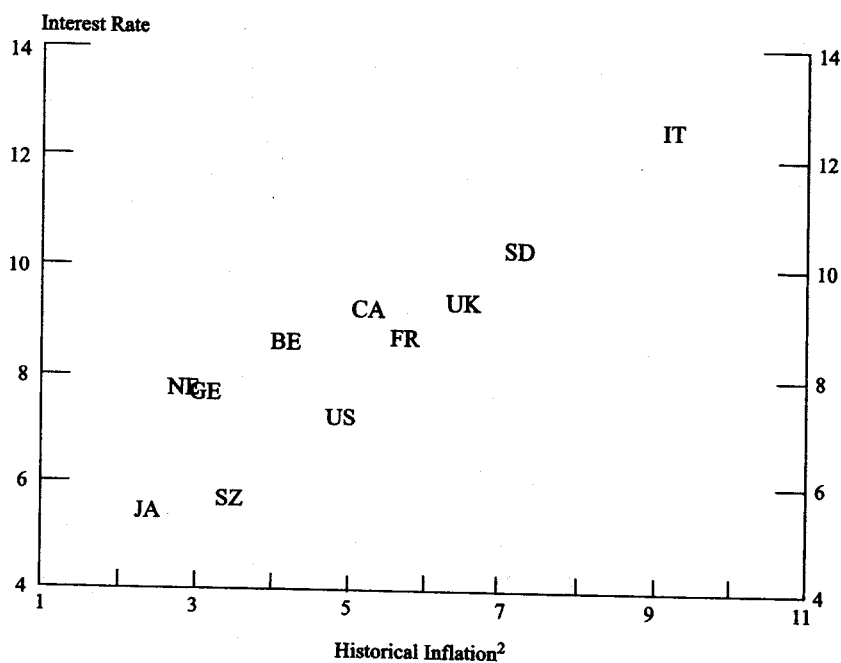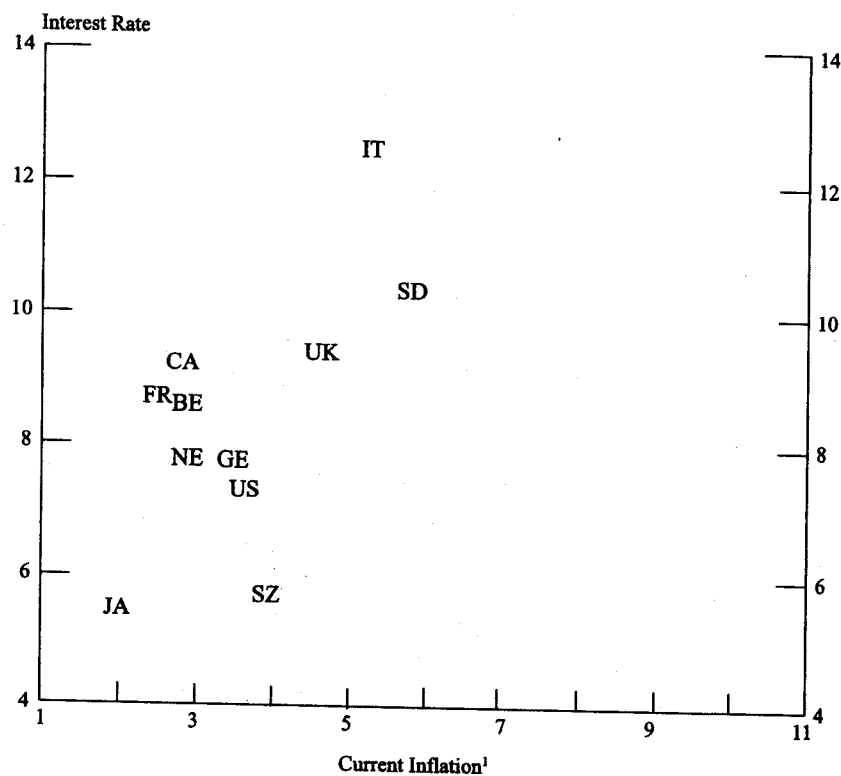
[1] Average inflation rates, 1990-94
[2] Average inflation rates, 1980-94

Source: OECD Secretariat and IMF International Financial Statistics

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have attempted to obtain quantitative results through simulations based on macro-economic models. Although there is no unanimity in the results, many such simulations confirm the superiority of consumption-based taxes over income taxes[40].

(iii) Interest Rate Effects

In the absence of a complete Ricardian offset, fiscal deficits (and debt) should have an effect on the level of interest rates. Economic theory identifies four such linkages. First, as discussed above, higher deficits reduce national saving; and as funding for investment becomes scarcer, the price of financial resources (i.e., the interest rate) rises – this mechanism is generally referred to as "crowding out".

Over time, "crowding out" of private investment reduces the growth of the private capital stock. The greater scarcity of capital will be reflected in a higher rate of return to capital, and by implication, in a higher real interest rate. This points to a second (stock) relationship between public debt, as a measure of foregone private capital accumulation, and real interest rates. This implies that any increase in public debt that is the result of past borrowing leads to a permanently higher real interest rate.

Third, capital (equity) and public debt are not perfect substitutes. Hence, any increase in the stock of public debt relative to the stock of equity will cause the interest rate on public paper to rise relative to the return on equity. This is because households will require a higher return on debt to compensate them for holding more of it.

Fourth, high levels of debt, as well as unsustainable fiscal positions, increase the risk of monetary policy becoming more accommodative and thus of higher inflation. This puts upward pressures on nominal long-term interest rates.

Despite the strong theoretical presumption of a causal relationship running from deficits and debt to interest rates, much of the empirical evidence remains surprisingly inconclusive. Some studies have found evidence of a positive relationship, but the estimated coefficients are generally small and often not very reliable statistically[41]; and, many other studies have failed to detect any significant linkage[42]. Recent work at the OECD suggests that a one percentage point rise in the deficit to GDP ratio might result in a 15 basis point rise in long-term interest rates[43]. Cross-country studies have found a significant correlation in recent years, but this relationship is not constant over time, and has occasionally been negative[44].

One problem with most studies is that they do not, or cannot, adequately control for all the variables affecting interest rates: inflation expectations, expected profitability, investment demand, and risk premia can only be measured indirectly, if at all. Another

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[40] See, for instance, Summers (1981), Perraudin and Pujol (1991), and Bartolini, Razin and Symansky (1995).

[41] See Hutchinson and Pyle(1984), Tanzi (1985), Hoelscher (1986), Wachtle and Young (1987), Bovenberg (1988), Tran and Sawhney (1988), Barth and Bradley (1989), Tanzi and Lutz (1991), Masson and Moghadam (1994), Tanzi and Fanizza (1995), and Hale (1993).

[42] See Plosser (1982), Evans (1985), Evans (1987a), Evans (1987b), Plosser (1987), Barro (1987), and Boothe and Reid (1989).

[43] See Orr, Edey, and Kennedy (1995).

[44] See Dubois (1995) and Bowman, et. al. (1994).

Table 5 - General Government Financial Balance and Net Debt
(in percent of GDP - OECD definitions, except where noted)

	Decade averages			1990	1991	1992	1993	1994
	1960s	1970s	1980s					

Financial balance, surplus (+), deficit (−)

United States	− 0.1	− 1.0	− 2.5	− 2.5	− 3.2	− 4.3	− 3.4	− 2.0
Japan	1.0	− 1.7	− 1.5	2.9	3.0	1.5	1.4	3.5
excluding social security	—	− 4.0	− 4.3	− 0.6	− 0.8	− 2.0	− 4.9	− 7.0
Germany (1)	0.7	− 1.7	− 2.1	− 2.1	− 3.3	− 2.9	− 3.3	− 2.5
France (2)	0.0	− 0.4	− 2.1	− 1.6	− 2.2	− 4.0	− 6.1	− 6.0
Italy	− 2.4	− 8.6	−11.0	−10.9	−10.2	− 9.5	− 9.6	− 9.0
United Kingdom (2)	− 0.3	− 2.4	− 2.0	− 1.2	− 2.6	− 6.1	− 7.9	− 6.5
Canada	− 0.3	− 0.8	− 4.5	− 4.1	− 6.6	− 7.1	− 7.1	− 5.3
Belgium (3)	—	− 5.1	− 9.2	− 5.4	− 6.5	− 6.6	− 6.6	− 5.3
Netherlands	—	− 1.4	− 4.9	− 5.0	− 2.8	− 3.8	− 3.2	− 3.0
Sweden	3.4	2.6	− 1.6	4.2	− 1.1	− 7.5	−13.4	−10.4
Switzerland (4)	—	− 1.1	− 0.3	0.0	− 2.1	− 3.5	− 3.9	− 3.0
G-10 Average (5)	0.0	− 1.8	− 3.0	− 2.0	− 2.7	− 3.8	− 4.3	− 3.7

Net debt (6)

United States	38.3	24.1	25.6	31.5	33.4	36.2	38.1	37.7
Japan (7)	− 5.7	0.0	22.0	9.5	5.3	4.4	5.8	9.2
gross public debt (8)	5.1	25.1	66.4	69.8	67.7	71.2	75.1	81.7
Germany (1)	−12.6	0.1	19.4	22.1	22.1	27.7	35.1	37.9
France	—	− 0.2	7.7	16.3	17.6	21.0	27.7	32.5
Italy (7)	31.2	49.5	76.6	99.0	102.6	110.0	118.6	121.0
United Kingdom (9)	75.9	60.2	43.5	28.8	30.2	35.2	41.2	45.5
Canada (10)	21.4	9.4	28.7	44.0	49.8	57.1	62.0	64.2
Belgium	—	52.9	105.5	119.0	119.9	122.0	127.9	127.8
Netherlands	—	22.1	40.6	56.8	56.0	57.7	59.8	60.3
Sweden	—	−27.3	5.4	− 5.0	− 2.3	6.8	12.9	23.4
Switzerland (11)	—	43.1	39.1	31.9	33.7	38.3	43.9	47.3
G-10 Average (5) :	25.3	19.1	29.1	31.9	32.7	35.9	39.6	41.3

(1) Includes the debt and the balance of the German Railway Fund as of 1994.

(2) 1960s figure corresponds to 1963-1969.

(3) Includes proceeds from privatization and sales of other assets in 1993 (BF 32.3 billion) and in 1994 (BF 12.7 billion).

(4) Excluding the voluntary component of social security. Data provided by the Swiss authorities.

(5) Weighted average (fixed weights), excluding countries for which data are not available.

(6) Net financial liabilities as defined in the System of National Accounts.

(7) 1960s figure corresponds to 1964-1969.

(8) Excluding social security assets.

(9) 1960s figure corresponds to 1966-1969.

