Public Debt in a Medium-Term Context and Its Implications for Fiscal Policy

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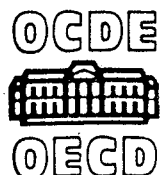## OF ECONOMICS AND STATISTICS

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No. 30: PUBLIC DEBT IN A MEDIUM-TERM CONTEXT AND ITS

IMPLICATIONS FOR FISCAL POLICY

by

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Monetary and Fiscal Policy Division

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This paper examines the problems raised by the recent sharp increases in the ratio of public debt to GNP in most OECD Member countries. When interest rates exceed growth rates, this development appears as a symptom of instability in public finances. The paper also analyses the evolution of public debt within the wider framework of the government sector's net worth. One particular aspect of this approach -- the implicit pension liabilities of governments -- is seen to have a significant bearing on the debt outlook in several countries. Finally, the paper assesses the sensitivity of the public debt profile under alternative fiscal policy settings.

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Ce document examine les problèmes posés par l'accroissement rapide de la dette publique par rapport au PNB dans la plupart des pays membres de l'OCDE au cours des dernières années. Lorsque les taux d'intérêt excèdent le taux de croissance économique, une telle situation apparaît comme un facteur d'instabilité des finances publiques. L'évolution de la dette publique est également analysée dans l'optique plus large de l'ensemble des actifs et passifs du secteur public. A cet égard, il ressort notamment que les engagements implicites des administrations au titre des retraites futures affectent de manière très importante les perspectives de la dette publique dans plusieurs pays. L'étude apprécie enfin dans quelle mesure des changements d'orientation de la politique budgétaire peuvent influer sur le profil de la dette publique.

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<div align="center">CONTENTS</div> <div align="right">Page</div>

<div align="center">LIST OF TABLES</div>

In text:

In annexes

I. INTRODUCTION

Concerns about increasing government indebtedness have been an important factor behind the conclusion, drawn by many observers (1), that the medium-term consequences of budget deficits limit the scope for using fiscal policy to support aggregate demand. These concerns are essentially twofold. First, if interest rates remain higher than growth rates, there is a risk that, in the absence of fiscal policy changes, public debt could "explode" because of the compounding effects of debt service payments (2). This would mean that, to avoid even larger budget deficits, taxes would have to rise or non-interest spending to fall, imposing considerable difficulties on governments, given the widespread desire to reduce the tax burden and the political problems of achieving further cuts in public expenditure. The second worry is that rising levels of public debt may create fears that future governments will attempt to "inflate their way out of trouble" through increased monetary expansion. Such expectations would put upward pressure on interest rates by raising the risk premiums therein, thus threatening the growth potential of the economy, particularly if the ongoing budget deficits and the consequent accrual of public debt serve to finance public consumption rather than investment. Moreover, there is a danger that exchange markets will react unfavourably for similar reasons.

The purpose of this paper is to investigate these issues further, in a medium-term context. Three sets of questions are addressed:

i) What is the appropriate concept of public debt and is there an optimal level for debt? How are such considerations affected by the other components of a public sector balance sheet, such as government capital and future pension commitments, which are not part of the financial assets or liabilities of the government?

ii) How serious is the present public debt situation? Will present policies lead to a debt "explosion", with still greater problems for budget flexibility and interest rates in the future? Does an examination of government non-financial assets and liabilities change the conclusion drawn from an analysis of debt alone?

iii) How sensitive is the debt outlook to changes in the stance of fiscal policy?

Parts II, III and IV of the paper deal successively with these questions. Tentative conclusions and issues for discussion are provided in Part V.

II. THE DIFFERENT CONCEPTS AND MEASURES OF PUBLIC DEBT

A. Definitions

Two major questions of definition, and a third somewhat less important one, arise when public debt is discussed. Should one look at gross or net debt? Is debt of the central government by itself, the general government sector or the public sector as a whole, including public corporations, the

most relevant concept? Finally, is there any reason to distinguish between foreign and domestic debt?

The measure of public debt usually discussed is gross debt (i.e. the total financial liabilities of government), reflecting the fact that the corresponding data are more readily available and thus more widely publicised, and that there is a direct link between gross debt and the level of debt service payments -- an important aspect of the concern about debt (see below). The net debt (i.e. the gross financial liabilities less the financial assets) of government, on the other hand, comes closer to reflecting the total of past budget deficits, which represent the net borrowing by government in each period. The distinction between the two concepts is best examined by considering the nature of government's financial assets -- the wedge between gross and net debt. These fall into two main categories: the assets held by the government as a financial intermediary and the social security funds built up in anticipation of future liabilities.

As a financial intermediary the government borrows funds (which increase its gross financial liabilities) in order to make loans to both individuals (e.g. mortgages) and institutions (e.g. investment loans for regional development). The financial assets thus acquired typically yield interest income to the government and should represent a legitimate offset against its gross debt. However, there are three concerns about such assets, which in some countries and to varying degrees suggest that netting them out of the gross debt figures may be inappropriate. First, if the interest paid to the government by individuals or institutions is below the market rate by more than can be justified by the government's capacity to pool risk, the interest revenues may not completely offset the debt service costs. Second, if the quality of the financial assets held by the government is open to question, the true value of the assets may be less than their recorded value. This can be the case for loans to insolvent private sector corporations or to some public enterprises. Finally, the additional government borrowing undertaken to acquire such assets may create pressures on financial markets if it corresponds to an increase in overall private sector access to credit.

The other important category of government financial assets is associated with social insurance schemes. The funds involved can represent buffers for year-to-year fluctuations of premiums and expenditures for unemployment or medical insurance schemes, for example. However, a major component of these assets in several countries relates to public pension plans, which also involve substantial future liabilities. The gross debt will usually fail to account for the social security sector at all, an important drawback given the implications of ageing populations -- see below. Net debt figures are also misleading, however, since they take account of only the assets side of the social security balance sheet. In some countries, notably Japan, such figures are in fact discounted by the authorities because they expect demographic changes to reduce the social security assets markedly in the near future. To sum up, the tighter links between net debt and fiscal policy, as measured by budget deficits, make it more appropriate to use net debt in the calculation of prospective debt scenarios. However, the problems associated with the quality of financial assets, the existence of implicit liabilities and the attention paid to gross debt interest payments make it important to consider gross debt as well.

The second major question of definition of public debt concerns the level of government considered. In some countries much of the attention is focussed on central government debt, while in others the debate has centred on the liabilities of the general government or the public sector as a whole (including publicly-owned enterprises). The narrowest concept could be justified because of the greater availability of data, and because central government debt is more subject to "monetisation", as central banks do not generally buy or discount local government debt. However, there are difficulties in comparing central government debt data across countries, for instance in those with and without federal systems. Alternatively, the widest concept (the public sector) could be justified from a balance sheet framework, since the government usually owns shares in public corporations, which are not counted as financial assets, and because estimates of the public sector deficit are less affected by changes in the definition or extent of "off-budget" transactions. For instance, sales of such shares affect central or general government gross and net debt, but not the public sector's overall position. In addition, public enterprises have often been used as instruments of government policy, particularly with respect to employment and to price setting. If the losses that result are met by government-guaranteed borrowing rather than operating subsidies, they will not show up, as they should do, in measures of general government deficits or indebtedness. However, measuring the public sector debt raises significant data and definition problems across countries and, in general, the activity of public sector enterprises is more like that of private firms than of government entities. On balance, therefore, the use of the intermediate (general government) concept, ensuring reasonable comparability across countries and consistency with the National Accounts, seems the most appropriate. Moreover, for most countries, the behaviour of central and general government gross debt in recent years has been quite similar.

A final distinction between types of debt is relevant to policy debates in some countries, such as Sweden, Denmark, Ireland, New Zealand: how much of the public debt is held by foreigners and how much is denominated in foreign currencies? Foreign loans can allow countries the additional resources to invest more than they save with lower interest rates than otherwise. On the other hand, interest paid on foreign-owned debt is not an internal transfer (it enters the current account of the balance of payments and thus lowers national income) and hence the ability to service the debt is of even greater importance than usual. Moreover, external financing can at times affect the competitiveness of the economy, notably if the capital inflows lead to an appreciation of the exchange rate. For a given total foreign debt, however, whether it is the government or the private sector that borrows abroad is (economically) largely irrelevant. Foreign currency debt can also pose a problem for governments if the domestic currency depreciates relative to those in which the debt has been contracted. While in the long run exchange rate movements would tend to be offset by interest-rate differentials, in the short run the exchange risk can be fairly important. Recent fluctuations in the U.S. dollar value of many national currencies have produced significant changes in the debt/GNP ratio unrelated to budget deficits for countries with large external debts, although such adjustments are not always reflected in published data. However, the analysis below does not distinguish between foreign and domestic liabilities of the government sector.

B.   Recent trends in debt/GNP ratios from a historical perspective

        Actual and projected figures for the gross and net debt/GNP ratios, on
a book value basis (3), are presented in Tables 1 and 2 for the period
1972-1986. The gross data show rapid increases in the ratios for most major
countries in the years after 1981, particularly in Italy and Canada. The
United Kingdom's relatively stable ratio is an exception but its level is
comparatively high. Italy, Japan and Canada among the major countries and
Belgium, Ireland, the Netherlands, Sweden and Denmark among the smaller
economies have the highest gross debt ratios. All are expected to be above
65 per cent at the end of 1985. The lowest ratios are in France, Australia,
Finland and Norway. However it is noticeable that, for many countries, the
1970s were not characterized by rapid increases. The debt ratio often did not
rise above the 1972 level until 1978 or later.

        Changes in the extent of government financial intermediation have not
been so large as to lead the behaviour of gross debt to differ qualitatively
from that implied by budget deficits for general government net indebtedness.
The net debt ratios have thus evolved in a fairly similar manner to gross debt
ratios. However, their levels are substantially lower, particularly in Japan,
Canada, the United States and the Nordic countries. Indeed, in the early
years of the period several countries had negative net debt -- financial
assets exceeding financial liabilities. Except for a few countries (Japan,
Germany, Australia, Denmark) the level of both gross and net debt ratios is
expected to rise again, often significantly, in 1986. In the case of Japan,
debt ratios seem to have stabilized, reflecting in part the 1986 increase in
contribution rates for the pension system, which expanded the surplus of the
social security sector. Without such an increase, the debt ratios would have
probably risen further. Moreover it should be noted that the social security
surplus has been traditionally invested in the public sector through the
Fiscal Investment and Loan Programs (FILP).

        Since debt ratios normally change only slowly over time it is necessary
to consider their evolution in a longer perspective to assess the importance
of recent growth in government indebtedness. To this end historical data on
debt/GNP ratios have been developed for 15 countries (see Chart A in Annex I)
in order to provide the longest possible series. Although not fully
comparable across countries these data are roughly consistent over time for
each country; in most cases they correspond to central government gross
debt (4). It is, of course, important to stress that, over periods as long as
shown in the chart, the nature of government has changed significantly. A
much larger share of output is now devoted to public consumption and
investment and the increase in total government spending (including transfers)
has been even greater. The growth in the size of government has, however, by
and large been accompanied by increased revenues without any clear trend in
levels of debt over the same long time periods.

        What do these data show? One general fact that holds for nearly all
countries is that current levels of debt/GNP ratios are still well within the
range of historical experience. However, it is important to note the
direction in which the ratios are moving. In interpreting such movements one
can distinguish between changes in the stock of debt (which reflect budget
imbalances and, occasionally, debt repudiation) and nominal GNP growth (both
real output growth and inflation). The relative importance of these for