(10) 1960s figure corresponds to 1961-1969.

(11) Gross public debt, not included in the G-10 average. Data provided by the Swiss authorities.

Sources: Data are taken from the OECD Economic Outlook 57, June 1995, except where otherwise noted, and comform to OECD definitions. For this reason the data often differ from national data, and from the IMF data reported in Table 6.

fundamental problem is that most studies to date have attempted to find a relationship between deficits and interest rates at the national level. To be sure, the effect of deficits and debt on inflationary expectations (or risk premia) will be borne entirely by national interest rate differentials. But, with the progressive integration of capital markets, much of the linkage between deficits and real interest rates should have shifted to the global level[45].

A recent study sought to capture the global effects of fiscal policy on interest rates by linking the interest rates of several industrial countries to OECD public debt[46]. The result is of a significant and sizable effect: a one percentage point rise in the OECD debt to GDP ratio raises interest rates by about 25 basis points[47]. Effects of similar magnitudes are found in two other studies. The first examines the relationship between industrial countries' net public debt and a weighted average real interest rate[48]. The second relates the world interest rate to three fiscal variables: government spending, cyclically-adjusted deficits, and net public sector debt (all expressed in terms of GDP). Of the three variables, it finds that only debt has a significant effect on the world real interest rate, although government spending has an effect on national risk premia[49].

In all, there remain very strong reasons to believe that rising public deficits and debts, by reducing available saving and capital accumulation, have contributed to higher real interest rates; and that a reduction in fiscal deficits would lower real interest rates. The theoretical presumption for this is very strong. At the national level, the empirical evidence of a link between interest rates and fiscal variables is not robust. But the link appears to be much stronger and clearer empirically at the global level, as between the world interest rate and the overall fiscal deficits and debts of industrial countries, as we would expect in an integrated world capital market. Thus real interest rates in the G-10 countries are affected by global (G-10 wide) deficits and debts rather than solely by their own fiscal stance. The implication is that it will take a generalized reduction in deficits to lower interest rates. Still, it is not possible to say with certainty by how much interest rates would fall for a given reduction in deficits; obviously many other factors may intervene over the medium term to shift desired investment and private saving in offsetting directions.

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[45] Globalization would tend to reduce but not fully eliminate the linkage at the national level in large countries such as the United States, on which most of the studies are based. Fiscal deficits could have a country-specific effect on interest rates also because of imperfect goods market integration: by raising the consumption of domestic goods, a higher deficit should cause the real exchange rate to appreciate at first and then to depreciate gradually, raising domestic real interest rates relative to world rates.

[46] See Ford and Laxton (1995).

[47] As in the case of other time-series studies, this result may be driven in part by the presence of reverse causality (running from high interest rates to deficits) over the sample period which includes the monetary-policy-based disinflation of the 1980s. That is, the tightening of the monetary policy stance of most G-10 countries in the 1980s could have affected deficits, both directly through higher interest payments on short-term debt and indirectly because of the induced slowdown in growth. This endogeneity tends to bias the estimated coefficient upward. Of course, to the extent that monetary tightening reduces long-term interest rates, it helps contain future debt-servicing costs.

[48] See Helbling and Wescott (1995).

[49] See Smith (1995), following a similar approach by Barro (1992).

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(iv) *Fiscal Sustainability: Some Unpleasant Arithmetic*

Independently from the actual levels of deficits and debts, perceptions about the sustainability of the fiscal stance may affect interest rates. Markets are likely to be much more concerned about the risk of inflation or default in a country where the debt to GDP ratio is rising than in a country with a similar ratio, but where the trend is downward. A sharp rise in the debt ratio will increase the inflation premium. By adding to the debt servicing burden and exacerbating the fiscal problem, this leads to a vicious circle of rising interest rates, deficits and debt, or "snowball" effect.

Operationally, sustainability is generally defined in terms of a stable or declining debt-to-GDP ratio, once the effects of the economic cycle have been taken into account. Technically, this translates into a specific requirement about the size of the cyclically-adjusted primary balance (i.e., the balance excluding debt interest payments) in relation to the initial debt ratio, the real interest rate, and the economic growth. To stabilize the debt ratio, the cyclically-adjusted primary balance would have to equal the debt ratio times the difference between the real rate of interest and the trend growth of output. High debt ratios consequently increase the vulnerability of the fiscal position to interest rate and output shocks. Indeed, the rise in long-term interest rates in 1994 considerably aggravated the conditions for fiscal sustainability in high-debt countries. Measures of sustainability are also quite sensitive to the assumption about trend growth and real interest rates. For instance, a one percentage point permanent rise in real interest rates, or decline in growth rate, would raise the required primary surplus to GDP ratio by 1 percent of the debt ratio.

Net-debt-to-GDP ratios have risen substantially in many G-10 countries over the last twenty-five years (Table 5), increasing the vulnerability of the fiscal positions. Table 6 shows the fiscal position of G-10 countries in greater detail – but because of differences between IMF and OECD definitions, the data differ from those of Table 5. The ranking of countries in terms of debt ratios varies, depending on whether gross or net debt is used. Both gross and net debt generally consolidate general government claims, so that claims among different parts of general government are netted out. The difference between gross and net debt is thus made up of the (non-government debt) asset holdings of government funds, such as social security and pension funds, as well as the government claims on the private sector. In the case of Japan, however, government debt claims are not fully consolidated in the gross debt figure. In particular, the large holdings of government bonds by the social security fund are included in gross debt. This particular treatment explains part of the very striking differences between gross and net debt ratios in Japan - 83 and 8 percent, respectively in 1994. The asset holdings of the social security fund cover part of the contingent liabilities of the social security system. This particular definition of gross debt may be justified by the fact that these contingent liabilities are much larger for Japan than for most other G-10 countries. This would also argue for using gross debt ratios as the basis for comparison between Japan and other countries.

As seen in Table 6, sizable primary surpluses in Belgium and Italy are expected to reduce their very high debt ratios in 1995. With the exception of the United States, debt ratios in all other G-10 countries should rise in 1995, albeit only marginally in the case of the Netherlands. In the case of Germany, the rise in debt reflects the inclusion of the Inherited Debt Fund in the debt statistics.

(v) *Fiscal Rules*

Given the desirability of fiscal consolidation, it is useful to identify clear fiscal rules to be followed over the medium term. An initial goal of fiscal adjustment in some G-10 countries has been to stabilize the debt ratio. However, this may prove to be an inadequate rule to guide fiscal policy over the medium term as it does not take account of the level of the ratio and indeed of the wide dispersion in public debt burdens among G-10 countries. Dispersion in debt ratios accentuates differences in the required policy responses to shocks, and can thus increase exchange rate volatility as well as lead to wider interest rate differentials. A generalized increase in interest rates, for instance, will require a larger offsetting adjustment in the primary balance of high-debt countries.

The fiscal criteria of the Maastricht Treaty address debt sustainability directly by placing a limit on the desirable debt-to-GDP ratio in EU countries. But the debt and deficit criteria of the Maastricht Treaty are only intended to serve as ceilings and G-10 countries may wish to retain more ambitious objectives, particularly in view of the looming fiscal burdens associated with the ageing of their populations – the section on demographics discusses this point further. Thus, once a prudent debt level has been reached, an appropriate medium-term rule for fiscal policy under normal circumstances would appear to aim for a steadily falling debt to GDP ratio. This would provide a safeguard against unexpected adverse shocks, which could otherwise threaten fiscal sustainability, and ensure that the debt ratio is not ratcheted-up over time.

A balanced-budget rule has received considerable attention of late. Such a rule can be expressed in terms of either the total deficit or the deficit on current expenditures and revenues. And it can incorporate cyclical adjusters. Expressed in terms of the total deficit, a requirement to balance the budget on average over the cycle would produce a clear, and in some cases steep, decline in debt ratios in all G-10 countries. The implications of a balanced-budget rule applied only to current-expenditures and revenues only are more ambiguous. Based on the current levels of public investment expenditures, such a rule would appear to be consistent with declining debt ratios in most G-10 countries. The balanced-budget rule applied to current expenditures and revenues is also known as the 'golden' fiscal rule and is in place in Germany at the federal level and in a number of countries at the level of local governments.

The aim of the "golden" fiscal rule is to prohibit a deterioration in the balance sheet of the public sector. Under the rule, borrowing can only be used to finance the net purchase of investment goods (gross investment less depreciation). Accordingly, current spending must be covered by tax (or other) revenues while capital spending can be financed by debt since, in principle, it is associated with an increase in assets of the same value. In practice, however, not all public investments will yield a stream of benefits that repay the cost of the investment, either because the rate of return is below the market rate of interest or because the benefits accrue to the private sector. Also, some spending that is conventionally considered as current, such as that on education, research or health care, produces a stream of future benefits in much the same way as physical capital. Because of these considerations, the implementation of a rule requiring a balanced budget on current expenditures would result in difficult classification problems.

Nonetheless, there are benefits from developing a full balance sheet for the public sector, which takes into account the value of all public-sector assets (both financial and non-financial) as well as outstanding liabilities. It is important to try to identify the

income stream from non-financial assets and the extent to which capital is being consumed or replaced. Full balance sheet or resource accounting can be of help in medium-term fiscal planning and in the design and appraisal of optimal rules for fiscal policy. Such a system of accounting is now in place in New Zealand, and is planned to be introduced in the United Kingdom by the end of the decade.

BOX 3

New Zealand's Fiscal Rules

In 1994, the New Zealand government undertook a major reform of the rules governing the conduct of fiscal policy. The new rules, designed to enhance transparency, openness, and thus fiscal responsibility, came into effect July 1, 1994, and were applied for the first time to the 1994/95 budget. The authorities expect that it will take a few years to assess the effectiveness of these reforms.

Ahead of these reforms, new <u>accounting rules</u> were adopted in 1989 and put in place in 1993, requiring the government to publish independently audited government accounts on the same basis as private sector firms, that is including both an accrual-based operating statement of income and expenditures, and a balance sheet of assets and liabilities – the December 1994 accounts are reproduced below as an example. In addition, the financial statement must include a statement of contingent liabilities. This new presentation is undoubtedly more complex than traditional fiscal accounts; but it is intended to be more transparent about underlying trends and developments.

Accompanying these accounting changes, were important changes in the fiscal policy requirements placed on governments. The new fiscal rules, as set out in the Fiscal Responsibility Act of 1994, require the government to present to Parliament, well ahead of the Budget and no later than three months before the new fiscal year, a <u>budget policy statement</u>. The budget policy statement must provide: early notice of the overall priorities and assumptions of each budget; the government's broad intentions for key fiscal variables for the three-year budget planning period; and the government's long-term fiscal objectives.