TABLE 1

GROSS PUBLIC DEBT AS A PERCENTAGE OF NOMINAL GNP/GDP

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984 (a)	1985 (b)	1986 (b)
UNITED STATES	44.1	40.9	40.1	43.3	43.3	41.8	39.9	37.8	38.0	37.1	40.9	43.5	44.4	46.6	48.4
JAPAN	17.5	17.0	17.9	22.4	28.0	33.4	41.9	47.0	52.0	57.1	61.1	66.9	67.4	67.2	66.8
GERMANY	18.8	18.6	19.6	25.0	27.0	28.5	29.9	30.7	32.5	36.3	39.4	41.0	41.8	41.9	41.5
FRANCE	26.4	25.1	24.7	25.8	24.7	25.2	26.3	26.2	25.0	25.9	28.3	29.8	31.8	33.4	34.9
UNITED KINGDOM	75.3	69.7	69.6	65.3	64.1	62.5	59.6	55.7	55.0	55.0	53.6	54.1	55.6	54.4	54.6
ITALY	60.1	60.6	57.7	66.8	65.4	65.2	71.2	70.4	67.2	70.3	76.6	84.3	91.1	95.9	99.2
CANADA	52.6	46.7	44.4	44.7	42.3	44.2	49.7	46.9	47.9	47.7	53.5	58.7	63.4	67.3	70.3
TOTAL MAJOR SEVEN	39.3	36.9	36.5	39.6	40.3	40.6	41.7	41.2	42.0	43.0	46.5	49.6	51.1	52.6	53.8
TOTAL MAJOR SEVEN LESS USA)	34.9	35.3	33.2	36.1	37.6	39.6	43.3	44.2	45.6	48.4	51.6	55.2	57.2	58.1	58.7
AUSTRALIA	35.0	31.8	29.2	28.5	27.9	29.1	30.3	29.2	26.2	23.4	22.8	24.5	25.6	26.0	25.6
AUSTRIA	17.5	17.5	17.6	23.9	27.4	30.1	33.9	36.0	37.2	39.2	41.3	45.7	45.1	44.6	44.2
BELGIUM	71.4	69.5	64.8	65.8	64.8	68.5	71.9	77.1	82.8	97.2	106.2	116.7	120.7	124.6	128.0
DENMARK	10.0	7.9	7.4	11.9	14.6	13.1	21.9	27.2	33.5	43.7	53.0	62.6	67.5	66.9	61.6
FINLAND	12.4	10.2	8.1	8.6	9.0	10.4	13.5	14.0	13.9	14.7	17.1	18.8	18.5	18.0	18.3
GREECE	23.2	19.4	20.3	22.4	22.1	22.4	29.4	27.6	27.7	32.8	36.4	41.4	47.5	52.8	55.0
IRELAND	60.8	57.2	65.1	72.3	78.8	76.4	80.0	84.9	87.7	94.1	103.9	109.7	112.9	120.1	122.2
NETHERLANDS	46.6	43.4	41.5	41.3	40.2	39.7	40.9	42.7	45.9	50.3	55.6	62.3	67.0	70.2	75.9
NORWAY	50.3	48.3	45.9	48.2	50.3	57.0	64.0	66.3	55.9	50.4	45.8	42.5	36.6	31.3	33.3
PORTUGAL		13.6	13.6	21.4	26.6	28.7	29.4	33.1	29.2	37.0	35.5	36.0	37.5		
SPAIN	14.9	13.2	12.6	12.9	12.6	13.7	13.9	15.7	17.7	21.3	26.5	32.0	38.4	42.2	44.5
SWEDEN	30.7	30.0	30.4	29.5	27.5	29.9	34.5	39.6	44.8	52.9	62.6	66.1	67.8	69.0	69.3
SWITZERLAND	37.1	36.4	37.5	42.2	46.3	45.9	45.1	44.1	42.6	39.9	38.8	38.3	39.5		
TOTAL SMALL COUNTRIES (c)	32.6	30.3	29.9	29.0	29.9	31.7	34.3	36.3	37.6	41.4	45.7	50.4	53.2	54.9	56.4
TOTAL OF ABOVE COUNTRIES (c)	38.4	36.0	35.5	38.3	39.0	39.5	40.8	40.6	41.5	42.8	46.4	49.7	51.4	52.9	54.1
OECD LESS USA (c)	34.4	32.6	32.2	34.8	35.9	37.8	41.4	42.5	43.9	46.8	50.3	54.2	56.4	57.4	58.2

(a) PARTLY ESTIMATED
(b) FORECASTS
(c) EXCLUDING PORTUGAL AND SWITZERLAND

TABLE 2

NET PUBLIC DEBT AS A PERCENTAGE OF NOMINAL GNP/GDP

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984 (a)	1985 (b)	1986 (b)
UNITED STATES	25.7	22.9	22.2	24.8	24.7	23.8	21.6	19.8	19.6	19.1	22.1	24.6	26.0	28.1	30.0
JAPAN	-6.5	-6.1	-5.4	-2.1	1.9	5.4	11.2	14.8	17.2	20.6	23.1	25.8	26.4	26.2	25.8
GERMANY	-5.8	-6.7	-4.7	1.0	4.6	7.0	9.4	11.5	14.3	17.4	19.8	21.8	23.0	23.1	22.6
FRANCE	9.1	8.3	8.8	11.1	10.9	10.2	10.2	9.8	9.1	9.9	11.3	13.3	15.1	16.6	18.2
UNITED KINGDOM	64.8	57.5	54.9	57.6	57.0	55.9	53.5	48.7	48.2	47.3	46.5	47.4	49.0	47.8	48.0
ITALY	50.0	52.1	49.2	59.9	60.9	60.7	64.5	65.5	60.0	66.1	70.8	84.1	91.0	95.7	99.0
CANADA	4.3	2.7	1.0	4.3	5.2	7.1	11.6	12.3	13.3	11.6	18.8	23.9	30.0	33.9	37.0
TOTAL MAJOR SEVEN	19.1	17.2	16.8	20.3	21.3	21.6	22.0	21.6	21.9	22.8	25.5	28.5	30.3	31.8	33.0
TOTAL MAJOR SEVEN (LESS USA)	13.2	12.0	11.9	16.2	18.2	19.6	22.3	23.3	23.9	26.1	28.5	32.0	34.2	35.1	35.7
AUSTRALIA	35.9	31.8	29.2	28.5	27.8	29.1	30.3	29.2	26.2	23.4	22.8	24.5	25.6	26.0	25.6
AUSTRIA	17.5	17.5	17.6	23.9	27.4	30.1	33.9	36.0	37.2	39.2	41.3	45.7	45.1	44.6	44.2
BELGIUM	59.8	56.7	53.7	54.1	54.2	58.0	60.9	65.5	69.7	82.1	90.4	101.4	105.3	109.3	112.6
DENMARK	-9.1	-12.3	-13.6	-10.1	-7.7	-5.0	-2.2	1.9	7.2	16.6	26.3	34.1	37.5	36.2	30.9
FINLAND	-8.1	-10.7	-10.6	-9.5	-10.5	-10.0	-8.3	-6.8	-6.1	-4.7	-1.9	-0.2	-0.5	-1.0	-0.7
GREECE	23.2	19.4	20.3	22.4	22.1	22.4	29.4	27.6	27.7	32.8	36.4	41.4	47.5	52.8	55.0
IRELAND	32.7	31.9	36.9	45.2	51.6	50.3	56.0	63.1	68.4	73.4	81.8	87.6	90.9	98.1	100.1
NETHERLANDS	24.6	21.0	19.1	19.8	20.4	19.3	20.1	21.8	25.0	27.4	31.3	36.8	41.4	44.7	50.3
NORWAY	0.6	-1.4	-1.8	0.7	3.5	9.5	14.0	16.9	6.9	3.2	1.2	-2.2	-8.1	-13.4	-11.4
PORTUGAL		13.4	15.5	21.3	26.5	28.9	28.6	32.4	28.8	37.0	35.4	36.0	37.4		
SPAIN	2.1	1.7	1.3	1.3	0.7	2.0	3.0	5.0	7.1	10.3	13.8	18.2	22.6	26.4	28.7
SWEDEN	-29.6	-31.1	-30.1	-28.8	-29.7	-28.9	-25.3	-19.8	-13.6	-5.3	4.5	10.6	12.7	13.9	14.2
SWITZERLAND	15.2	15.9	16.7	19.8	20.9	21.2	20.2	20.7	19.2	18.1	17.3	17.4	16.7		
TOTAL SMALL COUNTRIES (c)	14.1	11.7	10.8	12.0	12.4	13.8	16.1	18.2	19.6	22.9	26.8	31.3	33.7	35.4	36.8
TOTAL OF ABOVE COUNTRIES (c)	18.5	16.5	16.0	19.2	20.2	20.6	21.2	21.2	21.6	22.8	25.7	28.9	30.7	32.2	33.5
OECD LESS USA (c)	13.4	12.0	11.7	15.3	16.9	18.3	21.0	22.2	23.0	25.4	28.1	31.9	34.1	35.1	35.9

(a) PARTLY ESTIMATED
(b) FORECASTS
(c) EXCLUDING PORTUGAL AND SWITZERLAND
SOURCE:OECD

movements in debt ratios has varied over time. By far the most significant factor behind rises in the debt/GNP ratios has been increases in debt because of the need to finance wars. A secondary factor has been the tendency for large budget deficits during economic slowdowns. Recessions have at times led to falling prices and to lower real growth, increasing the real burden of a given nominal value of the debt. The increase in the debt ratios (primarily because of budget deficits) in the period of recession and slow growth since the late 1970s has been significant, in some cases as important as in the Depression of the 1930s, notwithstanding declining nominal output at that time.

Declines in the size of the debt relative to GNP have usually occurred as a result of rising nominal GNP. Strong real growth was a factor in most countries from the end of the war to the early 1970s. It was particularly important in Japan. Real growth also played a role in the long decline of the United Kingdom debt ratio during the nineteenth century. However, the most marked declines in debt/GNP ratios are due to strong inflation. Among the major countries, France and Germany in several periods and post-war Japan have been particularly notable examples in this respect. The effect of inflation has been less marked in the United States and the United Kingdom, but domestic prices have nevertheless increased 12 fold and 30 fold respectively since the beginning of the century -- compared with approximate stability over the nineteenth century. Reductions in the stock of debt as a result of budget surpluses have been comparatively rare, although the United States reduced its outstanding debt by about two-thirds during the thirty years after the Civil War and the United Kingdom repaid some of the debt built up during the Napoleonic Wars over the following century and ran surpluses again in the 1920s. The stock of debt has also been reduced on occasion by repudiation, as was the case in Germany at the end of the war. Repudiation is, however, almost always associated with significant changes of political regime.

C.   Debt analysis in a government balance sheet framework

The preceding discussion suggests that it may be difficult to establish guidelines for optimal levels of government debt that apply across countries and over time. In historical terms high and low debt ratios have each been associated with periods of both prosperity and recession. Movements in the debt/GNP ratio are likely to be negatively correlated with growth in economic activity. However, this primarily reflects the fact that a growing economy reduces the relative importance of public debt, rather than that a falling debt ratio increases output. It would appear desirable a priori for the debt/GNP ratio to decline during periods of economic expansion, since this would leave governments in a better financial position to cope with sudden economic shocks. However, the expression "financial position" should not be interpreted too narrowly. The debt data that have been discussed so far correspond to financial concepts, based on financial liabilities and (for net figures) financial assets of the government sector. Reference has already been made to loans and loan guarantees by the government for public sector enterprises, to government asset sales and to the implicit liabilities of public pension plans. All of these (as well as the government capital stock) have implications for what could be called the public sector's net worth that are different from their consequences for either gross or net debt as usually measured.

- 11 -

The use of such a "net worth" concept has been suggested as a better framework for assessing the medium-term consequences of fiscal policy (5). Since asset accumulation or decumulation would be clearly observable if government accounts were presented in a balance sheet format, this would be a natural vehicle for examining the implications of government capital formation, asset sales, resource depletion and social security. For example, as already noted, when the government sells non-financial assets, such as public corporations, the proceeds reduce its net financial debt but there is no equivalent improvement in its net worth (6). In some circumstances this may increase budgetary flexibility, but such an assessment requires knowledge of the government's overall balance sheet and not just its purely financial component.

There are two ways in which the government's net worth concept can be defined. The broader definition would include not only financial and non-financial assets and liabilities, but also the net present value of future tax receipts less transfers and the net present cost of future consumption expenditures (7), as well as the net present value of future seignorage. This definition of net worth is not particularly satisfactory from an operational viewpoint and raises severe measurement problems. It leads to a discussion of whether a government can be insolvent (i.e. have negative net worth), but this simply implies that the present values of taxes and expenditure must adjust, and therefore that policies cannot remain the same, without giving any information about when the change should take place.

A second and more straightforward definition is to take net worth as the net financial and non-financial assets of the general government sector. This would consider the assets that are ignored in the above calculation of net debt (government fixed capital, publicly-owned business enterprises, publicly-owned natural resources), as well as explicit and implicit commitments that are not generally included in the financial liabilities of the state. Two important examples of such commitments are public sector pensions and contingent liabilities. Pensions are particularly significant both because the magnitudes are very large and because they may be a substitute for private savings and hence lead to a shortage of loanable funds, which could "crowd-out" private investment. Contingent liabilities take the form of government guarantees of loans to corporations or individuals, who are seen as poor risks -- at least at prevailing interest rates. Such loans in normal circumstances present a relatively constant probability of default and so they are not likely to change assessments of net worth over the next few years (8). Governments may also make promises to compensate victims of natural catastrophies, wars, resettlements, etc. that may only affect the balance sheet as claims are made and satisfied over a period of many years.

The foregoing discussion gives some idea of the variety of government assets and liabilities to be taken into account in the calculation of net worth. In practice, it is of course difficult to evaluate the non-financial components of the government balance sheet. In the context of this paper it has not been possible to develop systematic cross-country comparisons of current levels of overall government net worth. In fact, this is not fundamental since in focussing on net worth the intention is not to show that the public sector may be a creditor rather than a debtor. The important aspect of the balance sheet approach as used here is rather to compare trends in net worth with those in debt. To this end, in the next section the discussion of possible public debt projections is supplemented by an analysis

of the trends in some of the major non-financial balance sheet items. A more detailed description of the problems and possible implications of the net worth approach is provided in Annex II.

III. CONCERNS RAISED BY THE EVOLUTION OF PUBLIC DEBT

A. The risk of "debt explosion"

Since the late 1970s interest rates have been particularly high in most Member countries, generally exceeding economic growth rates. Given the large budget deficits, this has led to a rapid increase in government debt service payments and raised concern that the compounding effects of such a situation would imply continuously growing deficits and an "explosion" of debt as a proportion of GNP. This issue is analysed in detail in Annex III (9), which concludes that the requirement for stability of the debt/GNP ratio is that the budget balance net of debt interest payments must be in sufficient surplus. Table 3 shows, for most OECD countries, the evolution of such balances in recent years and as forecast for 1986 (10). The last column represents the "sufficient" or required surplus under the admittedly arbitrary assumption that the interest rate continues to exceed the growth rate by two per cent. This provides a rough indication of the extent of fiscal adjustment required to stabilize the existing debt ratio. It can be seen that, although only some countries are now in a "stable" position by this criterion, most governments have nevertheless been moving quickly to improve their net-of-interest budget balances. France, Italy, Greece and Spain still have large net of interest deficits, which have not yet been reduced significantly. On the basis of 1986 projections, the United States, Canada, Belgium, Ireland and the Netherlands also require further improvement to stabilize their debt positions.

If the non-interest budget balance of the OECD countries not yet in a "stable" position does not improve and if interest rates retain their present relationship with growth rates (11), then government debt will tend to grow. Charts B (in Annex I) show the projected evolution of net debt/GNP ratios for the countries included in Table 3, under the following alternative scenarios:

i) the non-interest budget balance remains at the forecast 1986 ratio to GNP (12) while the economy grows at its trend rate (13); and

ii) the economy returns to its mid-cycle position over the three years 1987-39. As a result, the non-interest budget balance is affected by the automatic stabilizers during that period, after which it remains constant at its new ratio to GNP while output grows in line with its trend.

The assumptions underlying these scenarios (including estimates of the output gap and the real growth required to close it) are described in detail in Annex III. It should be noted that the projected debt figures may be too optimistic if the trend level of output is overestimated. However, for some countries the selected measure of trend output may in fact underestimate future growth because of excessive weight being placed on recent unfavourable experience (14). Moreover, maintaining interest rates above growth rates may seem unreasonably pessimistic, but, as noted earlier, much of the concern

TABLE 3

ACTUAL BUDGET BALANCES NET OF DEBT INTEREST PAYMENTS
(AS A PERCENTAGE OF NOMINAL GNP/GDP)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985 (a)	1986 (a)	Threshold
UNITED STATES	0.7	1.7	0.8	-2.9	-0.9	0.2	1.1	1.6	0	0.7	-1.7	-1.9	-0.6	-1.1	-0.9	0.6
JAPAN	-0.4	0.2	0.1	-2.3	-3.5	-3.5	-4.9	-3.9	-3.3	-2.6	-2.2	-2.0	-0.4	0.4	1.1	0.5
GERMANY	-0.8	0.8	-1.6	-5.6	-3.2	-2.0	-1.9	-1.9	-2.0	-2.6	-1.9	-0.9	-0.3	0.6	0.8	0.5
FRANCE	1.1	1.2	1.0	-1.7	0.1	-0.3	-1.3	-0.1	0.8	-1.0	-1.9	-1.9	-1.6	-1.1	-1.0	0.4
UNITED KINGDOM	1.2	-0.3	-0.4	-1.2	-1.1	0.6	-0.4	0.5	0.6	1.5	2.0	0.4	0.4	1.3	1.1	1.0
ITALY	-7.4	-6.4	-5.7	-8.1	-4.8	-3.4	-4.4	-4.1	-2.5	-5.1	-4.8	-2.7	-3.4	-4.7	-3.6	2.0
CANADA	0.4	1.2	2.0	-2.1	-1.2	-1.7	-2.0	-0.4	-1.2	0	-2.4	-3.3	-2.6	-1.8	-0.4	0.7
TOTAL MAJOR SEVEN	0	0.7	0.1	-3.2	-1.7	-0.9	-0.9	-0.3	-0.8	-0.6	-1.7	-1.8	-0.8	-0.7	-0.4	0.7
TOTAL MAJOR SEVEN (LESS USA)	-0.7	-0.2	-0.6	-3.4	-2.5	-1.9	-2.8	-2.0	-1.6	-1.3	-1.3	-1.6	-0.9	-0.4	0.1	0.7
AUSTRALIA	4.6	2.0	4.6	1.5	-0.8	1.9	0.7	-0.1	0.8	1.7	2.1	-1.2	-0.6	0.5	1.5	0.5
AUSTRIA	3.0	2.3	2.3	-1.2	-2.1	-0.5	-0.5	-0.1	0.8	1.0	-0.1	-0.8	0.9	1.2	1.6	0.9
BELGIUM	-1.3	-0.8	0.3	-1.8	-2.3	-2.0	-2.2	-2.1	-3.3	-7.5	-4.6	-4.2	-1.6	-0.6	0.4	2.3
DENMARK	2.7	3.3	0.9	-2.4	-1.0	-1.1	-0.6	-1.5	-2.4	-4.9	-6.1	-2.9	1.0	3.9	7.4	0.6
FINLAND	3.3	4.9	3.7	1.9	4.1	2.4	0.9	0	0.1	1.0	-0.5	-1.5	0.3	0.4	-0.3	0
GREECE	0.6	-0.4	-0.9	-2.1	-1.0	-1.7	-1.3	-0.2	-0.3	-8.7	-4.7	-6.0	-6.0	-8.1	-4.2	1.1
IRELAND	-1.4	-1.9	-4.9	-8.5	-4.2	-3.3	-4.8	-6.0	-6.5	-6.8	-6.8	-4.6	-2.2	-2.4	-1.7	2.0
NETHERLANDS	1.2	2.2	1.3	-1.2	-1.0	-0.3	-1.2	-2.1	-2.0	-3.1	-4.1	-3.1	-2.5	-0.9	-2.5	1.0
NORWAY	4.6	5.7	4.6	3.9	3.3	2.1	1.4	4.3	6.2	5.0	4.5	3.6	5.3	3.6	-4.2	-0.2
SPAIN	0.3	1.2	0.2	0.1	-0.3	-0.5	-1.6	-1.4	-1.8	-2.6	-5.3	-4.6	-3.7	-3.9	-3.0	0.6
SWEDEN	2.5	2.1	-0.1	0.6	2.2	-0.8	-2.4	-4.5	-5.0	-5.4	-5.8	-3.8	-0.9	-0.6	0.4	0.3
TOTAL SMALL COUNTRIES	2.0	2.0	1.6	-0.1	-0.2	-0.1	-0.9	-1.2	-1.2	-2.2	-2.7	-2.7	-1.2	-0.8	-0.5	0.7
TOTAL OF ABOVE COUNTRIES	0.3	0.9	0.3	-2.3	-1.5	-0.8	-0.9	-0.4	-0.9	-0.8	-1.8	-1.9	-0.9	-0.7	-0.4	0.7
OECD LESS USA	-0.1	0.2	-0.1	-2.7	-2.0	-1.5	-2.4	-1.8	-1.5	-1.9	-2.0	-1.9	-1.0	-0.5	-0.1	0.7

(a) FORECASTS

- 14 -

about public debt is linked to the present level of real interest rates. The third curve in each panel of Charts B shows, nevertheless, how the debt/GNP ratio would evolve if interest rates declined over the four years after 1986 to equal the growth rate from 1990. No specific assumption is made about monetary policy stance but real interest rates are held constant over the period. Under this hypothesis, any changes in inflation would be fully reflected in nominal interest rates and the outlook for the debt/GNP ratio would not therefore be affected, except for delays in rolling over old debt (which will tend to raise the ratio if inflation falls and lower it if inflation increases). The assumption that non-interest expenditures and revenues stay constant as a share of output (except for the effect of automatic stabilizers) would imply that fiscal drag (due to either inflation or real growth) was offset by the authorities. This hypothesis is consistent with the view that present levels of taxation are already too high; to reduce both deficits and the growth of the debt over the medium term by allowing fiscal drag to operate would not therefore represent a neutral policy.

The projections shown in Chart B suggest that the budgetary situations vary widely among the different countries considered. In thirteen of these, including the United States, France, Italy and Canada, the present situation can be characterized as "unstable" in the sense that their public debt would continue to rise if the non-interest budget balance does not improve. Italy, Belgium, Ireland and the Netherlands would have debt/GNP ratios of 160 per cent or more by the end of the century while in Canada it would be close to 95 per cent. Only in Japan, Austria and Denmark would the debt ratio fall to any extent. Under the alternative scenario, with economic activity returning to a mid-cycle level, automatic stabilizers improve or worsen the non-interest budget balance according to whether the economy is expected to be below or above its mid-cycle position in 1986. For several of the countries whose activity is currently below trend, the additional growth significantly improves the debt outlook. Germany, France, the United Kingdom, Greece and Sweden would see their debt reduced as a proportion of GNP, while in Belgium and Ireland the debt ratios would become approximately stable. On the other hand, in the other countries the debt ratio would continue to increase, albeit at a reduced rate, even if their growth rate returned to its mid cycle trend level. In those countries where economic activity currently appears to be above estimated mid-cycle positions, debt/GNP ratios would be less favourable under this scenario. In particular, in Australia and Norway, they would increase rapidly in the absence of policy changes to cope with the deterioration of the non-interest budget balance. However, the relatively low initial debt levels in these countries relative to GNP should presumably make these policy adjustments easier.

On the whole, under either scenario, and even with a fall in interest rates, high debt levels will continue to rise rapidly in a number of countries. The need to improve the public finances therefore remains of primary importance. This is especially true for the United States, Italy, Canada, and the Netherlands, where debt ratios will rise quickly without changes in the non-interest balances, even under the more favourable assumptions about economic growth. For the other countries whose budgets are such that debt ratios are likely to fall (particularly Japan, Germany, Austria, Denmark and, with favourable growth, the United Kingdom), Chart B suggests that there may be a choice as to the speed with which the relative size of the debt is reduced. Relatively small additional efforts to improve non-interest budget balances could put countries projected to have relatively

stable debt ratios in a similar position, if the return to mid-cycle activity levels materialises.

B.   The consequences of high and growing levels of debt

        Although, as indicated in Part II, the present level of public debt is not historically unprecedented in most countries, it is unusual to register long periods of rising government indebtedness during phases of economic recovery.   What are the likely economic consequences of large amounts of public debt?   This section examines briefly the possible effects of stocks of debt, as distinct from those of government deficit flows (the source of rising public sector financial liabilities).   The implications of sustained public sector deficits have been much discussed (15).   Indeed, concerns about the effects of large deficits on interest rates, particularly during periods of expanding private demand, have been an important motivation for the policies of fiscal consolidation pursued in most Member countries since 1979.   The question addressed here is to what extent does the level of debt -- and/or the expectation of further increases in it -- create problems over and above those related to high deficits (i.e. to what extent is there an incremental "stock effect" of debt in addition to the crowding out arising from deficit flows).   The two most important difficulties associated with high stocks of debt appear to be the budget inflexibility, resulting from the increased burden of debt service, and the risk of upward pressure on interest rates, leading to lower private investment, a smaller capital stock and reduced growth potential for the economy.

        The higher the level of debt, the bigger will be the burden of interest payments (at present interest rates) and hence the greater the squeeze on other components of expenditure for a given degree of fiscal restraint.   In many countries, budget deficits and public debt have continued to increase as a result of the recession and rising interest payments, notwithstanding rigorous fiscal consolidation.   For instance, an examination of structural budget balances, net of interest payments (see Table 4), shows that the combination of tax increases and discretionary expenditure cuts has been very important in recent years, particularly in Japan, Germany, Belgium, Denmark, Ireland and Sweden.   These measures have often been unpopular;   further budget restraint, if needed, will be increasingly hard to achieve.   Problems of debt service payments may well be compounded in several countries if the relative importance of present sources of inexpensive government finance (such as post office savings and "captive" investment funds) diminishes as a result of increased financial market deregulation and the resulting competition for funds.   Moreover, the rising share of debt service payments in total government expenditure (see Table 5) tends to make fiscal policy less flexible.   In particular, this makes it harder to achieve a lower level of taxation and, consequently, to reduce the distortions of the tax system, which are increasingly recognised as a source of significant welfare losses (16) and a potential source of short-term structural rigidities.   This is indeed one of the motivations behind the desire expressed in recent years by many governments to contain the growth of public debt over the medium term.

        Concern about the effect of government debt accumulation on interest rates is particularly relevant in present circumstances because of the high level of real credit costs that have prevailed in recent years in most OECD countries.   The potential "crowding out" arising from a combination of large