The budget policy statement is then submitted to Parliamentary review. The Fiscal Responsibility Act requires Parliament to assess the fiscal stance of the government against the fiscal objectives and intentions set out in previous Budgets and budget policy statements, as well as against a set of <u>principles of responsible fiscal management</u>. These principles are:

● reducing the public debt to prudent levels by achieving operating surpluses until such a level is achieved;

● maintaining the public debt level at prudent levels by ensuring that, on average, over a reasonable period of time, the total operating expenses of the state do not exceed its total operating revenues;

● achieving a level of net worth that provides a buffer against adverse future events;

● managing prudently the fiscal risks of the state; and

● pursuing policies that are persistent with a reasonable degree of predictability about the level and stability of tax rates for future years.

The Fiscal Responsibility Act eschews setting out explicit quantitative targets. It is up to each government to determine what it regards as "prudent" and "reasonable", but it has to justify that interpretation publicly. It was important for the New Zealand authorities to retain a certain degree of flexibility. Underlying this approach, was the view that the political will to follow responsible fiscal policies is better enhanced through a transparent and open debate, than through the adoption of binding targets. In the absence of transparent fiscal accounts, quantitative targets could, in any case, be circumvented. And it was thought that the use of rigid rules or legislated fiscal targets could seriously distort decision making.

In addition to the budget policy statement and the Budget, the government is required, under the Act, to produce half-yearly audited financial statements as well as <u>regular fiscal updates</u>, including in the four to six weeks before elections.

FINANCIAL STATEMENT OF THE GOVERNMENT OF NEW ZEALAND
Statement of financial performance
(for the six months ended 31 December 1994)

Six months ended 31 December 1993 Actual $m	Year ended 30 June 1994 Actual $m		Six months ended 31 December 1994		Year ending 30 June 1995 Forecast $m
			Actual $m	Forecast $m	
		REVENUE			
		Levied through the Crown's Sovereign Power			
8,540	17,585	Direct taxation	10,132	10,214	19,958
4,673	10,120	Indirect taxation	5,225	5,151	10,292
92	190	Compulsory fees, fines, penalties and levies	113	112	210
13,305	27,895	Total Revenue Levied through the Crown's Sovereign Power	15,470	15,477	30,460
		Earned through the Crown's Operations			
(389)	(292)	Unrealised losses arising from changes in the value of commercial forests	(76)	—	—
656	1,368	Investment income	710	703	1,913
354	713	Sales of goods and services	332	326	665
207	499	Other operational revenue	205	193	466
828	2,288	Total Revenue Earned through the Crown's Operations	1,171	1,222	3,044
14,133	30,183	**TOTAL REVENUE**	16,641	16,699	33,504
		EXPENSES			
		By functional classification			
5,583	11,479	Social security and welfare	5,634	5,728	11,618
2,309	4,602	Health	2,391	2,387	4,876
2,303	4,627	Education	2,388	2,385	4,807
918	1,723	Core government services	383	635	1,427
575	1,150	Law and order	579	584	1,187
468	1,049	Defence	473	481	993
356	711	Economic and industrial services	344	352	780
379	815	Transport and communications	311	314	758
127	299	Primary services	140	144	286
111	241	Heritage, culture and recreation	113	108	233
5	39	Housing and community development	22	22	50
6	14	Other	3	3	119
1,954	3,788	Finance costs	1,909	1,885	3,747
(738)	(898)	Net foreign-exchange (gains)/losses	(753)	(192)	(192)
—	—	Supplementary Estimates provision	—	—	50
14,356	29,639	**TOTAL EXPENSES**	14,137	14,836	30,739
(223)	544	**REVENUE LESS EXPENSES**	2,504	1,863	2,765
359	853	Surplus attributable to State-owned enterprises and Crown entities	337	362	756
(121)	(642)	Dividends and other distributions	(323)	(324)	(1,203)
238	211	Net surplus/(deficit) attributable to State-owned enterprises and Crown entities	14	38	(447)
15	755	**OPERATING BALANCE**	2,518	1,901	2,318

FINANCIAL STATEMENT OF THE GOVERNMENT OF NEW ZEALAND
Statement of financial position
(as at 31 December 1994)

As at 31 December 1993 Actual $m	As at 30 June 1994 Actual $m		As at 31 December 1994 Actual $m	As at 31 December 1994 Forecast $m	As at 30 June 1995 Forecast $m
		ASSETS			
		Current Assets			
26	70	Cash and bank balances	45	57	59
6,538	7,561	Investments	5,588	6,501	5,967
5,600	5,142	Receivables and advances	7,732	6,980	5,047
443	340	Inventories	352	345	339
12,607	13,113	Total Current Assets	13,717	13,883	11,412
		Non-Current Assets			
735	614	Investments	715	665	714
2,401	2,453	Receivables and advances	3,365	4,139	4,140
16,131	16,569	State-owned enterprises and Crown entities	17,045	17,066	16,716
20,273	21,648	Physical assets	21,484	21,722	21,755
35	22	Intangible assets	19	19	14
39,575	41,306	Total Non-Current Assets	42,628	43,611	43,339
52,182	54,419	TOTAL ASSETS	56,345	57,494	54,751
		LIABILITIES			
		Current Liabilities			
2,229	3,358	Payables and provisions	3,170	3,163	2,559
437	423	Pension liabilities	427	435	490
14,634	16,362	Borrowings	16,926	18,219	15,152
17,300	20,143	Total Current Liabilities	20,523	21,817	18,201
		Non-Current Liabilities			
876	780	Payables and provisions	725	713	726
1,673	1,529	Currency Issued	1,848	1,615	1,612
7,320	7,528	Pension liabilities	7,411	7,521	7,481
32,583	30,067	Borrowings	28,992	29,459	29,945
42,452	39,904	Total Non-Current Liabilities	38,976	39,308	39,764
59,752	60,047	TOTAL LIABILITIES	59,499	61,125	57,965
(7,570)	(5,628)	TOTAL ASSETS LESS TOTAL LIABILITIES	(3,154)	(3,631)	(3,214)
		CROWN BALANCE			
		ACCUMULATED OPERATING BALANCE			
(8,269)	(8,269)	Opening balance	(7,539)	(7,539)	(7,539)
15	755	Operating balance for the period	2,518	1,901	2,318
—	(25)	Transfer (to)/from revaluation reserve	9	9	9
(8,254)	(7,539)	Closing balance	(5,012)	(5,629)	(5,212)
		REVALUATION RESERVE			
574	574	Opening balance	1,911	1,911	1,911
		Net revaluations			
—	763	State highways	—	—	—
78	94	Land and buildings	127	96	96
—	224	Specialist military equipment	—	—	—
32	231	Other assets	(171)	—	—
110	1,312	Total net revaluations	(4,44)	96	96
—	25	Transfers from/(to) accumulated operating balance	(9)	(9)	(9)
684	1,911	Closing balance	1,858	1,998	1,998
(7,570)	(5,628)	TOTAL CROWN BALANCE	(3,154)	(3,631)	(3,214)

Table 6 - Fiscal Positions of the G-10 Countries, 1993-95

(in percent of GDP - IMF definitions, except where noted)

	Overall balance			Primary balance			Net debt			Gross debt			Gross debt Maastricht definition (1)		
	1993	1994	1995	1993	1994	1995	1993	1994	1995	1993	1994	1995	1993	1994	1995
United States	− 3.4	− 2.0	− 1.9	− 1.3	− 0.1	− 0.5	56.2	57.6	57.6	68.8	68.9	68.9	—	—	—
Japan (2)	− 1.4	− 3.0	− 3.7	− 0.8	− 2.5	− 3.0	4.8	7.8	11.6	76.6	83.2	90.6	—	—	—
Germany (3)	− 3.3	− 2.5	− 2.5	− 0.6	0.4	0.9	35.0	40.1	48.0	47.8	49.8	57.8	48.2	50.1	58.2
France	− 6.1	− 6.0	− 5.2	− 2.5	− 2.2	− 1.3	34.4	40.3	43.2	45.3	48.4	51.1	45.8	48.5	51.2
Italy	− 9.6	− 9.0	− 7.7	2.6	1.7	3.1	112.0	117.2	114.9	123.2	129.0	126.5	119.4	125.4	124.9
United Kingdom	− 7.8	− 6.8	− 4.9	− 4.8	− 3.6	− 1.6	32.5	37.7	42.4	40.4	45.9	49.0	48.5	50.1	51.5
Canada	− 7.3	− 5.3	− 4.6	− 3.5	− 1.4	− 0.3	61.9	64.4	67.2	92.1	95.4	98.0	—	—	—
Belgium	− 6.6	− 5.4	− 4.5	3.8	5.0	4.7	128.0	128.4	126.8	137.2	136.0	134.1	137.2	136.1	134.3
Netherlands	− 3.3	− 3.4	− 3.2	2.0	2.1	2.6	60.4	60.8	61.2	81.4	79.4	79.7	81.4	78.1	78.1
Sweden	−13.4	−10.4	− 8.9	− 7.0	− 3.5	− 1.1	12.8	28.4	35.7	74.2	92.0	95.2	76.2	79.1	84.6
Switzerland (4)	− 3.9	− 3.0	− 3.5	− 1.9	− 0.8	− 1.2	22.2	24.8	26.0	43.9	47.3	49.2	—	—	—

(1) Data provided by the European Commission.
(2) Gross debt includes government bonds held by the social security fund.
(3) The debt and debt service obligations of the Railway Fund and the Treuhandanstalt and some smaller agencies were taken over by the general government in 1994-95, adding to general government debt and to the general government deficit.
(4) Data provided by the Swiss authorities. Fiscal balances exclude the voluntary component of social security.

Sources: Contributions by E. Dubois (France Economics Ministry), J. Gagnon (U.S. Federal Reserve), S. Hay (Bank of England), and F. Panetta (Bank of Italy) to the G-10 Working Group.

(vi) *After-tax Rates of Return and Saving*

As noted above, cuts in government spending, increases in income taxation, and increases in indirect taxation may all have different effects on private saving. A more specific issue is whether a cut in the taxation of income from savings (interest, dividends and capital gains), offset by higher taxes elsewhere, can affect the volume of household saving. Taxation of capital income may distort saving (and investment), and thereby reduce welfare, by creating a wedge between the rate of return earned by capital and the rate of return received by households. It is often supposed that, by lowering the after-tax rate of return to households, taxation of capital reduces saving. A recent extensive OECD survey, however, found no clear evidence of an empirical link[50]. This result is consistent with the weak empirical evidence linking saving to interest rates. It suggests that the substitution effect of a lower return is broadly offset by the income effect; that is the disincentive to save is offset by the fact that individuals have to save more to achieve a given target wealth. Still, some researchers find evidence of a positive relationship between saving and the real interest rate[51].