TABLE 4

STRUCTURAL BUDGET BALANCES NET OF DEBT INTEREST PAYMENTS
(AS A PERCENTAGE OF NOMINAL POTENTIAL GNP/GDP)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985 (a)	1986 (a)
UNITED STATES	1.0	0.9	1.8	0.3	1.5	1.7	1.8	2.2	1.6	2.6	2.2	1.7	1.7	1.5	1.5
JAPAN	-0.1	0.1	0.7	-1.8	-2.5	-2.5	-4.0	-3.1	-2.5	-1.8	-1.5	-0.8	0.6	1.3	2.1
GERMANY	-0.7	0.7	-0.8	-3.5	-2.3	-1.3	-1.5	-1.9	-1.6	-1.2	0.5	1.8	1.9	2.5	2.3
FRANCE	1.1	1.0	1.4	0.5	1.2	0.7	-0.8	0.2	1.8	0.8	0.4	0.6	1.5	2.4	2.1
UNITED KINGDOM	1.6	-1.1	-0.2	0.6	1.1	2.4	0.7	1.0	3.3	6.6	7.4	5.2	4.7	4.6	3.8
ITALY	-6.6	-6.2	-5.7	-6.7	-4.3	-2.8	-3.9	-4.2	-2.9	-5.3	-4.3	-1.7	-2.4	-3.8	-3.0
CANADA	0.2	0.4	1.3	-2.0	-1.7	-1.5	-1.8	-0.2	-0.4	0.5	0.9	-0.4	-0.4	-0.5	0.3
TOTAL MAJOR SEVEN	0.3	0.2	0.7	-0.9	-0.1	0.3	-0.2	0.2	0.4	1.1	1.3	1.2	1.4	1.5	1.6
TOTAL MAJOR SEVEN (LESS USA)	-0.4	-0.4	-0.2	-1.9	-1.5	-1.0	-2.1	-1.6	-0.7	-0.2	0.4	0.7	1.2	1.5	1.7
AUSTRALIA	4.2	0.8	4.1	1.4	-0.9	3.0	1.9	0.8	1.8	2.2	3.2	0.4	-1.0	-1.0	-0.5
AUSTRIA	2.6	2.3	2.8	-0.2	-1.5	-0.6	0.4	-0.2	0.4	1.4	0.9	-0.1	1.3	1.2	1.4
BELGIUM	-1.9	-2.6	-1.8	-1.4	-2.8	-0.8	-0.7	-0.3	-2.8	-4.8	-1.9	-0.4	2.3	3.6	4.3
DENMARK	1.9	2.0	1.9	0.7	-0.5	-0.1	1.2	-0.6	0.2	0	-2.2	0.8	3.4	5.4	8.5
FINLAND	4.3	4.8	3.7	2.5	5.7	5.2	3.6	0.6	-0.6	0.7	-0.9	-2.0	-0.3	-0.2	-0.3
GREECE	1.2	-0.4	1.2	-0.1	0.6	0.3	0.3	1.3	1.4	-5.9	-1.2	-2.0	-2.1	-4.0	0.5
IRELAND	0.3	-0.4	-3.3	-6.8	-1.5	-2.4	-5.3	-6.0	-6.3	-6.1	-3.4	1.2	3.4	4.6	4.6
NETHERLANDS	1.5	1.6	0.6	0.7	0	1.3	1.2	0.3	0.6	0.5	0.9	1.9	1.9	2.8	0.9
NORWAY	4.8	6.3	5.2	4.8	3.5	3.0	2.5	4.3	5.7	5.1	5.5	3.4	3.4	0.4	-8.8
SPAIN	0.1	0.5	-0.5	0	-0.2	-0.7	-1.6	-0.8	-0.9	-1.1	-3.1	-2.3	-1.3	-1.4	-0.8
SWEDEN	3.2	1.9	-0.9	-0.4	1.9	1.4	0.1	-3.1	-3.4	-2.4	-2.1	-0.4	1.5	1.5	2.5
TOTAL SMALL COUNTRIES	2.0	1.3	1.2	0.5	0.1	1.0	0.5	-0.2	-0.1	-0.4	-0.2	-0.1	0.7	0.8	0.7
TOTAL OF ABOVE COUNTRIES	0.5	0.3	0.8	-0.7	0	0.4	-0.1	0.2	0.4	0.7	1.1	1.0	1.3	1.4	1.5
OECD LESS USA	0.1	0	0.1	-1.4	-1.1	-0.6	-1.5	-1.3	-0.5	-0.3	0.3	0.6	1.1	1.3	1.5

(a) FORECASTS
SOURCE OECD

TABLE 5

GROSS INTEREST PAID ON PUBLIC DEBT AS A PERCENTAGE OF TOTAL GOVERNMENT EXPENDITURE

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985 (a)	1986 (a)
UNITED STATES (b)	3.3	3.6	3.4	3.3	3.8	3.8	3.8	3.7	3.9	5.0	5.1	5.5	6.6	7.0	7.1
JAPAN	3.6	4.1	4.0	4.5	5.7	6.8	7.5	8.5	9.8	10.8	11.6	12.7	13.8	14.4	14.8
GERMANY	2.5	2.7	2.8	2.8	3.3	3.6	3.6	3.7	4.0	4.7	5.7	6.3	6.3	6.5	6.5
FRANCE	2.3	2.2	2.4	2.9	2.8	3.1	3.2	3.4	3.4	4.3	4.2	5.0	5.2	5.6	5.9
UNITED KINGDOM	9.4	9.5	10.0	8.9	9.7	10.5	10.4	11.0	11.0	11.3	11.3	10.4	10.7	11.2	11.3
ITALY	5.5	6.2	7.3	9.3	10.6	11.6	12.7	12.8	13.6	14.0	15.4	15.8	16.7	16.0	16.1
CANADA	10.8	11.0	10.1	9.9	11.0	11.1	12.4	13.4	13.9	15.5	15.9	15.6	16.7	17.9	18.7
TOTAL MAJOR SEVEN	4.1	4.4	4.3	4.5	5.1	5.4	5.7	6.0	6.4	7.3	7.7	8.1	9.0	9.3	9.5
TOTAL MAJOR SEVEN(LESS USA)	4.8	5.1	5.2	5.5	6.3	7.0	7.4	8.0	8.6	9.4	10.0	10.5	11.1	11.5	11.7
AUSTRALIA	9.3	8.2	7.7	6.6	7.0	7.9	8.5	6.6	6.6	6.5	6.7	6.9	7.9	9.3	10.0
AUSTRIA	2.5	2.4	2.5	2.9	3.6	4.0	4.5	4.8	5.2	5.6	6.2	6.0	6.7	6.9	7.5
BELGIUM	8.3	8.3	8.7	7.0	8.1	8.7	9.3	10.2	11.8	13.7	16.0	16.5	17.9	19.5	20.9
DENMARK	3.1	3.0	2.7	2.5	2.8	3.3	4.4	6.6	7.0	8.8	9.8	13.1	15.9	16.6	15.7
FINLAND	2.7	2.5	2.1	1.8	1.8	2.1	2.2	2.7	2.9	3.0	3.3	3.9	4.2	4.5	4.3
GREECE	3.5	3.8	4.4	4.5	4.9	1.0	1.1	6.5	7.3	7.8	6.5	8.0	9.8	11.1	13.1
IRELAND	8.8	9.0	8.7	9.1	10.8	11.7	12.1	12.6	12.6	14.1	16.2	16.8	17.7	19.4	18.5
NETHERLANDS	7.6	7.6	7.9	7.2	7.0	6.9	7.3	6.1	6.7	7.7	8.7	9.5	10.3	11.1	11.5
NORWAY	4.4	4.6	4.7	4.6	5.2	5.8	6.4	7.5	3.6	8.1	7.9	8.0	8.3	12.0	13.9
SPAIN	2.5	2.8	2.2	1.9	1.8	1.9	1.9	2.1	2.5	2.3	2.6	3.8	5.8	8.8	9.0
SWEDEN	4.1	4.1	4.2	4.4	4.0	4.3	4.5	5.2	6.9	8.5	10.7	11.2	12.3	13.1	12.7
TOTAL SMALL COUNTRIES	5.4	5.2	5.1	4.7	4.9	5.1	5.5	5.6	6.3	6.9	7.6	8.4	9.6	11.1	11.6
TOTAL OF ABOVE COUNTRIES	4.3	4.5	4.4	4.5	5.1	5.4	5.7	5.9	6.3	7.2	7.7	8.1	9.0	9.6	9.8
OECD LESS USA	5.0	5.2	5.2	5.4	6.0	6.6	7.0	7.5	8.1	8.9	9.5	10.0	10.8	11.4	11.7

(a) FORECASTS
(b) NET INTEREST PAID ON PUBLIC DEBT
SOURCE:OECD

budget deficits and non-accommodating monetary policy is well known: interest rates rise and investment falls -- or, in the case of an open economy, the exchange rate appreciates as a result of capital inflows, and the trade balance deteriorates. However, there is less agreement about the extent to which, at a world level, budget deficits are responsible for the present high interest rates, especially in view of the increasing international integration of financial markets and (in recent years) the partly offsetting movements in deficits in the United States and the rest of the OECD area (17). Attention has thus also been paid to possible links between stocks of debt and interest rates. These could arise through one of two possible channels. The first is a "portfolio effect" -- higher interest rates may be required in order to induce the private sector to hold increased shares of debt in asset portfolios. Most empirical evidence suggests that such an impact would not be large (18), particularly since in many countries market values of equities and of real estate have risen significantly in recent years, so that the share of government bonds in portfolios has not increased as much as the figures for debt might suggest (19). The second and probably stronger argument for an effect of high levels of public debt on interest rates is linked to expectations of future inflation. If government debt is high, savers will fear that the authorities will be tempted to reduce the debt burden on the public sector by inflation through increased "monetisation". As was noted in Part II, this has historically been an important explanation of reductions in the debt/GNP ratio -- although inflation has typically been the unintended result of policies that were not specifically directed at reducing the debt burden. The fear of high inflation will be reflected in greater risk premia in interest rates (20). As a result, real and nominal interest rates will tend to rise, which could affect private investment (21).

In discussing the effects of increased stocks of public debt on interest rates and, ultimately, on capital formation it is, however, important to distinguish between cyclical and longer-lasting increases in the debt/GNP ratio. To the extent that debt accumulation is perceived as cyclical (and as such susceptible to being reversed over the rest of the cycle) "crowding-out" of private investors may be a lesser problem. On the other hand, a permanent increase in government debt, associated with a higher structural budget deficit (because of higher debt service costs), can be expected to raise interest rates if the government maintains a non-accommodating monetary policy (22). In this regard, the above projections of rising debt/GNP ratios, when the economy is on average at its trend level, clearly represent lasting increases in debt.

It should also be noted that the higher the level of public debt, the greater will be the possible crowding out of private investment and the distortions created by taxes levied to service the debt. By itself this could imply that the optimal debt level should ideally be zero. However, such a conclusion does not hold in practice for two main reasons. First as the above discussion on net worth suggested, the existence of public investment projects yielding social returns greater than the costs of borrowing may justify the existence of some debt (23). Second, the optimal debt level is in any event endogenous, depending on the prevailing economic circumstances as well as on the transition costs of achieving it, which will vary across countries and over time (24). This is particularly the case to the extent that the role of government includes the buffering of public and private consumption in the face of economic shocks. Although a non-zero level of debt may, therefore, be

justified on these grounds, it would appear that, as the examination of historical experience indicated, there is no simple way of determining what the optimal level of debt should be.

For a long time some economists have even argued that government debt has little or no effect. This view was restated by Barro (25) using what is sometimes called the "Ricardian Equivalence Theorem". The essence of the argument is that rational consumers who cared about their heirs would not consider government debt as wealth, and would therefore act in a way that left aggregate (public and private) saving, investment and labour supply decisions unchanged. They would recognize the future tax liability (including a possible inflation tax) associated with any new government borrowing and adjust their saving in consequence, so that increased private saving would just offset greater public dissaving; interest rates (and investment) would thus be unaffected. This conclusion, that individuals could and would offset any effort by governments to redistribute consumption over time, requires very strong assumptions both about their behaviour and the organisation of the economy, implying, in particular, that individuals are not income constrained.

There is little empirical support for the pure form of such a proposition (26). Indeed most available econometric evidence supporting a role for private wealth in consumption and savings behaviour suggests that public debt is perceived as wealth, at least in part. It is possible that public debt is to some extent offset in people's estimates of their own wealth (or that of their children) by recognition of future tax liabilities. This may be indeed more likely in a period with a growing and widely publicised public debt (27). Moreover such accounting for future tax liabilities will be more important the greater the strength of the bequest motive, which some recent discussion has suggested may be more relevant than is usually believed (28). It seems clear, however, that the debt neutrality proposition does not hold in its strongest form; the possible negative consequences from public debt, described earlier, remain valid reasons for policy makers to be concerned about projected further growth in government liabilities. In particular, the concerns about budget flexibility and tax-induced distortions discussed above would in any event mean that the size of the public debt has economic consequences given the fact that taxation is not lump-sum.

C.   A wider perspective: the outlook for government net worth

The discussion of government balance sheets in Part II suggested that movements in public debt should not be considered in isolation from those of overall government net worth. For instance, a declining debt/GNP ratio will not generally reflect an improving government financial position if this decline is due to the sale of public sector corporations, the rapid depletion of publicly-owned resources, the reduction of government fixed capital or a temporary surplus of the social security system. The medium-term projections described above do not assume any future asset sales, since the budget deficits used as a starting point are those calculated on a National Accounts basis for the general government, rather than public sector borrowing requirements (29). On the other hand, changing rates of exploitation of natural resources can affect significantly projections of government debt and net worth. Several OECD countries (notably the United States, the United Kingdom, Canada, Australia, the Netherlands and Norway) draw important revenues from the exploitation of non-renewable resources, particularly oil

and gas. A country's total reserves of resources can be viewed as a capital asset yielding a permanent annual return. Where this return is exceeded by the current revenues from the resources, the actual budget deficit will be smaller than would be sustainable on the basis of current tax and spending policies, making the debt projections based on current deficits unduly optimistic. For the United Kingdom an attempt has been made to calculate the sums involved; these are very significant: the projection for 1985-86 is for a difference of some 3 per cent of GDP between actual and "permanent" revenues (30). The Secretariat projections already described, which assumed a return to mid-cycle output levels, when recalculated for the United Kingdom (31) using the "permanent" non-interest budget balance (to allow for an eventual fall in North Sea oil revenues), show a significantly less optimistic debt outlook.

The most visible example of the government's non-financial assets is the stock of fixed capital (highways, schools, hospitals, etc.). This is typically large and, unlike debt incurred for public consumption, its growth has traditionally been considered a valid justification of public sector borrowing if the rate of return on investment is sufficient. If recent increases in government debt relative to output reflected expansion of public sector capital, there could be less reason for concern (32). Estimates of the government sector capital stock (33), obtained from various national sources, have been combined with net financial debt to provide narrow measures of general government net worth for the major OECD countries. These are presented in Table 6; further information is given in Annex II. For most countries government net worth has fallen in recent years, suggesting that capital formation does not explain the rapid growth in public debt. The only major exception is Japan where the rise in capital stock has offset the growth in debt over most of the period under review. Consideration of the stock of public capital even aggravates for some countries the problem of a worsening government financial position suggested by the debt data. However, since the ratio of capital stock to GNP should remain broadly unchanged in the next few years (if present public investment behaviour is sustained) (34), the future evolution of government net worth is likely to reflect primarily the trends in net public debt.

The earlier discussion suggested that the inclusion of government non-financial assets did not greatly affect the picture obtained from examining projected debt/GNP ratios. There is, on the other hand, another type of government liability, not included in gross or net debt, that does have significant implications over the medium term: the (future) liabilities of social security systems and of public pension plans. These pose two problems: one related to the pay-as-you-go nature of public pension schemes in most countries, the other to the demographic changes foreseen for the next 15-20 years. The first arises because present pensions are paid by taxing those currently working, so there is no invested fund to provide for the benefit entitlements of future retirees. These entitlements can be thought of as a government liability, similar in nature if not in contractual terms to government debt. To the extent that future beneficiaries consider them as wealth (35) there will be less saving, in the absence of full debt neutrality as discussed above, and thus a lower capital stock for the economy as a whole. This aspect of the pension problem is related to concerns about levels of public debt, rather than about growth in debt, the main focus of the discussion here. If the population were growing at a steady rate the effects of the pension scheme on capital formation would have already been felt.

TABLE 6

GENERAL GOVERNMENT NET WORTH
(AS A PERCENTAGE OF NOMINAL GNP/GDP)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985 (a)	1986 (a)
UNITED STATES	34.2	34.2	35.5	41.7	46.7	43.7	40.4	40.4	42.2	45.5	47.7	45.1	41.0	36.6	30.2	26.8	24.3
JAPAN	36.6	39.4	41.7	46.6	48.9	46.1	43.7	41.4	38.0	39.2	40.1	38.4	37.1	35.8	37.7	41.8	44.2
GERMANY	70.9	70.8	69.1	69.7	70.3	65.8	61.1	60.3	60.0	62.9	63.7	61.2	57.6	55.2	52.8	50.4	48.5
FRANCE	17.5	17.7	19.6	21.4	21.3	20.1	19.6	21.0	21.0	22.1	23.9	24.5	22.7	20.8	19.3	17.2	15.7
UNITED KINGDOM	-12.3	-6.0	4.8	21.2	29.4	24.3	21.0	17.7	19.5	28.4	30.9	28.6	22.7	18.1	18.7	20.5	20.4
ITALY	0.8	-3.6	-9.7	-13.4	-11.2	-19.4	-21.6	-21.3	-25.5	-26.2	-19.6	-23.1	-24.6	-34.8	-36.0	-39.6	-42.1
CANADA	42.2	45.2	45.1	45.0	49.3	48.0	45.1	44.2	39.7	38.3	37.5	39.8	34.9	27.7	23.6	18.3	15.3

(a) FORECASTS

NOTE:FOR DEFINITIONS AND METHODOLOGY SEE ANNEX II

However, the second and possibly greater concern is the likely effect of demographic trends on social security liabilities in the future. The present age structure of the population in many countries is significantly more favourable (in the sense of fewer retired people per worker) than it appears likely to be in any eventual equilibrium situation. Moreover, the presence of "baby boom" bulges in the demographic profiles of many countries means that not only will the dependency ratio (the number of those above retirement age divided by the labour force) rise in the long run, it will even "overshoot" the equilibrium level for some period in the next 25-40 years (36).

In order to consider how these changing population patterns could affect governments' financial outlook, it is necessary to consider their budgetary consequences (37). To facilitate international comparisons it is assumed in the first instance that pension benefits as a share of GNP will in the future vary directly with the dependency ratio, starting from the most recent observation. This would be consistent with, for example, the assumption that government payments to the elderly after retirement will follow the growth in real wages (38), while the participation rate and the wage share of GNP remain constant. Table 7 shows how income support for the elderly as a share of GNP would evolve and how the dependency ratio will change (on the assumption that the participation rate will be constant for those between 20 and retirement). The differences between countries are quite noticeable. Over the next quarter-century (39) the cost of pensions (under this hypothesis) would fall slightly as a per cent of GNP in the United Kingdom and increase relatively modestly in the United States and Canada (40). Germany, Japan and France will pay significantly more of their GNP to support the elderly and most other countries also show increases. During the subsequent 20 years (for which demographic projections are less reliable) all the major countries except Japan and the United Kingdom would face major additions to the cost of supporting the elderly, in the absence of policy changes. In fact, however, pension costs can be expected to increase more quickly in some countries, notably Japan and the United Kingdom, as a result of maturing social security systems. This represents the policy problem facing governments: increased pension payments because of the ageing population can be considered the result of existing policy, and although in some cases there are specific formulae to raise taxes or social security contributions to meet such extra payments, concern about the size of the tax burden makes such increases unattractive. Social security contributions (or the general taxes used to finance pensions in some countries) are therefore assumed here to be a constant fraction of GNP.

What are the implications of the projected increases in such spending for an assessment of public debt? Strictly interpreted, the unchanged policy assumptions described above would imply that all the increases in benefit payments projected in Table 7 will be debt-financed -- an extreme case but coherent with the concern about tax burdens. Chart C in Annex I shows how the debt/GNP ratios would evolve under this assumption, compared with the previous scenario (41). For Japan and the United Kingdom separate estimates of the increases in pension costs were used, in order to capture the effect of the maturing of the social security system in those countries (42). It appears that consideration of pension benefits and their projected expansion does not qualitatively change the outlook for the major countries whose debt is already "exploding" (Italy, Canada and the United States). However, some of the countries whose debt ratios are projected to fall or stabilize (specifically Japan, Germany and France) face a much less comfortable situation when their

Table 7 (a)

EVOLUTION OF PAYMENTS TO THE ELDERLY AS A PERCENTAGE OF GNP (b)

	1985	1990	1995	2000	2005	2010	2015	2020	2025	2030
United States	6.9 (24.0)	6.8	6.7	6.6 (23.2)	6.7	7.3 (25.6)	8.4	9.8	11.2	11.9 (41.5)
Japan	5.1 (18.3)	5.9	6.8	7.8 (30.4)	9.0	10.3 (40.1)	11.2	11.1	10.8	11.0 (42.7)
Germany	12.0 (29.0)	12.2	13.1	15.1 (34.8)	16.8	17.7 (40.8)	18.8	20.7	24.1	27.6 (63.6)
France	12.7 (31.0)	13.2	13.5	13.5 (34.2)	13.9	15.5 (39.5)	17.2	18.6	20.1	21.5 (54.6)
United Kingdom	6.3 (30.3)	6.1	5.9	5.7 (26.8)	5.7	6.0 (28.1)	6.3	6.6	7.4	8.1 (37.6)
Italy	12.8 (27.1)	13.2	13.6	14.2 (29.4)	15.3	16.2 (33.6)	17.3	18.3	20.2	22.5 (46.5)
Canada	4.0 (16.0)	4.3	4.7	4.9 (20.0)	5.0	5.5 (22.6)	6.3	7.4	8.5	9.6 (39.4)

a. Secretariat projections based on national demographic forecasts.

b. Figures in parentheses for 1985, 2000, 2010 and 2030 represent the ratio of those over retirement age to the labour force (defined as the men and one half of the women between 20 and retirement age).

budgetary position is examined in this wider context. -- the previously
projected declines in debt ratios are eliminated and after remaining stable
for 10 years, debt burdens eventually expand.

Therefore, unless governments are prepared to tolerate continued
increases in public debt, it is clear from the charts that, in most countries,
some future increases in taxes or contribution rates would be inevitable if
current or projected benefit levels were to continue. In general, the sooner
rates are raised (to create a social security fund or to expand an existing
one) the smaller the required increase and the less the variability of tax
rates (43). However, given that the problems described above are expected to
develop over a long period, there would presumably be room for flexibility in
the timing of rate increases, consistent with cyclical considerations. The
alternative, lower pension benefits, higher retirement age, or reductions in
other budget spending, would probably be more difficult to implement, although
such changes have been made or planned in a few countries (e.g. Japan). A
reduction in future pension commitments (i.e. future liabilities) could in
fact be considered similar in nature to a reduction in the debt burden by
either repudiation or its equivalent, unexpected inflation.

IV. PUBLIC DEBT PROJECTIONS UNDER ALTERNATIVE FISCAL POLICY SCENARIOS

A.   Policy options

In recent years a major preoccupation of governments in most OECD
countries has been to reduce budget imbalances in order to stop the growth in
public debt, thereby moderating the pressures on interest rates and restoring
private sector confidence. Although fiscal restraint is clearly still
required for countries where rising debt remains a problem, the question of
whether and how quickly to reduce the debt arises for the economies where the
outlook is more favourable, with a debt/GNP ratio likely to decline or
stabilize in the years ahead. Alternative fiscal policies will clearly change
future debt profiles. While the policy choices in each country will depend on
the particular circumstances, policy-makers will have to decide whether the
longer-term debt consequences of any fiscal action outweigh its short-run
demand effects. Present and projected high unemployment in many countries
may, for instance, make governments reluctant to cut expenditures further or
to raise taxes in order to reduce the debt more rapidly. However, wider
considerations about government net worth, and particularly the medium-term
expansion of pension costs in many countries, also need to be taken into
account. In this context, this section examines how different fiscal policy
options would affect the projected evolution of the debt/GNP ratios in the
seven major economies. The base case scenario used for these simulations is
the one examined in the last section of Part III (and shown in Chart C of
Annex I), which assumes a gradual return (by 1989) of economic activity to
mid-cycle levels, together with changes in spending on pensions in line with
demographic developments. This base case does not constitute a forecast; it
presents instead a medium-term debt profile that is broadly consistent with
plausible output levels.

On the basis of the present and projected debt outlook, as discussed above, the major OECD countries can be divided into three groups. The United States, Italy and Canada, under any reasonable assumptions, face rapid increases in debt/GNP ratios in the absence of changes in taxes or expenditures, so only restrictive policies appear as viable options. In other words, their policy choices are mainly related to the degree of restraint and the speed with which it is applied. For France and the United Kingdom the debt ratios would decline slightly and remain roughly stable, respectively, if the economies return to mid-cycle trend output levels (and allowing for oil revenue effects in the latter country). In both cases, the outlook is critically dependent on the assumed level of trend output. In addition, demographic considerations reverse the falling debt profile for France while the maturing of the present pension system worsens the debt picture for the United Kingdom. In these circumstances one could envisage alternative fiscal policies in these two countries that were either slightly less or slightly more restrictive. Japan and Germany would have declining or stable debt ratios and fairly small general government budget deficits on the basis of their 1986 fiscal position. A move to trend output level over 1987-89 would ensure that their debt ratios fall continuously. However, as indicated above, this optimistic assessment is offset over the medium to longer term by the expected substantial increases in pension benefits, so that higher taxes or cutbacks in other categories of spending would eventually be needed to prevent debt from exploding. Nevertheless, since the debt ratio in these two countries, when the ageing population is taken into account, will only start to increase in the first half of the 1990s, further restrictive measures appear unlikely in the short run. For these countries, therefore, the debt situation may not be regarded as sufficiently pressing to eliminate <u>a priori</u> the possibility of short-run fiscal stimulus, and it is the debt consequences of such an option that are examined here.

As an illustration of this range of possible policy alternatives, the options examined here (as shown in Chart D of Annex I) are:

  i) for the United States, Italy and Canada (a) to reduce the non-interest budget deficit (as projected in the base case scenario) by 1 per cent of GNP in 1987 and again in 1988, with the non-interest deficit held at its new level from 1989 and (b) the same policy change but taking effect in the 1989-90 period. (The difference between this and the first option can be viewed as representing the costs of a delay in taking action.)

 ii) for France and the United Kingdom (a) to raise the non interest deficit by 1/2 per cent as a share of GNP relative to the "base case" levels; and (b) to reduce the non interest deficit from 1987 by 1/2 per cent of GNP.

iii) For Japan and Germany (a) to increase temporarily the non-interest deficit as a share of GNP by 1 per cent in 1987 and 1988, this being followed by a return to the base case scenario values of the non-interest deficit and (b) to raise permanently the non-interest deficit from 1987, by the equivalent of 1 per cent of GNP.

It must be stressed that such fiscal policy options are considered solely in terms of their medium-term consequences for the stock of debt. Thus possible short-run demand and interest rate effects of budgetary changes are ignored in the simulations described below. However, as discussed

subsequently, this does not significantly affect the projected profile of the debt/GNP ratios. It is also important to recognize that these options represent stylised budgetary changes. In particular temporary measures of fiscal expansion may be difficult to achieve in practice, as it is often difficult to ensure that such stimulative budgetary changes are reversed. This is particularly the case for measures affecting government consumption, transfers and taxes, which, as recent experience suggests, can only be reversed at some social and political cost. Although new public investment is in principle less subject to this constraint, it can sometimes be difficult to identify and implement worthwhile projects at the appropriate time from a cyclical viewpoint.

B.   The effects of fiscal policy changes on the stock of debt

For the United States the first option, in which fiscal restriction is applied starting in 1987, would stop the growth in the government debt/GNP ratio and allow a gradual reduction in the ratio from 1989. This option is similar in magnitude to the deficit cuts implied by the August 1985 Congressional Budget Resolution and the effects on the debt/GNP ratio should also be comparable (44). The more recent legislation to eliminate the deficit by 1991 (the "Gramm-Rudman-Hollings amendment") would have an even greater impact. The second option, which delays the deficit reduction by two years, would also lead to a declining debt ratio but it remains at or above current levels until 1992. In the case of Italy, the debt/GNP ratio would grow much less quickly after the reduction in the non-interest budget deficit under the first option. The ratio would nevertheless still be rising slowly and would, in fact, be over 135 per cent by the end of the century and nearly 140 per cent if the measures were delayed for two years as suggested by the second option. Although either is a significant improvement relative to the base case scenario, the stabilization of the debt would require some further action, while an even greater effort would be necessary to reduce the debt ratio to any extent. In Canada, the budget tightening considered under the first option would also be insufficient to stabilize the debt/GNP ratio. By the end of the century the total general government net debt would be 58 per cent of GNP, while delaying the deficit reduction measures (the second option) would leave the debt ratio just below 65 per cent by then. However the measures announced by the federal government in the last two budgets, which will affect spending and revenues in the years after 1986, would stabilize the debt ratio by 1990.