By contrast, there is ample evidence that capital income taxation has a significant effect on the composition of household saving. In a number of G-10 countries, pension accounts and, to a much lesser extent, owner-occupied housing receive preferential tax treatment relative to other assets. In these countries, most saving has taken place in these forms.

Similar distortions have become apparent with the progressive removal of capital controls, which has led to a reallocation of saving in response to differential tax treatments of similar financial assets. This is most evident among members of the European Union, where capital market integration has increased markedly. In this area, differential tax treatments and especially the tax exemption granted to interest income earned by non-residents, have induced large scale capital movements. This could well have had an impact on the cost and pattern of financial intermediation and, possibly, on the final allocation of saving among potential borrowers. Furthermore, the taxation of nominal interest income and the tax-deductibility of nominal interest payments may have distorted decisions to use debt or equity to finance capital expenditures, and may have affected cross-border capital flows[52].

Another important implication of this form of tax competition has been a downward adjustment of the effective tax rate on income from capital. This is due to outright tax evasion and to the fact that governments have responded to tax competition from abroad by shifting the tax base from capital to earned income and to consumption, through lower withholding taxes on interest income, differential tax rates for certain forms of financial income, or tax exemptions for small deposits.

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[50] See OECD (1994).

[51] Among recent studies, Bosworth (1993), using data for industrial countries, finds a positive correlation between saving and real interest rates using a time series estimation for individual countries, but a negative correlation in cross-country estimation. Masson, Bayoumi, and Samiei (1995) and Smith (1995) find some support for a modest positive interest rate elasticity of saving.

[52] Bayoumi and Gagnon (1992) find a strong correlation between the pattern of cross-country net foreign assets and long-term inflation differentials across OECD countries.

II. OTHER FACTORS

(a) Economic Growth

The (weighted) average annual growth rate of G-10 countries since the 1980s (2.4 percent) is less than half of that sustained in the 1960s (5.4 percent). There is growing empirical evidence that changes in trend growth have important implications for private saving behaviour, for both industrial and developing countries. Estimates based on cross-country comparisons among industrial countries suggest that each percentage point of sustained higher growth raises the private saving rate by about 2.5 percent of GDP[53]. Thus, Japan's strong growth performance since the 1960s – 5.9 percent average annual growth from 1961 to 1994 compared to an average of 3.0 for the rest of the G-10 – appears to be an important factor behind its high private saving rate over the period. At the same time, however, the study finds that the private saving rate declines as per capita income rises to U.S. levels, which suggests the presence of a catching-up effect. The finding of a positive link between growth and saving is supported by the work of other researchers. A recent Bank of Italy study concludes that the slowdown in Italian growth contributed two-thirds of the reduction in the private saving rate (adjusted for inflation), between the 1960s and the 1980s[54].

It is generally assumed that higher saving, through higher investment, raises growth. There is considerable evidence to support the view that higher investment can raise productivity growth for example, through improvements in technology, leading to a faster rate of technical progress. This suggests that the rate of long-term growth is endogenously determined. The above findings, however, point to the possibility of significant reverse causality running from growth to saving. Indeed, in many Asian high-growth countries, increases in saving rates appear to have lagged behind the acceleration in growth; and evidence of such reverse causality is confirmed by formal statistical tests[55]. This would suggest the existence of a virtuous circle involving saving, investment, and growth: an exogenous increase in investment or in productivity growth could generate, through higher growth, a positive saving response, which in turn would permit to finance the increased investment demand and dampen the upward pressures on interest rates.

A declining growth rate may help to explain the deterioration of public finances in industrial countries after the first oil shock. In the United States, rule-driven expenditure programs set up in a high-growth period began outpacing revenues when growth slowed down. Budget processes that might have tended toward surpluses began producing deficits, requiring continuous and difficult discretionary fiscal corrections[56].

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[53] See Masson, Bayoumi and Samiei (1995). The correlation between saving and growth is smaller if looking at changes in growth and saving rates over time in a single country.

[54] See Cannari (1994).

[55] See Carroll and Weil (1994).

[56] See Bosworth (1995).

(b) Financial Liberalization

Financial liberalization can, by improving the pricing of credit and relaxing rationing constraints, make the allocation of resources more efficient. It can also affect interest rates, savings and growth. In the last two decades, the financial systems of many industrialized, and some developing countries have undergone major reform. Macro-economic developments and structural modifications in the functioning of the financial services industry have undermined the effectiveness of regulatory restrictions on financial transactions. Moreover, many countries have sought to remove restrictions to improve the functioning of the financial system. Liberalization measures have been implemented in a majority of countries and competition is keener than in the past. Deregulation has abolished price and quantity controls on banks, removed controls on international capital movements and foreign exchange transactions and liberalized the financial services sector. The improvement in the range and quality of financial services and the relief of credit-rationing to firms and households have probably affected interest rates and the saving and investment patterns of economic agents. In particular, eliminating credit controls may have increased the "measured" interest rate, but not the effective market clearing rate which was previously not observable.

In countries that previously had administered controls requiring banks to purchase large quantities of government debt, including France, Italy, and Sweden, liberalization has had a direct effect on the interest rates on government debt examined in this study. Table 1 (in Chapter 1) shows that the measured real interest rates in these countries were significantly lower than in other G-10 countries during the 1960s.

Liberalization has also affected real interest rates on government debt indirectly through saving behaviour. A first channel of transmission is through the effects that the elimination of deposit and lending interest rate ceilings and international capital controls might have had on the reward to savings and on savings plans. As mentioned in the previous section, however, changes in the rate of return to saving seem to have only a weak effect on the volume of saving. While interest rate controls at the end of the 1960s were pervasive in all OECD countries, by the end of 1987 they had been lifted in about half of them and by the end of 1990 had been virtually abolished in all but three countries (see Table 7). Thus, part of the observed increase in real market rates over the 1980s might reflect the authorities reduced reliance on direct controls[57]. It is likely that this has improved the market allocation of credit. The impact on private saving depends on expectations at the time controls are lifted. If their abolition is seen as part of a sequence of supply side measures which will raise future income, then consumption will rise and saving fall initially. Over the longer term, the higher growth will foster higher saving[58].

A second indirect channel is through the effects that financial liberalization and floating exchange rates may have had on the volatility of market rates of return, and

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[57] Controls on bank interest rates have often been accompanied by other types of financial repression measures, such as foreign exchange restrictions. Using a panel of 61 developing and developed countries, Grilli and Milesi-Ferretti (1995) find that capital controls, current account restrictions and multiple currencies practices are, in general, associated with lower interest rates.

[58] See King (1991) and McKinnon and Shaw (1973).

thus on the perceived uncertainty on the returns on financial assets. For countries with monthly data available back to 1960 (Belgium, Canada, France, Germany, Italy, United Kingdom, United States) the average volatility of long-term interest rates was 2-to-3 times greater in the 1990s than in the 1960s, except in the case of Belgium, where volatility was roughly unchanged[59].

This increased uncertainty on the return to saving might have affected not only households' portfolio composition, twisting it towards assets whose volatility did not increase, but also the overall pattern of wealth accumulation. In principle, however, the effect is ambiguous: while higher uncertainty over returns tends, ceteris paribus, to discourage saving since the reward to saving is worth less to the saver, it also raises precautionary saving, as households need more assets to cushion against bad return realizations. At present there is no empirical evidence on the net effect of rate-of-return uncertainty on private sector saving. It is unlikely that the overall effect has been substantial.

Financial liberalization has probably affected savings negatively through more direct channels, i.e. by easing households' access to credit and insurance markets. Empirical evidence supports the view that countries which have liberalized the access to consumer credit have experienced a decrease in the aggregate saving rate[60]. The removal of credit ceilings and controls during the 1980s in the United Kingdom, Finland, Denmark, Sweden and Norway was followed by a sharp increase in households' average propensity to consume, but there are indications that over the longer run the impact is unwinding[61].

The experience of these countries supports the view that the reduction in saving rates following liberalization is largely temporary. However, the removal of limits to the access to credit markets should, in principle, also lead to a permanent reduction in the households' aggregate propensity to save. Indeed, cross-country comparisons suggest that, other things being equal, the availability of consumer credit helps to explain international differences in saving rates, which tend to be lower in countries where households have easier access to the market for loans – such as the United States or the Scandinavian countries – and higher in Italy and Japan where households' access to credit markets is more limited[62].

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[59] Volatility is defined as the standard deviation of the long-term interest rate over the previous 12 months. (Monthly data were obtained from International Financial Statistics through May 1995.) This standard deviation has averaged around 50 basis points for these countries in the 1990s, except for Italy, where the standard deviation has averaged around 75 basis points. An alternative measure of volatility is the coefficient of variation, which is the standard deviation divided by the mean. The coefficient of variation also rose between the 1960s and the 1990s for every country except Belgium, although increase was somewhat moderated by the increase in the mean interest rate between the two periods.

[60] Bayoumi (1993), using regional data for the United Kingdom, finds a strong positive relationship between consumer credit (a proxy for deregulation) and consumption: large increases in consumer credit associated with deregulation appear to have reduced household saving. Miles (1992) also finds a downward shift in U.K. saving in the 1980s due to financial liberalization. Lehmussaari (1990) discovers positive effects on consumption in Denmark and Finland, where credit rationing was eased in the 1980s, and similar results are found for France by Levy and Ostry (1994).

[61] One exception to this pattern is Germany, where financial liberalization was not accompanied by debt-financed consumption booms. Instead, German households' indebtedness has been consistently low. It has been argued that this behavior is probably due to rooted expectations of low inflation by German households, which tends to make debt less attractive.

[62] See Hayashi (1986), Muellbauer and Murphy (1989), and Guiso, Jappelli and Terlizzese (1994).

Table 7 - The Process of Interest Rate Deregulation
Countries with interest rate controls or agreements

	End 1960	End 1980	End 1987	Mid 1995
Australia	***	***	**	**
Austria	***	***	***	**
Belgium	***	***	***	* (1)
Canada	***	**	**	**
Denmark	***	***	**	**
Finland	***	***	***	**
France	***	***	***	* (2)
Germany	***	**	**	**
Greece	***	***	***	*
Ireland	***	***	**	**
Italy	***	**	**	**
Japan	***	**	**	** (2)
Netherlands	***	**	**	**
New Zealand	***	***	**	**
Norway	***	***	**	**
Portugal	***	***	***	***
Spain	***	***	**	**
Sweden	***	***	**	**
Switzerland	***	***	***	**
Turkey	***	**	***	**
United Kingdom	***	***	**	**
United States	***	***	***	* (2)

  * Official controls or private agreements.
  ** No official controls or private agreements.
  *** Controls generally abolished, with only a minor exception for a specific category.
(1) Interest rate controls apply only to certain tax-advantaged passbook savings accounts.
(2) Prohibitions remain on interest payments on demand deposits.
Sources: OECD, Banks Under Stress, 1992; and OECD, Secretariat.