For France the first of the fiscal policy options considered, i.e. expanding the non-interest budget deficit by 1/2 per cent of GNP starting in 1987, would eliminate the approximate stability in the debt/GNP ratio projected in the base case scenario. Instead the ratio would continue to rise steadily. At the end of the period the debt ratio would be over 30 per cent compared with 22 in the base case. If fiscal policy were contractionary -- reducing the non-interest deficit by 1/2 per cent of GNP from 1987 on -- the debt ratio would decline slowly until the end of the century, by which time it would be below 15 per cent of GNP. In the United Kingdom, increasing the non-interest deficit by 1/2 per cent of GNP from 1987 would lead the debt ratio to grow even more rapidly, to 80 per cent at the end of the century. If, instead, the non-interest deficit were reduced by 1/2 per cent of GNP from 1986 the debt ratio would remain stable until the middle of the next decade, after which it would grow rapidly as the maturing of SERPs affects pension payments (in the absence of pension reform).

In Germany and Japan the consequences of the first fiscal option -- a temporary increase in the non-interest budget deficit -- are very similar. With such a stimulus the pattern of steadily rising debt (apparent only after several years in the base case scenario as a result of the ageing populations) would begin almost immediately. The net debt/GNP ratio at the end of the century would be over 50 per cent in Japan and almost 40 per cent in Germany. The second policy option, a permanent increase in the non-interest deficit, would compound this effect. The debt ratio would grow rapidly, reaching about 50 per cent in Germany and 60 per cent in Japan by the end of the century.

The above simulations assume that the growth of nominal income will be essentially unchanged, which would be consistent with relatively steady growth in the money supply and the hypothesis that fiscal policy changes do not affect long-run levels of activity. The debt projections considered thus represent a very mechanical view of the budget deficit-public debt process, neglecting all possible influences of an increased or decreased deficit on real output, interest rates or prices. Does this assumption significantly affect the long-run profile of debt/GNP ratios as shown in the simulations? Would fiscal stimulus in fact increase nominal output sufficiently to offset the worsening of the debt/GNP ratio that the increased budget deficit would otherwise cause? In principle this could occur even if fiscal policy is neutral in the long run, so it is important to see if such short-run effects could be significant. Moreover, much of the debt problem may be related to expectations about future movements in the debt/GNP ratio, and temporary deviations from the paths projected, especially where they reinforced pre-existing trends, could influence expectations perversely.

One way to take these short-term effects of budgetary changes into account is to look at the results of simulations with the OECD Secretariat's INTERLINK model (45). These are not fully comparable with the mechanical ones described above, but they give a fair idea of how output and interest rate changes might affect the projected evolution of debt/GNP ratios shown in Chart D of Annex I. To this end, Table 8 presents the effects on the debt/GNP ratio after 6 years of a permanent increase of 1 per cent of GNP in government non-wage expenditure in each of the major seven economies, as calculated using INTERLINK simulations, assuming non-accomodating monetary policy and floating exchange rates. The table also shows the effect of a 1 per cent increase of GNP in the non-interest budget deficit as derived from the mechanical projections. One can see that the differences between the two sets of results are not large (except for the United Kingdom and Italy), which lends support to the debt profiles obtained mechanically. The INTERLINK results reflect, in particular, the interest rate effects of a non-accomodated fiscal shock, which affect interest payments with a lag (longer for the United Kingdom and Italy than for the other major countries, which explains their smaller increase in debt in the INTERLINK simulation). A simulation of the same fiscal shock accommodated by monetary policy would lead to "improved" debt profiles because of higher prices and fiscal drag, but of course neither inflationary pressure nor a bigger tax burden are very desirable.

Table 8

CHANGE IN THE PUBLIC DEBT/GNP RATIO AFTER SIX YEARS
IN RESPONSE TO A FISCAL STIMULUS (a)

	INTERLINK simulation (b)	Mechanical simulation (c)
UNITED STATES	7.6	7.1
JAPAN	7.3	6.3
GERMANY	7.9	6.3
FRANCE	8.8	6.7
UNITED KINGDOM	3.5	7.0
ITALY	2.9	6.8
CANADA	8.9	7.1

a.   In percentage points.

b.   One per cent of GNP permanent increase in government non-wage spending, with floating exchange rate and non-accommodating monetary policy.

c.   One per cent of GNP permanent increase in non-interest budget deficit.

V. CONCLUSIONS

Public debt -- either gross or net -- has increased rapidly as a proportion of GNP in most OECD countries over the last 10 years. While present debt/GNP ratios are generally within the range of historical experience, the current pattern of continued increases in these ratios during a period of economic expansion is rather unusual. Such high, and in most cases, still growing levels of public debt raise two main concerns. First the consequent higher debt interest payments would reduce budget flexibility: to keep deficits unchanged would require greater cuts in non-interest public spending while the scope for lowering the tax burden would be substantially constrained. Second, high stocks of debt could raise interest rates (over and above any pressures from budget deficit flows) either as a result of an increased share of government debt in private portfolios or, more importantly, because of fears of debt monetisation, which would result in an acceleration of inflation. Against these concerns, the argument is sometimes made that debt financing is equivalent to tax financing, since future tax liabilities would be fully anticipated, and would not necessarily lead to "crowding-out" effects. However, this "debt neutrality" proposition does not so far appear to have much empirical support.

If the stance of fiscal policies and the levels of real interest rates projected for 1986 remained the same in the future, and assuming that output grew at its potential rate from 1986 forecast levels, the debt ratios would rise rapidly in most OECD countries. Notable exceptions would be Japan and Germany, where debt ratios would decline. However, since in many countries output is now well below its estimated mid-cycle level of potential, debt projections should be made on the more reasonable basis that output will, on average, be at trend levels over the medium term. In such a case the non-interest budget deficits projected for 1986 could be expected to improve, and, consequently, debt ratios would grow less rapidly or fall more quickly. However recognition of (future) social security or pension liabilities -- which are not usually taken into account in the definition of gross or net debt -- would tend to increase projected government deficits relative to output as the population ages and as social security plans mature, unless policy is changed to raise taxes or to reduce benefits. Considering this factor substantially changes the outlook for debt ratios in a number of countries. In particular, debt ratios in Japan and Germany, instead of declining, would at first stabilize and then, after ten years, begin to rise rapidly.

Alternative fiscal policy options would clearly affect these debt projections based on a stylised interpretation of unchanged policies. The scenarios considered in Part IV of the paper for the major seven countries lead to the following main observations:

   i) For the United States, Italy and Canada a substantial reduction in the non-interest budget deficit would be required to stabilize or to reduce their debt/GNP ratios. In the case of the United States and Canada there appears to be some prospect that these adjustments will take place.

ii) For Japan and Germany, any fiscal measures to expand demand in the short run would likely eliminate or shorten substantially the period of relatively stable debt ratios that would otherwise be expected before rising pension costs lead to a marked deterioration of the situation. For France and the United Kingdom any measures to ease the degree of fiscal restrictiveness would lead to similar results.

While it is difficult to define an "optimal" level of the public debt/GNP ratio on purely economic grounds, a risk-averse strategy would seem to be to reduce the ratio when economic conditions are favourable in order to increase government flexibility in the face of future shocks. Although reductions in debt could be obtained by running down or selling off government non-financial assets (such as natural resources or public enterprises), this would generally not improve the government's overall net worth. Of course, the speed at which the debt should be reduced will depend on the particular economic circumstances in each country. When the debt ratio is not expected to increase for several years there may be scope for less restrictive policies in the short run. However, in considering any easing of fiscal policy, it is important to bear in mind that, given the large debt accumulation that has already occurred in most countries, the room for budgetary stimulus would be much less than it was in the 1970s. Moreover, any short-run demand benefits would need to be weighed against the medium-term consequences for debt, particularly in view of the expected rapid increase in pension costs in the future. This would imply the need to reverse such a stimulus, which, as past experience suggests, can sometimes prove quite difficult.

NOTES AND REFERENCES

1. See J.C. Chouraqui and R.W.R. Price, "Medium-Term Financial Strategy: The Co-ordination of Fiscal and Monetary Policies" OECD Economic Studies, No.2 (1984), R.W.R. Price and P. Muller "Structural Budget Indicators and the Interpretation of Fiscal Stance in OECD Economies, OECD Economic Studies, No.3 and the German Federal Ministry of Finance, Tasks and objectives of a new fiscal policy: the limits to public indebtedness, December 1985. The growing burden of debt interest payments was discussed in OECD Economic Outlook 36 and movements in the debt/GNP ratio were described in OECD Economic Outlook 37.

2. This problem was discussed briefly in OECD Economic Outlook 38 as part of a special section "The Present Recovery in a Longer-term Perspective", page 71.

3. Ideally these data should be at market values to reflect the changes in the value of outstanding bonds as a result of interest rate movements. However, except for the United States, Germany and the United Kingdom, such figures are not available. The decline in inflation and nominal interest rates in recent years suggests that the "true" debt/GNP ratios will have risen by more than those which are presented in Tables 1 and 2. For Australia, Austria and Greece net debt figures are the same as the gross debt. The Australian data exclude municipal debt, while for Greece and Ireland data represent central government liabilities only. Australian data do not include the government-guaranteed debt of government enterprises, which has been rising rapidly in recent years (see Economic Planning Advisory Council, "Issues in Medium-Term Budgetary Policy", Council Paper No.16, March 1986).

4. Internationally comparable gross and net debt data for the general government sector are only available for the period since 1970. In some countries data can be extended back to World War II but to get longer series it is usually necessary to refer to central government gross debt figures. The nature and source of the data used are described in Annex I.

5. See, for example, Willem Buiter, "A Guide to Public Sector Debt and Deficits" Economic Policy, November 1985 and J. Odling-Smee and C. Riley, "Approaches to the PSBR", National Institute Economic Review, August 1985.

6. It is possible that a public corporation may be worth more if sold to the private sector -- particularly if better management is not offset by a loss of any monopoly power that the company may have had. If the asset sale captures all or part of this increase in value for the government, then there will be an improvement in the government's overall position, although not by as much as the change in net debt may suggest.

7. See Buiter op. cit. The discussion of education (and to a lesser extent health) expenditures in this context is arbitrary. These can be considered as investment or as consumption goods. If they are investment goods however, their financial worth to the government is presumably captured via the higher future income and thus tax revenue that the greater human capital will generate.

8.   There is, however, another contingent liability that could pose greater problems. Deposit insurance in many countries is provided from a fund that is generally small relative to total deposits. Even without considering the possibility that there are implicit public guarantees of the deposits in excess of formal insurance limits, there could be major claims against the government if any of the oft-cited risks to the world financial sector were to be realized. This problem is not small even without major defaults. Experience in the United States (Continental Illinois) and Canada (a series of trust companies) suggests that there is a great deal of pressure to guarantee deposits, and even bonds, of financial institutions well beyond the ceilings that were in principle imposed on the insurance. If the guarantee is provided directly by the central bank rather than the government itself, this would merely insure that the increased liabilities were immediately monetized.

9.   See also Economic Outlook 38, p.71 and J.A. Bispham, "Rising public sector indebteness: some more unpleasant arithmetic" in Private Saving and Public Debt, Blackwell (Oxford), forthcoming.

10.   It must be noted that government interest revenues are not generally available. The net interest payments used are obtained by multiplying gross debt service charges by the ratio of net to gross financial liabilities. This assumes that governments receive the same average return that they pay -- which may be optimistic. The estimates do not take account of remittances from central bank profits. The U.S. data are net figures as officially published.

11.   The interest paid on new debt is taken as a weighted average of the short and long-term interest rates projected for 1986 or a figure 2 per cent above the nominal growth rate obtained by compounding the projected 1986 inflation rate and the assumed potential real growth rate. In several countries this overestimates the effective rate of interest paid on the gross debt because of the presence of significant sources of inexpensive finance (postal savings, local authorities balances, etc.). However these sources are either offset by the fact that they are assets of other levels of government or that, with increasing financial deregulation and competition, they will represent a progressively smaller source of debt finance.

12.   For some countries this may not be an exact measure of unchanged policies. For example, in the United States, the proposed 1987 Budget would lower the non-interest deficit of the Federal government further in the years after 1986. In Japan, the announced intention of the government is to eliminate the central government borrowing requirement except for the purposes of public investment by 1990. However, the assumption of constant non-interest deficits is maintained here as the measure of unchanged policy in order to allow cross-country comparisons.

13.   The trend growth rates assumed for each country are those used in calculating the structural budget indicators (details of the simulation method are provided in Annex III). The rates of inflation are assumed to remain at their 1986 level.

14. The debt projections are in fact more sensitive to the assumed 1986 levels of trend output (and thus to the output gap) than to the choice of future growth rates; see details in Annex III.

15. See, in particular, J.C. Chouraqui and R.W.R. Price, op. cit.

16. For a survey of issues connected with the measurement of welfare losses from taxation see John B. Shoven and John Whalley "Applied General Equilibrium Models of Taxation and International Trade: An Introduction and Survey", Journal of Economic Literature, September 1984, pp.1007-1051.