Sizeable effects on personal savings can derive from improvements in the mortgage markets. The age pattern of savings, and thus overall savings, can be greatly affected by the functioning of the mortgage market. A higher down-payment requirement tends to induce households to postpone consumption early in the life cycle in order to accumulate enough assets to qualify for buying a house. This observation is supported by the sharp differences in the average age of first-time home buyers among countries with differing access to mortgage markets. It is around age 30 in the U.S. and the U.K., where mortgages can cover between 70 and 90 percent of the house price, and around 40 in Italy and Japan where the down-payment requirement is over 40 percent of the cost of a house. Credit market imperfections of this type can explain part of the cross country differences in household savings and their elimination can significantly reduce personal saving, at least over the short to medium term. Some Italian estimates suggest that the elimination of limits to households' borrowing in the mortgage market could lower the saving rate of Italian households by 2.2-3.7 percentage points. Analogous computations

on U.S. and Japanese data show that reducing the down-payment on house purchases by 20 percent can lower the household saving rate by 2 percentage points[63].

To sum up, it is likely that the financial liberalization of the 1980s has reduced savings and contributed to the upward shift in interest rates. The increase in savings induced by the positive impact on interest rates of the abolition of interest rate controls has been more than offset by the negative effects produced by giving access to credit to previously liquidity-constrained households. This negative effect on saving may be largely transitional as it allowed previously constrained consumers to bring consumption forward within their life-cycle, although the adjustment to a new equilibrium may be prolonged. Financial liberalization and developments in insurance markets may also have reduced saving by enabling households to improve their risk diversification. Competition has increased and new products have been introduced to allow insurance against previously uninsurable risks. The accumulation of precautionary assets by households has probably been reduced as a result.

(c) Profitability of Investment

Thus far, this chapter has focused on factors that influence national saving. On the investment side, changes in the rate of growth of total factor productivity and in the rate of growth of the labour force, as well as structural and regulatory changes will affect the desired rate of investment; new technologies, more open trade arrangements, more competitive markets, and a larger pool of labour all tend to increase the opportunities for profitable investment projects.

The past 35 years have witnessed deep and widespread market-based reforms in national and international markets, which would have tended to increase economic efficiency and expand investment opportunities. But, the growth rate of total factor productivity – which is determined by technological progress and changes in economic efficiency – has slowed in every G-10 country since the early 1970s. This slowdown in the growth of total factor productivity implies that the positive effects of liberalization, deregulation, and globalization have been outweighed by slower technology growth. The reasons for this are unclear, although the completion of the post-war reconstruction effort in Europe and Japan has undoubtedly played a role. As regards the labour force, it grew in the 1970s with the baby-boom cohort joining the labour force, and with the rise of female participation, but it has since slowed down considerably[64].

For a given cost of capital, a rough rule of thumb is that each percentage point slowdown in the growth rate of total factor productivity should lower the desired investment rate in line with the capital-output ratio; in practice by two or more percentage points of GDP, depending on the marginal profitability of capital. As the slowdown in the growth of total factor productivity between 1960-73 and 1974-93 ranged from 1.4 percentage points in the United States to 4 percentage points in Japan, the implied reduction in the desired investment rate is quite large. An increase in the labour force growth rate in the 1970s and early 1980s partly offset this decline in desired investment.

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[63] See Hayashi, Ito and Slemrod (1988) and Guiso, Jappelli and Terlizzese (1994).

[64] Data and analysis are based on Bosworth (1995).

Since the late 1980s, labour force growth has returned to the lower rates of the 1960s, further intensifying the decline in desired investment.

Looking to the future, some observers claim that more rapid technological progress and more competitive markets will raise the growth rate of total factor productivity toward the level of the 1960s. There was some evidence for this claim in the high productivity growth rates observed at the beginning of the recent U.S. recovery, but later figures have proved to be more in line with historical experience. In Japan, the evidence is consistent with a further slowdown in the growth of total factor productivity.

Economists often assume that rates of return on different assets are roughly equalized, so that government borrowing directly affects the cost of capital for private businesses. In practice, there are wedges between the cost of private and public borrowing, as well as between the cost of private debt and equity capital. It is therefore useful to compare the trends in the overall return to private capital in the business sector in G-10 countries with the measured real rates of return on government debt.

Table 8 shows that measured rates of return on capital in the business sector declined between the 1960s and the 1980s, and that they have risen since the 1980s[65]. The pattern over the last thirty-five years has been mixed, with three countries showing increases of more than 200 basis points and four countries showing decreases of more than 200 basis points.

Table 8 - Rates of Return on Capital in the Business Sector (1)

	1960-69	1970-79	1980-89	1992	1993	1994	1990-94
United States	17.1	15.7	14.9	17.1	18.1	18.8	17.4
Japan	24.8 (2)	17.9	14.3	14.0	13.8	13.4	14.2
Germany	16.3	13.5	11.9	13.7	13.2	13.8	13.7
France	11.9 (3)	12.8	11.9	14.6	14.3	14.7	14.5
Italy	12.7	11.8	13.6	14.5	14.6	15.2	14.7
United Kingdom . .	11.8 (3)	10.2	9.9	9.9	10.9	11.5	10.2
Canada	12.4 (4)	14.2	17.1	16.1	16.4	17.1	16.5
Netherlands	n.a.	13.9	16.3	17.4	16.7	17.9	17.9
Belgium	n.a.	12.7	11.7	12.5	12.1	12.4	12.7
Sweden	13.2 (2)	10.7	10.0	11.1	12.0	12.6	11.0
Switzerland	15.6	11.1	8.9	8.5	9.3	10.4	9.4
G-10 Weighted Average	17.0	14.8	13.8	15.1	15.5	16.0	15.3

(1) Gross output of the business sector minus net indirect taxes and labour income, all divided by non-residential capital stock excluding land.
(2) 1965-69
(3) 1963-69
(4) 1966-69
Sources: OECD Secretariat.

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[65] The rates of return are presented for comparison over time within each country, and for comparison of time trends across countries. The levels, however, are not comparable across countries because of differences in the composition of unincorporated business income and in the measurement of the capital stock, depreciation and investment deflators. Even within a given country over time, the nature of unincorporated business income has changed secularly, especially in countries that had a large agricultural sector in the 1960s.

Since the 1980s, the rate of return on capital has increased in nearly every G-10 country. By itself, such a rise in the rate of return on capital is not necessarily a sign of improved investment opportunities. As discussed in the section on fiscal policy, deficits and public debt, through crowding out, also contribute to raising the rate of return on capital; this is because as capital becomes scarcer, its rate of return rises. The observed decline in national saving lends support to this interpretation. Perhaps more importantly, there has been a generalized shift in business fixed investment to shorter-lived assets since the 1980s. The higher depreciation on these assets tends to increase the measured gross rate of return reported in Table 8 without necessarily increasing the net rate of return that is relevant for comparison with the real rate of interest on bonds.

In order to shed light on future prospects for investment demand, analysis of the recent relative movements in equity and debt markets may, in principle, reveal whether there has been an upward revision to expectations of future profitability. In equilibrium the real interest rate equates planned investment and planned saving. Hence an increase in real interest rates may reflect either a positive shift in planned investment or a negative shift in planned saving. But, in an efficient market, higher planned investment should be associated with a higher present discounted value of expected future dividends, and, consequently, a rise in the return on equity compared with that on bonds[66]. Testing whether or not this has occurred is quite difficult given the volatility of equity markets and the possible changes in the equity premium over time (see Box 2). Recent Bank of England research attempts to address the question through analysis of the relative movement in U.K. equities and index-linked gilts[67]. It is most useful to compare equity returns with those on index-linked bonds rather than on nominal bonds because the latter are affected also by shifts in expected inflation. Given the integration of global capital markets, the results from the U.K. experience may have wider applicability.

The main result suggests that expected profitability may have improved in the last two years. The U.K. equity market – and equity markets generally – rose strongly in 1993, but share prices slipped back somewhat in the United Kingdom during 1994 in common with the broad global pattern[68]. Nonetheless, share prices fell less than bond prices, so there is weak support for the view that an improvement in expected profitability over the next decade contributed to upward pressure on real interest rates in 1994.

(d) Emerging Economies

The net demand for capital originating from developing and transition countries has grown sizeably over the last few years. This section looks at the factors behind this development, to assess whether it could have contributed to the observed rise in real interest rates in G-10 countries.

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[66] See Blanchard and Summers (1984). Smith (1995) provides some evidence that equity price changes can help to explain movements in investment and real interest rates over time.

[67] See Paisley (1995).

[68] The United States was a notable exception.

Aggregate net resource flows to developing countries, defined as the sum of long-term debt (maturity greater than a year) and non-debt-creating flows (foreign direct investment, portfolio equity flows, and official grants), averaged about $47 billion per year in the 12-year period leading up to the debt crisis in 1983 (Table 9)[69]. Rising from their most recent low of $49 billion 1987, aggregate net resource flows reached a new peak of about $168 billion in 1993; in terms of GDP, aggregate net resource flows to developing countries went from about 2.7 percent of GDP in 1983-89, to 3.6 percent of GDP in 1990-93. This development reflects the restoration of access to international capital markets following the debt crisis as well as heavy investor interest in emerging markets. Equally striking are recent developments in short-term flows, which increased from less than $1 billion in 1985 to $28 billion in 1993. Data on net external financing, which are not strictly comparable (since they are based on the balance of payments and include short-term flows), show a $60 billion decline in capital inflows from 1993 to 1994, down to $136 billion.

Table 9 - Developing Countries: Composition of Aggregate
(Long-term) Net Resource Flows (1)
(In percent of GDP)

	Developing countries			Countries in Transition
	1971-82	1983-89	1990-93	1993
Debt (long-term) (2)	2.62	1.58	1.30	2.06
Foreign Direct Investment	0.49	0.59	1.16	1.19
Portfolio equity flows	—	0.02	0.52	—
Grants	0.42	0.45	0.60	1.04
Total net resource flows	3.53	2.65	3.58	4.30
Memorandum Items				
Annual Averages (US$ billion):				
Net resource flows	46.80	55.35	112.41	23.62
Short-term debt flows (3)	n.a.	4.66	22.97	– 0.79

(1) For country coverage and definition of concepts see text.
(2) Maturity greater than one year.
(3) Maturity less than one year.
Sources: World Bank, *World Debt Tables*, and IMF, *World Economic Outlook*.