17. A discussion of the possible causes of the prevailing high real interest rates can be found in Paul Atkinson and Jean-Claude Chouraqui, "The Origins of High Real Interest Rates", OECD Economic Studies, No.5, Autumn 1985. See also The Effects of Deficits on the Prices of Financial Assets, Office of the Assistant Secretary of Economic Policy, U.S. Treasury Department, January 1984, particularly Part II.

18. See the discussion in Buiter, op. cit. pp.47-48.

19. This point is made in Olivier J. Blanchard and Lawrence H. Summers "Perspectives on High World Real Interest Rates", Brookings Papers on Economic Activity 1984:2, p.312.

20. Expected inflation would, of course, normally be reflected in the inflation premia in interest rates. Thus, only unexpected inflation can reduce the debt/GNP ratio, except to the extent that fiscal drag operates (an increase in taxation that is usually considered politically unacceptable). If this expectations factor has become important, inflationary policy may no longer be a "solution" to the debt problem.

21. Although, strictly speaking, expected real interest rates would not change in such circumstances, investors are likely to react negatively to the greater uncertainty about the true cost of borrowing, as well as to the short-term effects on cash flow.

22. See the discussion in D.K. Foley and M. Sidrauski, Monetary and Fiscal Policy in a Growing Economy, Macmillan, 1971, especially Chapters 5 and 11.

23. See also Annex II. This point is extended further in A. Drazen, "Government Debt Human Capital and Bequests in a Life-cycle Model" Journal of Political Economy, June 1978, pp.505-516.

24. A model showing optimal debt moving over time along the economy's transition path is described in Foley and Sidrauski, op. cit. Moreover, the long-run optimal public debt will depend on the level of "structural" excess supply of or demand for savings. However, this model is primarily concerned with closed economies.

25. R.J. Barro "Are Government Bonds Net Wealth?", Journal of Political Economy, November/December 1974, pp.1095-1117.

26. See, for example, J. Tobin and W.H. Buiter, "Fiscal and Monetary Policies, Capital Formation and Economic Activity", in G.M. von Furstenberg, editor, The Government and Capital Formation, Ballinger 1980, M.J. Boskin and L.J. Kotlikoff, "Public Debt and U.S. Saving: A New Test of the Neutrality Hypothesis, National Bureau of Economic Research, No.1646, June 1985 and E. Koskela and M. Viren, "National Debt Neutrality: Some International evidence", Kyklos, 1983, N°4, pp.575-588. However, others, for example J.J. Seater and R.S. Mariano, in "New Tests of the Life Cycle and Tax Discounting Hypotheses", Journal of Monetary Economics, 1985, Vol.15, pp.195-215, find support for Barro's argument.

27. Debt neutrality may be more likely if the government is expected to raise taxes fairly quickly. This is the case in Japan where the government is known to adjust social security contribution rates every five years and in a manner both predictable and widely discussed. Under such conditions the transitory movements in government deficits and debt over the cycle may well be largely discounted.

28. See L.J. Kotlikoff and L.H. Summers, "The Role of Intergenerational Transfers in Aggregate Capital Accumulation", Journal of Political Economy, August 1981, pp.706-732.

29. For the United Kingdom, a rough calculation suggests that the total value of sales of public sector corporations (but not sales of council houses) over the last 6 years is about 1 1/2 per cent of GDP.

30. See Annex to Odling-Smee and Riley op. cit. The calculations were made before the recent fall in oil prices. If this proves permanent and production plans do not change the gap would be somewhat less.

31. Using oil revenue projections from Odling-Smee and Riley the deterioration in the United Kingdom budget balance to the year 2000, relative to the case which assumes a return to the mid-cycle output level, is enough to reverse the downward trend in the debt/GNP ratio. In the rest of this paper the U.K. projections will incorporate the oil revenue factor.

32. It is important to bear in mind the quality of public investment. There are those who would suggest that in the period when the public sector was expanding rapidly, public investment was undertaken, for which the cost of borrowing was greater than the social rate of return. The true value of the resulting government capital would therefore be less than the investment flows would suggest. By the same token, cutbacks in investment that reflected a more careful application of this "profitability" criterion would imply an improvement in the net worth despite a decline in the size of the government's fixed capital.

33. These are generally developed by the perpetual inventory method from public investment data and revalued at current price levels.

34. Capital stock projections are tentative because of uncertainty about the average life of government capital and hence the depreciation rate. Relatively small changes in budget composition affecting public investment would substantially modify such projections over long time horizons.

35.   This assumes, of course, that they continue to have faith in governments' willingness to fulfill their promises. Recent American and Canadian efforts to change pension indexing rules suggest that the political ability to change these promises is in fact limited.

36.   Dependency ratio is used to refer to old people relative to workers. Children are excluded primarily because their costs tend to be borne by the private rather than the public sector. The statement that these ratios will "overshoot" assumes that the long-run fertility rate will be closer to (at least) zero population growth than is presently the case in most countries. Such projections have been made by the OECD on the basis of hypotheses established by Member countries.

37.   Considerable effort has been made in the United States and elsewhere to measure "social security wealth" -- the excess of future benefits over future contributions. However such measures include the value to individuals of the sustainable part of future benefits -- i.e. that could be financed at existing contribution rates on a pay-as-you-go basis as well as that which would require additional funding (from taxes or borrowing) because of changing population patterns. It is this latter portion on which attention is focussed here. It is clear that health care costs would show an analagous if less marked increase as well. The consequences for the budget as a whole would be reinforced.

38.   This assumption can be considered unduly pessimistic for pension costs (relative to price indexation) given the pressures governments will face in the future. However the intent here is to quantify the problems rather than to anticipate the solutions.

39.   Demographic projections are at risk the further out they go. In terms of the ratios used here, however, the period to 2005 can be considered as quite reliable -- except for migration.

40.   With the most recent changes, the United States social security trust funds will grow significantly for the next few decades reaching nearly 27 per cent of GNP by 2020 (see A.H. Munnel, "Social Security and the Budget", New England Economic Review, July/August 1985). However, this development is recognised in the projections shown for the net public debt since the present level of social security taxes, which are sufficient to generate such funds, are included in the fixed non-interest budget deficit.

41.   The United Kingdom reference projection incorporates the anticipated oil revenue decline.

42.   The Charts incorporate OECD estimates of the increases in benefits per retired person that will take place in Japan, as the pension system matures, despite the reform measures adopted in 1985. The United Kingdom projection is based on the assumption that the State-Earnings-Related Pension scheme (SERPs) remains in place and the estimates are based on figures published in the 1985 Green Paper "Reform of Social Security", Volume I, page 16. The hypothesis adopted is that the basic pension is uprated in line with prices reflecting current U.K. practice. If SERPs is reformed as indicated in the

December 1985 White Paper "Reform of Social Security", the pension cost increases will be reduced but the savings will not be significant until after 2005 so the picture in Chart C will be little changed. The Canadian earnings-related pension scheme is also immature, but the growth in its benefits should be largely offset by reductions in the means-tested component of the non-participatory pension scheme.

43. A discussion of this question for Japan can be found in M. Fukao and M. Inouchi, "Public Pensions and the Savings Rate", Economic Eyes, EPA, June 1985.

44. The Congressional Budget Office (The Economic and Budget Outlook, An Update, August 1985, p.64) has estimated that as a result of the measures in the Resolution the Federal debt/GNP ratio would fall gradually after 1987.

45. The projections reported here are based on the Autumn 1985 version of the model.

ANNEX I

.CHARTS

HISTORICAL EVOLUTION OF DEBT/GNP RATIOS

UNITED STATES

JAPAN

GERMANY

FRANCE

UNITED KINGDOM
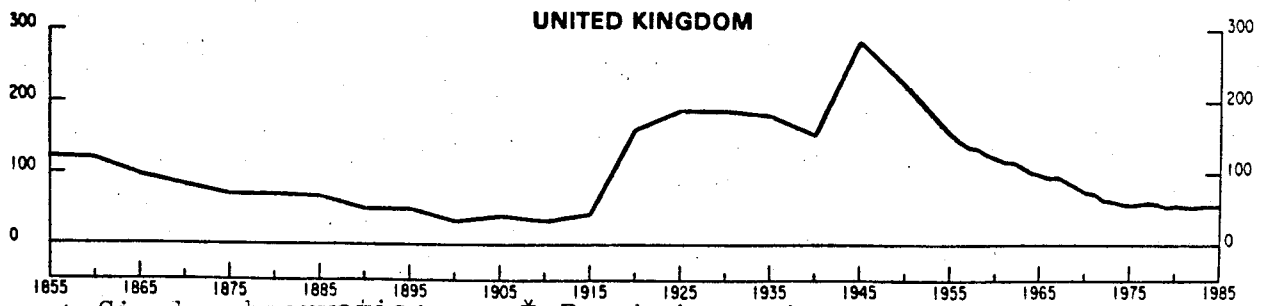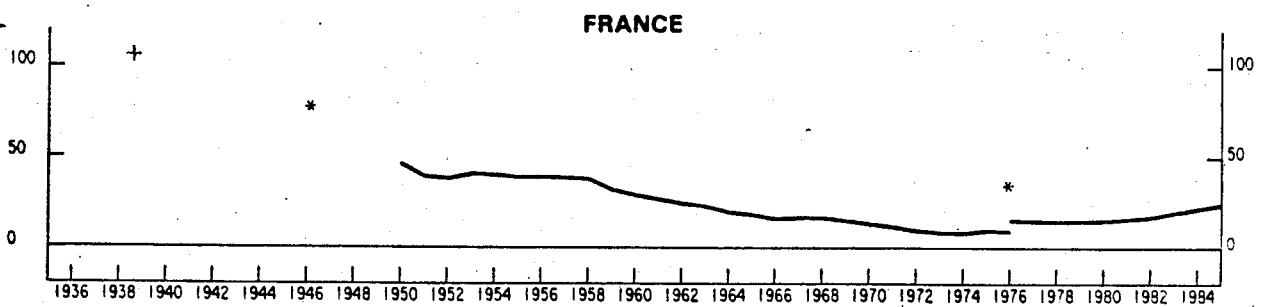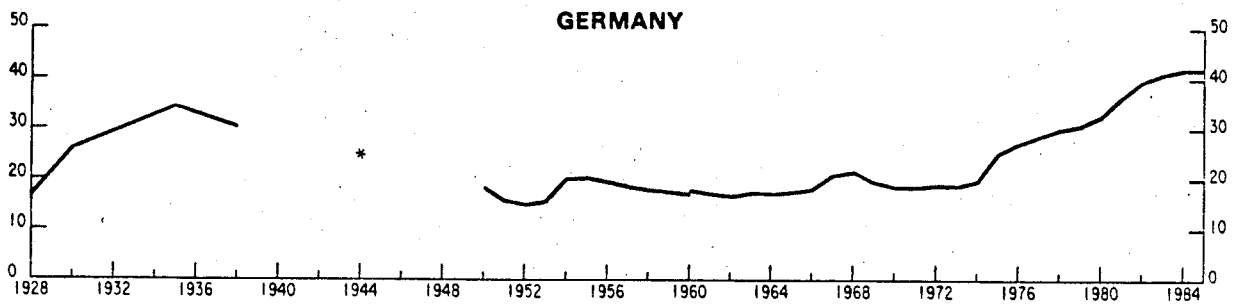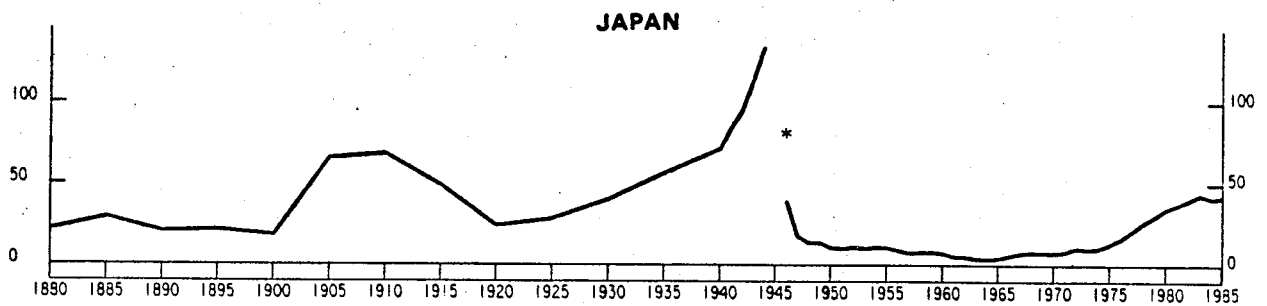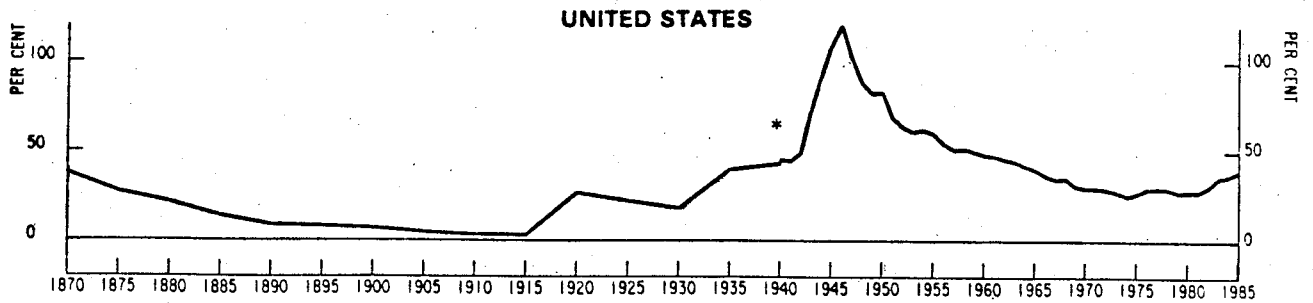
+ Single observation.   * Break in series.