[69] Where possible, data are from the *World Debt Tables* published by the World Bank, but owing to data limitations, country coverage here is limited to 89 developing countries. Only 1993 data were available for the economies in transition. Regional breakdowns are according to the IMF's *World Economic Outlook*, which was also the source of GDP data.

Net resource flows to countries in transition, at $17 billion in 1993, remain modest. Data on net external financing, which again are not strictly comparable, show an increase in inflows, from an average of $6 billion in 1990-91 to $16 billion in 1992-94[70].

The resource transfer implied by these capital flows is clearly evident from the swings in the current account balance of industrial countries, which moved from an average deficit of $88 billion in 1987-90, to a surplus of $23 billion in 1993, and then back to an estimated deficit of $10 billion in 1994.

The saving-investment balance of developing countries shows that the increase in the net external financing need of developing countries stemmed primarily from a surge in investment rather than a fall in saving. The saving rate did decline temporarily in the early 1990s, but had already recovered by 1993 and rose further in 1994. In a longer-term perspective, it also appears that capital flows to developing countries have returned to the levels prevailing in the early 1970s[71]. It is also striking that most of the substantial increase in investment in developing countries since 1970 has been financed through increased domestic saving.

Not surprisingly, the same factors that affect private saving behaviour in industrial countries are found to contribute to the rise in saving in developing countries over this period. Notable among these factors are, falling dependency ratios and high growth. The effect of per capita income appears to be more complicated. For poorer countries, a rise in per capita income appears to lead to a rise in the saving rate; the reason may be that once a country moves beyond the subsistence level, it is able to increase its saving rate substantially. But the saving rate appears to level off, and even decline (consistently with the evidence from industrial countries), when countries reach a certain income threshold[72].

There are important differences in the performance of developing countries, notably between Asian and Latin American countries. In Asia, high growth has been typically associated with high saving, causing a relatively low reliance on foreign capital inflows. The marked increase in foreign capital inflows in 1993-94 relative to GDP has been related to rapidly rising investment rates, which outpaced the rise in saving rates. The experience of Latin American countries has been quite different: through the 1970s they sustained similar rates of growth, but with slightly lower investment rates while attracting more foreign capital in relation to GDP. Following a period of low growth and limited access to foreign capital, Latin American countries, and notably Mexico, experienced massive capital inflows; unlike the case of Asia, these were linked as much to falling saving rates as to rising investment rates.

Developing countries in Asia show a persistent negative entry for errors and omissions in the region's balance of payments (of almost $10 billion annually for 1987-93), whereas Latin American countries display a persistent positive entry (just over US$ 1 billion annually for 1987-93). For the most part, this is likely to reflect unrecorded capital flows, without any implications for measured saving and investment. However,

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[70] See World Economic Outlook, May 1995, Table A32.

[71] The current account and saving-investment data for industrial and developing countries show no discernible increase in net capital flows to developing countries between the early 1970s and the 1990s, in relation to GDP, when accounting for the growing world current account discrepancy.

[72] See IMF, World Economic Outlook, May 1995, Chapter V.

even if all of the errors and omissions were to be treated as unrecorded income flows (which would reduce saving in Asia and raise it in Latin America), the adjustment would explain less than one percentage point of the 11 percentage point difference in their respective saving rates[73].

There are two possible explanations for the difference in the performance between Asian and Latin American developing countries. First, public saving in Asian countries has been consistently higher than in industrial countries and in other developing countries: average public saving between 1985 and 1993, was around 4 percent of GDP for developing countries in Asia, almost twice the level recorded in Latin America[74] - the corresponding figure for the G-10 is -0.5. Second, the evidence of an effect running from high growth to private saving suggests that policies that promote investment can engender a virtuous circle of sustained and largely self-financed growth. This points to, in the first place, the importance of macroeconomic stability (prudent fiscal stances and low inflation) and structural market-based reforms, two areas in which fast growing Asian countries have had very strong records. Well developed and stable banking systems appear to have been another distinguishing feature of successful East Asian countries. A number of developing countries have introduced a variety of forced saving schemes, such as the Central Provident Fund in Singapore; empirical evidence, however, suggests that saving channelled into these schemes has been largely offset by a reduction in private voluntary saving[75].

In all, the data show that there has been a clear secular rise in investment demand in developing countries, with a recent further acceleration, accompanied by a similar saving performance. In recent years, investment demand has outpaced saving, but a number of reasons suggest that this is unlikely to have exerted strong pressures on world real interest rates. First, from a long-term perspective all of the increased investment has been financed by higher domestic saving; even though net capital flows to non-industrial countries have increased in recent years, they appear to have largely returned to the levels prevailing in the early 1970s, in proportion to GDP. Second, as regards more recent developments, the surge in capital flows in 1993 occurred in a period of falling long-term real interest rates; and the volume of capital flows actually fell as interest rates rose anew in 1994. Third, the net external financing need of developing countries between 1992 and 1994 (at around 3 percent of their GDP), represented less than 1 percent of industrial countries' GDP, and around 4 percent of private saving in the G-10 countries; these are small amounts compared to the 16 percent of private saving absorbed by public sector deficits in G-10 countries.

There is historical evidence of sizable capital flows being directed to specific countries over sustained periods of time: net capital inflows into Canada, for instance, averaged 7 percent of GDP from 1870 to 1913; even more strikingly, Korea's net capital inflows averaged 9 percent of GDP from 1953 to 1980; and more recently, Mexico's net inflows from 1991 to 1994 averaged almost 7 percent of GDP. However, these seem to be exceptions, and there is no clear pattern which enables to draw firm conclusions for

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[73] The current account deficit of Latin American countries would still be three times as large as that of developing Asian countries in relation to GDP, in 1987-93.

[74] See IMF, *World Economic Outlook*, October 1993.

[75] See IMF Occasional Paper No. 119 (1995) and Faruqee and Husain (1995).

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developing countries as a whole. Greater caution on the part of institutional investors following events in Mexico, should shape future developments, as will the efforts to generate more saving domestically in Latin American countries. Overall, it is very difficult to predict what will happen to net capital flows to developing countries.

There is likely to be pressure for an increase in private capital flows to transition countries, but even so they would account for only a small fraction of industrial countries' saving in the years to come. The transition process in eastern Europe and the former Soviet Union had been expected by many to require large foreign financing. So far these predictions have turned out to be exaggerated: even though national saving fell markedly in these countries, investment demand was also much lower than anticipated. Moreover, in the early phases of transition, capital flight has tended to outpace gross private inflows[76]. As the process of macroeconomic stabilization and structural reform takes hold across this group of countries, capital flight could be reversed. At the same time, there appears to be ample scope for large increases in foreign direct investment. To some extent these should be accompanied by a recovery of domestic saving, particularly corporate saving, and by a gradual reduction in official capital flows.

BOX 4

The Nature of Capital Flows to Developing Countries

Prior to the debt crisis, Latin America absorbed by far the largest share of resource flows to developing countries (about two fifths of the total), followed by Asia (about one quarter of the total). With the debt crisis and the subsequent drying up of debt financing, which affected Latin America more than other regions, these shares have been reversed and, by 1989, Asia accounted for 40 percent of the total resource flows to developing countries.

The rebound in net resource flows to developing countries since 1990 has concerned mostly Asian and Latin American countries. Resource flows to Asian countries rose from about 2 percent of their GDP in 1989 to about 5 percent in 1993, with a similar swing for Latin American countries. Among Latin American countries, Mexico accounts for the largest share of the resource flows over this period. The reflow to these two regions was reinforced by a turnaround in short-term capital flows, from an outflow of $5 billion in 1985 to an inflow of $11 billion in 1993 for Latin American countries, and from an outflow of nearly $1 billion in 1986 to an inflow of $12 billion in 1993 for Asian countries.

The debt crisis also contributed to a important change in the composition of capital flows: the share of long-term debt in total resource flows to developing countries went from nearly three quarters in the 1970s and early 1980s, to a little more than a third by the 1990s. The counterpart to this trend has been a sharp increase in portfolio equity flows (especially in the Latin America region) and foreign direct investment (especially into the Asian countries). Net resource flows to transition countries have been about evenly divided between long-term debt and non-debt-creating flows.

The nature of debt-creating flows has also changed significantly over the past several years. First the share of private non-guaranteed debt in total long-term debt doubled between the 1970s and the early 1990s, reaching 34 percent of total debt in the period from 1990 to 1993. The main exception is Africa where, throughout the period, virtually all net debt flows remain public or publicly guaranteed. Second, there has been a remarkable shift away from commercial bank financing towards bond financing of the government sector, including for the transition economies.

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[76] See IMF, *World Economic Outlook*, May 1995.

(e) Demographic Influences

The life-cycle model of saving behaviour predicts that changes in the age structure of the population should affect private saving rates. Saving should be low when workers have children to support; it should rise as workers enter their highest-earning years; and finally it should become negative when workers retire. This theory implies that the ratio of children and retirees to workers – the dependency ratio – ought to be negatively correlated with private saving.

Empirically, the dependency ratio does help to explain differences in saving rates across countries, but it generally is not significant in explaining saving behaviour over time[77]. The failure of the demographic variable to explain changes in saving over time may be due to the fact that its movement is small relative to other factors influencing saving.

Assuming that demographic factors are important for saving, their influence on private saving rates over the past 35 years should have been to increase saving. Between 1960 and 1995 the G-10 dependency ratio fell by roughly 15 percentage points. According to a cross-country estimate of the demographic effect on saving from the IMF, this decline in the dependency ratio should have increased the private saving rate in G-10 countries by roughly 2.5 percentage points. Since the 1960s, however, private saving has declined in most G-10 countries.

It seems most likely that other factors were at work over this period to counter the effect of demographics. Two of these factors, the growth slowdown and financial liberalization, have been discussed elsewhere in this study. Social insurance programs and unfunded public pension systems are also important determinants of private saving. By reducing the financial risk of illness, disability, and layoffs, social insurance programs have reduced the precautionary motive for saving; and by promising a public retirement pension, governments have reduced the normal life-cycle motive for saving. Since public pension systems in G-10 countries are largely unfunded – that is the net present value of future outlays from the schemes exceed the net present value of contributions to them – the drop in private saving is not offset by higher public saving[78].

Most studies of the effect of public pensions on saving find evidence of an effect in the expected direction, but, given the many other factors that affect saving, it has been difficult to prove that this effect is both statistically and economically significant. Nevertheless, a reasonable estimate of the combined effect of social insurance and unfunded public pensions in reducing national saving over the past 35 years might lie in the range of 1 to 3 percent of GDP[79].

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[77] Cannari (1994) claims that demographic movements explain only a small share of the decline in Italy's saving rate. Masson, Bayoumi, and Samiei (1995) present cross-country and time-series evidence for a number of industrial and developing countries.

[78] See Masson, Bayoumi, and Samiei (1995).

[79] All public pension systems in the G-10 countries operate primarily on a pay-as-you-go basis. A few countries have built up surplus accounts to help offset the expected increase in beneficiaries over contributors over the next few decades - and more countries are planning to introduce such accounts - but in no country do these accounts equal as much as half of the net future liabilities of the system. See OECD (1988) and Van den Noord and Herd (1993).

Over the next 30 years, the average dependency ratio in the G-10 countries is expected to rise by roughly 10 percentage points. Similar increases are expected for the other industrial countries and the economies in transition[80]. Using the IMF estimates, this increase in the dependency ratio would be expected to reduce private saving by about 1.5 percent of GDP. On the other hand, in the developing countries the dependency ratio is expected to fall by nearly 20 percentage points over this period, which would tend to increase private saving. A recent IMF study projects that the rise in developing country saving may exceed the fall of industrial country and transition economy saving, so that the world saving rate may not fall over the next 30 years[81]. However, the study cautions that the developing country projections are very sensitive to the assumed high growth rate and recent high saving rate of one country - China.

Demographic factors may also be expected to affect investment demand in a manner that is roughly similar to their effect on saving[82]. A smaller cohort of workers in G-10 countries in the next century should reduce desired investment. This labour-force slow-down has already begun and will intensify gradually over the coming years as the ratio of children in the population declines steadily.

The net effect of demographics on the balance of private saving and investment is likely to favour saving over the next 10-20 years. This is because of the entrance of the baby boom generation into their highest saving years. However, when the baby boom generation begins to retire, the private saving rate is likely to drop faster than the domestic investment rate. This retirement boom will begin around 2005 in Japan and 2015 in Europe and the United States.

Aside from their potential impacts on private saving and investment, future movements in the dependency ratio will have a direct impact on government budgets through public pension systems, health care expenditures, and educational expenditures. According to a recent report by the OECD, the overall impact of demographic changes on general government primary balances between 2000 and 2030 ranges from -1 percent to -9 percent of GDP for the G-7 countries[83]. Only the United Kingdom, at -1 percent, and Canada, at -3.5 percent, were projected to have a deterioration of less than 5 percent of GDP in magnitude. These estimates were calculated using demographic projections from the World Bank, constant labour force participation rates by age cohort, a productivity growth rate of 1.5 percent, pension benefit rules and contribution rates built into existing legislation, and assumed increases in real wages and the real prices of health care and education equal to the productivity growth rate[84].

The OECD report discusses several strategies for coping with the anticipated fiscal demands of population ageing. One strategy is to increase tax revenues correspondingly - by 1 to 9 percent of GDP, depending on the country. Due to concerns about the

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[80] See Munnell (1987).

[81] Italy has one of the more generous unfunded pension schemes. Rossi and Visco (1994) attribute roughly 3 percentage points of the decline in the Italian saving rate to the growth of public pensions.

[82] See Temprano (1995).

[83] See Masson, Bayoumi, and Samiei (1995).

[84] See Cutler, Poterba, Sheiner, and Summers (1990).

existing burden of taxation in many G-10 countries, this strategy appears unlikely to be adopted. A second strategy is to reduce other government expenditures by 1 to 10 percent of GDP. According to the report, in the United States such an approach would be equivalent to eliminating all defence spending, and in Japan it would be equivalent to eliminating all spending on public services and defence.

A third strategy is to raise the retirement age by 5 years. This change would roughly eliminate the fiscal imbalance over the next 35 years in Japan, Germany, the United Kingdom, and the United States, and it would eliminate over half of the imbalance in Canada, France, and Italy. At present, the retirement age in most countries is either 65 years or it is scheduled to increase to 65 over the coming decades. In the United States, it is scheduled to increase to 67 by 2022. In Italy, the retirement age is not scheduled to increase above 60 for women, and in France it is not scheduled to increase above 60 for either sex. Raising the retirement age carries the dual advantage of increasing the payroll tax base at the same time that it reduces total expenditures.

A fourth strategy is to reduce the level of benefit expenditures per retiree. A number of options are available: pension benefits could be lowered gradually; pension benefits could be taxed; pension and health care benefits could be means tested; and cost-saving incentives could be built into health care systems.

In the end it is likely that governments will adopt more than one, and possibly all four, of these strategies. One attractive means of packaging these strategies is to increase the extent to which public pension systems are funded on an actuarial basis. In a fully funded system, the average beneficiary receives a pension that is consistent with his contributions, the accrued interest on his contributions, and his life expectancy after retirement. The main advantages of a fully funded system are that it automatically adapts to changing demographic profiles and that it tends to increase national saving. The main disadvantage to moving to a fully funded system at present is that it would require today's workers to pay for both their own retirement and their parents'[85]. This fact argues for a gradual increase in the extent to which public pensions are actuarially funded. Moreover, since governments also wish to use public pension systems to guarantee a minimum retirement standard for the poor, it may not be desirable to operate a strict fully funded system[86].

The OECD report also makes clear that delays in preparing for the burdens of an ageing population can have disastrous consequences. If the initial increases in public pension and health care costs are financed by borrowing, the rapid run-up in public sector debt ratios early next century will make the inevitable adjustments even more uncomfortable. In light of debt-to-GDP ratios that are already high in most G-10 countries, there would appear to be an added incentive to hasten fiscal consolidation now. At the same time, given the long horizons with which individuals plan their retirements, it would also be less disruptive to enact structural changes to public pension and health care systems as early and as gradually as possible.

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[85] See OECD (1995).

[86] The estimates do not incorporate the implications of this year's legislative changes to the Italian public pension system.

CHAPTER 3

Policy Conclusions

Over the past 35 years the G-10 countries have experienced a sustained increase in real long-term interest rates. Starting from a level of around 3 percent in the 1960s, average real long-term rates in the G-10 now stand at about 4 percent, having fluctuated by about half a percentage point on either side during the past two years. Over the same 35 years, the G-10 countries have experienced a decline in gross saving rates of nearly 5 percent of GDP.

The secular rise in real interest rates in the G-10 countries appears to be mainly the result of a large decrease in saving rates which has been only partly offset by a decrease in desired investment. The largest single component of the decline in the savings rate is the fall in public savings as fiscal deficits have widened, but private sector saving rates have also declined. The induced rise in real interest rates raises concerns about future rates of economic growth and employment creation, although the risk should not be overstated. Higher real interest rates may also reflect higher expected returns on investment and thus better growth prospects linked to structural reforms. There is some evidence of a recent increase in the return to investment in several G-10 countries, which could raise investment demand and maintain upward pressure on real interest rates. But such pressures do not appear to explain the secular increase in real interest rates.

Net investment demand from non-G-10 countries does not appear to be a significant factor behind the secular rise in real interest rates. Capital flows to developing countries dropped to low levels in the 1980s and have now returned to the levels prevailing in the early 1970s, when expressed in terms of industrial countries' GDP. The investment rate of developing countries has increased markedly over the last twenty-five years – to nearly 30 percent of GDP presently – but their saving rate has risen in parallel. Indeed, the experience of successful Asian countries demonstrates that rising investment rates and high growth, by stimulating saving, tend to become self-financing. Similarly, the large capital needs of transition countries in the years ahead should be financed largely by a recovery of their saving rates.

Looking forward, the ageing of the population is likely to be the most important factor affecting longer-term trends in G-10 saving and investment. In the near term, demographic factors should increase the G-10 savings rate. However, after 10-20 years the G-10 saving rate is expected to decline significantly. The impact on real interest rates of this decline may be offset to some extent by a decrease in investment demand resulting from a shrinking labour force and, at the global level, by a projected rise in the volume of saving from developing countries. However, the prospect of the ageing of the population in the G-10 countries poses a serious challenge for pension and health care systems that needs to be addressed expeditiously.

Financial liberalization has led to the close integration of financial markets, especially within the industrial countries. This globalization has increased the correlation of real interest rates across the industrial countries at the same time that it has allowed individual countries to run greater current account surpluses and deficits. Financial liberalization has also increased developing countries' access to bond financing and portfolio capital flows.

When real interest rates are measured using recent levels of inflation to proxy for long-term inflation expectations, there appear to be significant differences in real rates across countries. But there is evidence that differences in nominal long-term interest rates largely reflect previous inflation experience over a long period, and that recent inflation rates may not be a good proxy for future expectations. The true *ex ante* real interest rates, net of inflation risk, may in fact be relatively similar across countries. Evidence from index-linked bonds, where they exist, provide some confirmation of this hypothesis.

In most G-10 countries the current levels of real long-term interest rates are close to their average measured values over the past five years. But in countries with a long history of high inflation, measured real rates are significantly above this level, at least when current or recent price increases are used to proxy inflation expectations. In these countries, the inflation premium in nominal rates appears to be high in spite of satisfactory inflation performance in the recent past. Success in achieving anti-inflation credibility over time will bring substantial benefits in these countries as inflation premia gradually decline.

The analysis and empirical evidence marshalled in this study suggest that the solutions to the problem of higher real interest rates and low saving are to be found in three key policy areas - fiscal consolidation, inflation control and pension reform. Financial market issues also warrant continued attention.

Role of Fiscal Policy in Promoting Saving and Investment

The swiftest, surest and potentially most equitable way to raise national saving would be to reduce fiscal deficits. The evidence brought together in this study demonstrates that cutting public sector deficits will unambiguously increase national saving and thus tend to put downward pressures on world real interest rates. With the international integration of capital markets, changes in fiscal deficits will tend to have a stronger effect on the current account balance of countries than on their national interest rates - although changes in the prospects for the sustainability of fiscal policy will still affect national rates.

Fiscal policy should aim at the attainment and preservation of sound public finances, to be achieved in a transparent and credible medium-term framework. There is no exact definition of what constitutes a sound level of deficits and debt, but a number of arguments militate in favour of lower levels than prevail at present in most G-10 countries. In many countries high debt levels make public finances particularly vulnerable to adverse shocks and threaten fiscal sustainability. It would also be desirable to reduce debt levels before rising dependency ratios increase demands on public pension and medical programs. Consolidation of structural deficits should therefore aim, in the first instance, at reducing public debt to more prudent levels. Even after debt levels are at a more acceptable level, an appropriate medium-term rule for fiscal policy should aim for a steadily falling debt-to-GDP ratio in normal times. This would provide a cushion against unexpected adverse shocks, which could otherwise threaten fiscal sustainability, and would ensure that the debt ratio is not ratcheted up over time.

Decisions about changes in public spending and revenue are part of general economic policy and the wider political process and cannot be made solely in the light of their impact on savings and investment. However, savings and investment have important implications for economic growth and should be given due weight when such decisions are made. There is evidence suggesting that fiscal consolidation is likely to be more effective at increasing saving and investment if it is based on expenditure reductions rather than tax increases. As taxation frequently distorts economic decisions and reduces the incentive to work, where possible fiscal consolidation should be based on expenditure reductions.

Decisions to reduce public expenditure should take account of the impact on saving and investment. As long as public-sector investments have been correctly appraised and are worthwhile, the stress in fiscal consolidation should be on reducing current expenditures rather than capital expenditures.

If revenue increases are included in a program of fiscal consolidation, consideration should be given to the impact of the revenue-raising measures on saving and investment. Increases in consumption taxes have less of a negative impact on saving than do increases in income taxes, but social policy considerations place a limit on how much of the tax burden can be shifted. Subsidizing particular forms of saving has been found to have little or no impact on the level of aggregate savings in most countries, but it does affect the channels through which savings flow.

Lowering the Inflation Premium

Countries with a history of high inflation tend to have higher nominal and measured real interest rates. Their past performance is used to judge their present commitment to price stability. Accordingly, the single most important way to reduce expectations of longer-term inflation is to maintain unfailing commitment to policies of non-inflationary growth over the long run.

There is consensus among G-10 authorities that monetary policy should be geared to price stability. Countries have sought to improve the effectiveness of their monetary policy by adopting and announcing specific targets for particular "nominal anchors" such as money growth, a fixed exchange rate, an exchange rate band or a specific inflation rate. Such an approach has two advantages. Firstly it pre-commits the monetary authorities to a well-defined goal. Secondly, it allows market participants to monitor the performance of the central bank. However, these features also entail potential costs when they limit the ability of the central bank to respond to unforeseen events.

Several countries have sought to improve the credibility of their anti-inflation policies by granting central banks greater independence and charging them with the sole or primary goal of achieving price stability. Such institutional changes enhance commitment. They can be expected to reduce the transitional costs of moving to a lower rate of inflation and of maintaining price stability, but only to the extent that they are backed by broad social support.

Monetary policy will tend to meet with greater success in attaining and maintaining price stability if other economic policies are well focused and supportive. For this reason a clear and credible medium-term framework for economic policy helps to reduce inflation expectations. Fiscal policy is particularly important in this regard. High deficits may evoke fears of monetary accommodation and raise inflation premia. Structural policies

too can contribute to lowering expectations of longer-term inflation by augmenting flexibility and strengthening competition in labour and product markets. To the extent that they reduce unemployment, they can in turn alleviate fiscal pressures.

Demographic Changes and Pensions

The impact of demographic changes on G-10 saving and investment over the past few decades has been largely overtaken by other factors. But changing demographic trends undoubtedly will have large effects in the decades to come. The increase in dependency ratios will tend to boost social expenditures, notably for pensions and health care, and thus reduce national saving. Increased payments out of private pension funds will reduce private saving. At the same time, under current contribution and disbursement rules, the social security systems of many countries will move into large deficit positions, causing rapid rises in public debt.

It is essential for governments to take timely action in order to preempt these adverse trends. Without such action, there is the prospect of social conflicts: the elderly are unlikely to accept a sudden and substantial reduction in entitlements and the working population is unlikely to accept higher contributions. Since corrective action may lead to considerable inter-generational transfers, steps should be taken as part of a broadly endorsed and credible program aimed at addressing the manifest threat of unsustainable pressures on public finances over the longer term.

There are no general rules for public involvement in the provision of pensions, but a case can be made for a system of basic benefits in a public scheme that allows for supplemental benefits from private or public fully funded programs. As the public pension schemes in all G-10 countries are largely or entirely financed on a pay-as-you-go basis, efforts are needed to ensure that the programs are sustainable in the future.

One way to do this is to dampen the trend towards early retirement or otherwise reduce the pressure for increased public pension and health expenditure. Another is to encourage alternative schemes. Any scheme should be designed so that demographic changes do not lead to major swings in entitlements or contributions. A shift to more fully funded pensions would help to do this and could lift current saving rates. To the extent that higher saving increases investment and capital formation, it would make it easier to resolve inter-generational distribution issues.

Pension reform can have a significant impact on the labour market. By raising indirect labour costs, a move to more fully funded public pensions through a higher payroll tax would make it more difficult to resolve unemployment problems. Pension reform should therefore be harmonized with policies designed to alleviate structural unemployment.

Financial Market Issues

The experience of the last several decades demonstrates that financial liberalization is beneficial. Financial liberalization increases economic efficiency by removing distortions, improving the allocation of savings, reducing intermediation costs, and broadening the range of instruments and financial services available to meet the needs of savers and investors.

The effect of financial liberalization on the aggregate level of savings depends upon the circumstances. Experience over the last two decades indicates that, by increasing access to consumer credit, financial liberalization may lower the personal saving rate at least temporarily. Nevertheless, the beneficial impact of liberalization on the mobilization and allocation of saving is very likely to outweigh any adverse impact on its aggregate level.

The development of new financial instruments and the integration of national financial markets have facilitated the pricing of risk and augmented the discipline markets exercise over micro-economic decisions and macro-economic policies. At the same time, by allowing individuals and institutions to engage in new and sometimes unfamiliar activities, financial liberalization may pose certain risks that authorities need to monitor. By pursuing sound and sustainable policies that maintain price stability, the authorities reduce uncertainty and foster market efficiency. In addition, they can reduce the threat of excessive market reaction by removing tax distortions and regulatory incentives that encourage the taking on of excessive debt loads or inappropriate risks.

Timely provision of comprehensive, accurate and transparent data on economic performance and policies is essential if markets are to adequately assess risks and market discipline is to be maintained. A regular flow of data can significantly reduce the risks of abrupt changes in sentiment and disruptions in capital flows. The maintenance of financial soundness also requires enhanced disclosure and adoption of risk assessment procedures by banks and other institutions active in international financing. Efforts by the IMF, the BIS, the OECD and other international and national authorities to improve the provision of information and prudential monitoring should be given the highest priority.

Increased international financial integration has two significant implications for international economic co-operation. Firstly, it means that national economic policies, including tax policies, have significant repercussions on other countries through their impact on saving, investment, and the global real interest rate. There is increasing reason for countries to co-operate closely in dealing with internal and external imbalances. Secondly, because financial markets exact sizable risk premia when the soundness of a country's economic policy strategy is in doubt, individual countries can avoid significant penalties in the form of higher interest rates by adhering to policies that are conducive to low inflation expectations, stable financial market conditions, and an adequate level of savings.

Accordingly, the pursuit of sound economic policies is in keeping with both national self interest and the interests of other countries.

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Annex
Financial Liberalization and Welfare

To address the welfare effects of financial liberalization it is useful to draw a distinction between financial market developments that affect only (or mainly) firms and those that, instead, improve households' access to credit and insurance. These two types of financial liberalization may have different implications for savings and welfare.

Easier access to mortgages and consumer credit raises the welfare of individuals, as they can achieve a more efficient consumption plan over time. Similarly, developments in insurance markets, either through increased competition or through the provision of new products allowing insurance against previously uninsurable risks, raise coverage against unforeseen events and improves resource allocation across states. From the perspective of the economy as a whole, however, this is likely to lower savings and the accumulation of capital. It then follows that the effects of financial liberalization on the welfare of consumers could be ambiguous: on the one hand, better access to consumer credit or insurance improves resource allocation at the individual level; on the other hand it lowers the amount of resources available for capital investment. Jappelli and Pagano (1995) argue against financial liberalization in the market for household credit. Their analysis shows that, unless an economy is over-capitalised (i.e., is dynamically efficient) a certain degree of financial repression is socially optimal. Furthermore, if savings affect the growth rate of the economy, welfare should increase unambiguously during a period of financial restraint. However, one should be careful in concluding that an easing of households' access to credit has a negative impact on welfare and growth. Households borrow to finance not only current consumption but also the accumulation of human capital, by investing in education and health care. Therefore, while limiting households' access to credit does raise the stock of physical assets, it could also lower the stock of human capital. Hence, growth and welfare may either increase or decrease, depending on the relative importance of physical and human capital as engines of growth and the extent to which human capital accumulation is self-financed by households or state-financed, as is the case in many countries.

For financial liberalization to have a negative effect on welfare it is necessary that lower savings be translated in a lower growth rate. As far as the effect of savings on growth is concerned, the empirical evidence is not clear cut. There is a general consensus on a positive relationship between the aggregate saving rate and the growth rate but, in principle, the direction of causality can run both ways. More direct tests reveal that economies where households have easier access to credit grow less rapidly (Jappelli and Pagano, 1994); no empirical evidence is available, however, on the link between savings, growth and insurance markets. An indirect way of addressing this question is to examine the behavior of precautionary savings. The evidence on this is mixed. Carroll and Samwick (1993) argue that the accumulation of precautionary assets to cushion unexpected drops in income represents a large part of total asset accumulation. Banks, Blundell and

Brugiavini (1994) argue that precautionary savings to face income uncertainty is a relevant factor in the U.K.. Guiso, Jappelli and Terlizzese (1992), instead, find that earnings uncertainty can at most explain 2 percent of the net worth of Italian households. Similarly, Dynan (1993) finds little evidence of a precautionary motive for U.S. households.

Let us now consider firms. Financial liberalization can benefit firms in two ways: first, by funnelling savings to firms more efficiently; second, by improving the allocation of funds to the most profitable firms. The first case refers to the efficiency of the financial intermediation sector. For a given quantity of saving, a lower proportion of resources is absorbed by the intermediation process, thereby realizing more resources for investment. The second case refers to the impact of financial liberalization on improving the risk-sharing and monitoring role of financial intermediaries. Improved risk sharing increases the liquidity of assets issued by the intermediaries and makes it possible to finance high-risk-high-return projects, increasing the average growth of the economy.

Other things being equal, such developments in financial markets increase resources and the efficiency of their allocation and are therefore likely to increase welfare. These innovations, however, can affect saving decisions and this, in turn, can limit the final effect on growth and welfare. Better prospects for diversification can reduce households' exposure to risk. While this allows a more efficient allocation of resources across states of the world, it may also lead to a reduction in precautionary saving and hence in the stock of capital in the economy. This effect tends to counteract the direct beneficial effect of financial liberalization on the allocation of capital across firms.

To sum up, while the experience with financial liberalization is perceived to be largely positive, in theory, the effects of financial liberalization on welfare are ambiguous. Improvements in the working of financial markets that benefit mainly firms are likely to raise welfare; those that concern mainly consumers can even lower welfare if the reduction in savings following the liberalization has a strong negative effect on the capital stock and growth rate of the economy.

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