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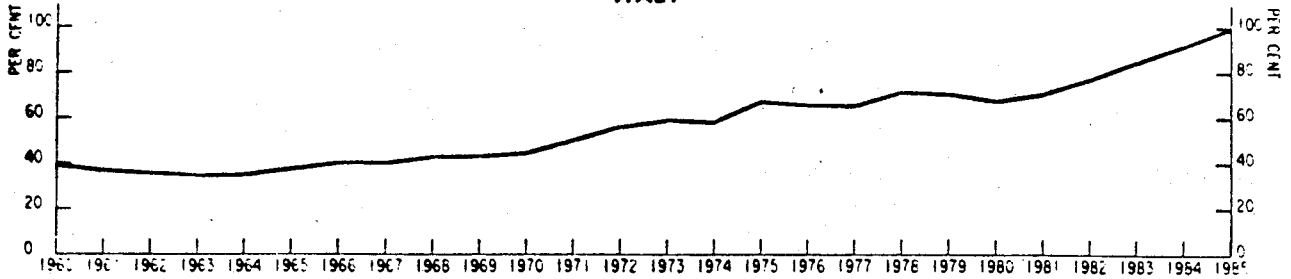
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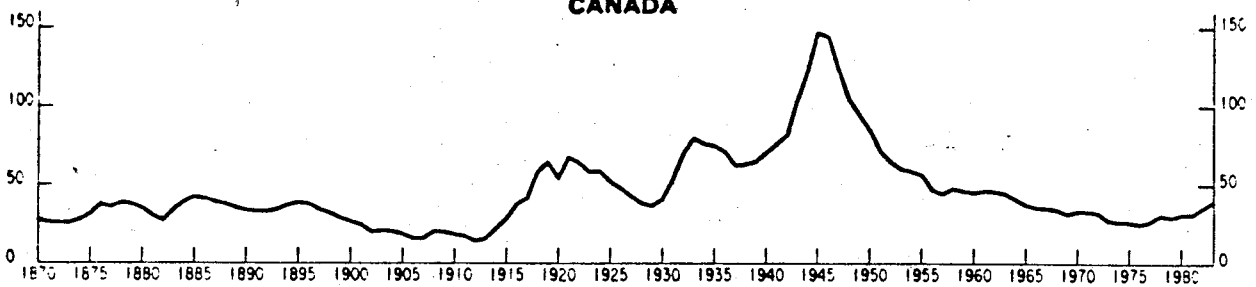
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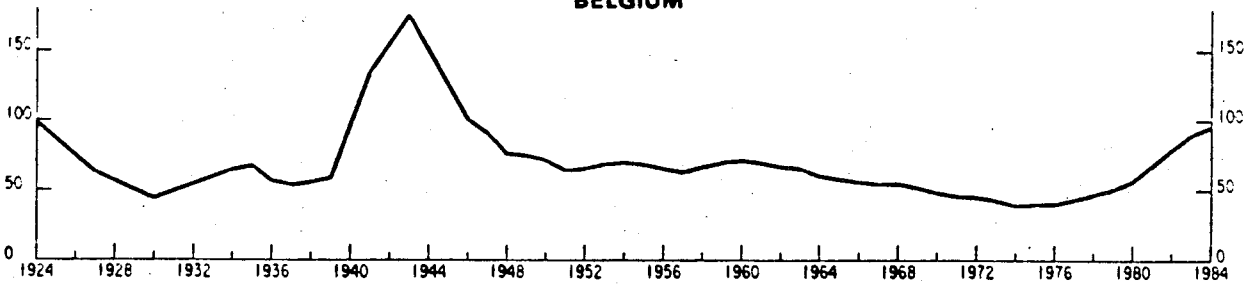
DENMARK

FINLAND

*Break in series.

NETHERLANDS

NORWAY

SPAIN

SWEDEN
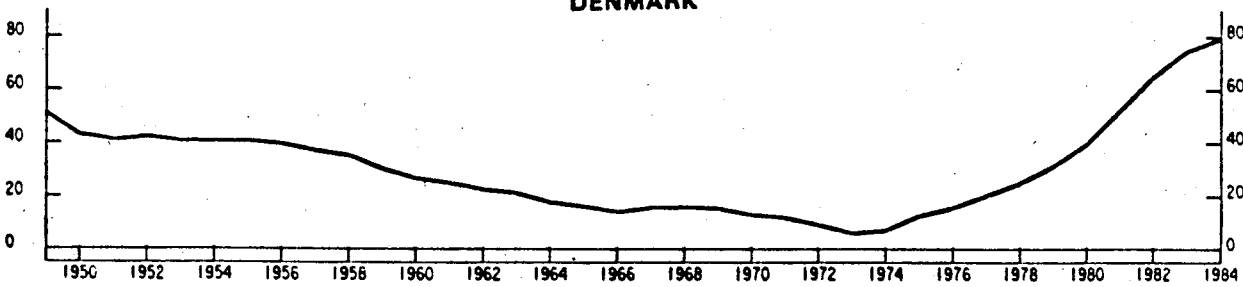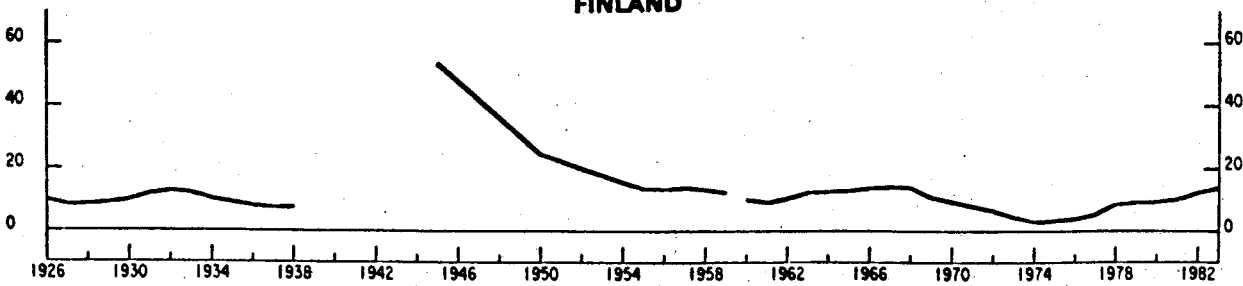
SWITZERLAND
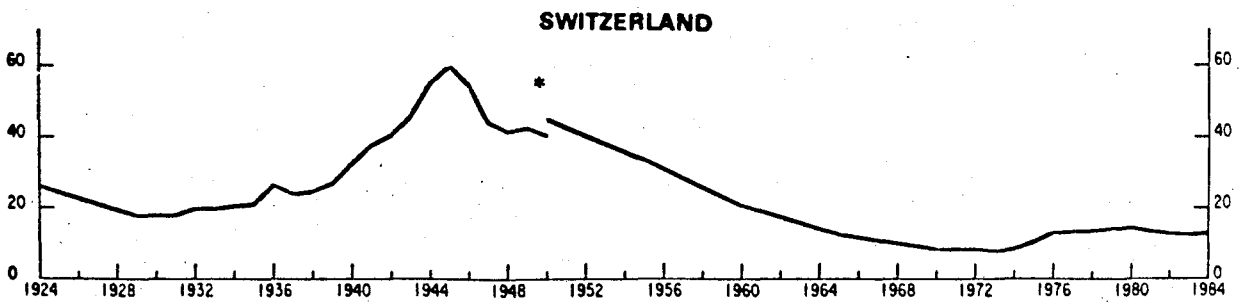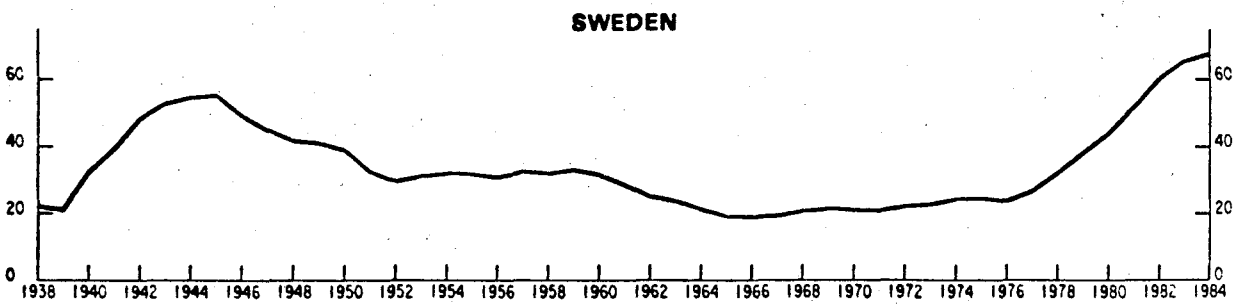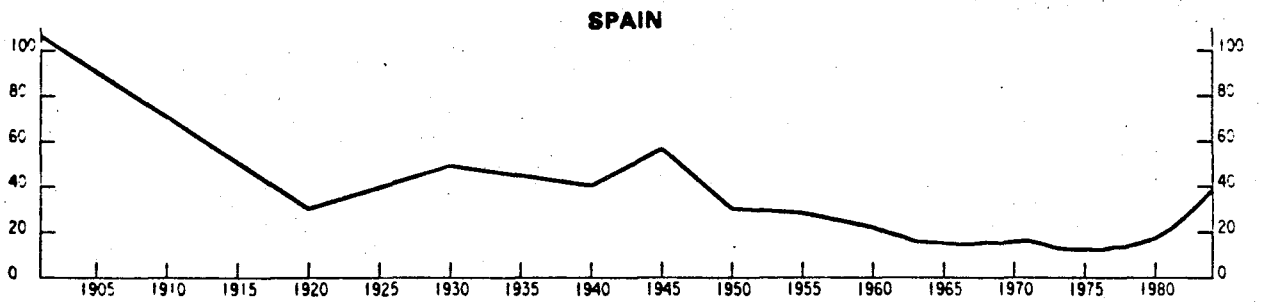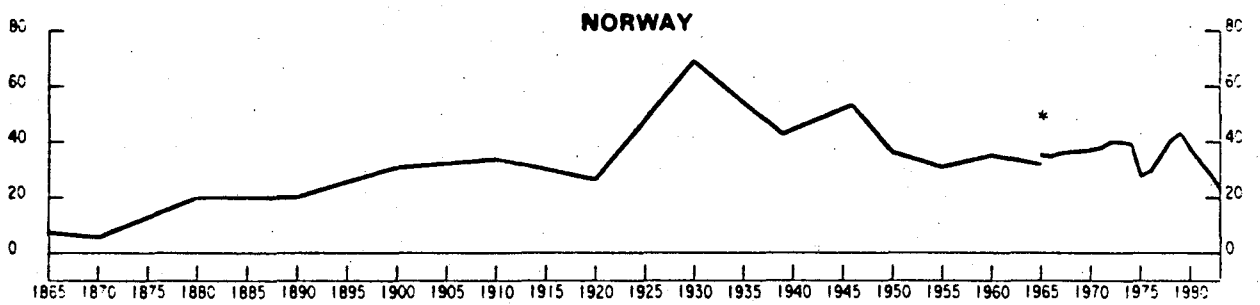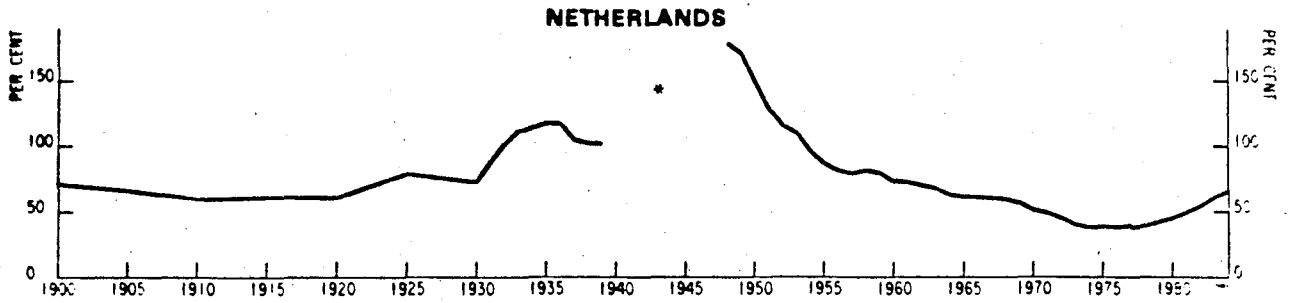
*Break in series.

Note to Chart A

The debt definitions used in this chart are the following (further details and sources for both debt and GNP data are available from the Secretariat):

UNITED STATES
    i) Gross federal debt held by the public 1940-85
    ii) Public debt of the Federal government 1870-1940

JAPAN
    Central government gross debt (Government bonds including short-term bills) 1880-1985 (Break in series in 1946)

GERMANY
    i) General government gross debt 1950-85 (change of definition in 1960)
    ii) General government gross debt, prewar boundaries 1928-1938

FRANCE
    General government gross debt 1938-1985 (change of definition in 1976 and only one pre-war observation)

UNITED KINGDOM
    National debt 1855-1985 (corresponds broadly to central government gross debt)

ITALY
    General government gross debt 1960-1985

CANADA
    i) Federal government gross debt 1972-1983
    ii) Federal government direct debt (excluding annuity accounts and sinking fund debt) 1867-1971

BELGIUM
    Central government gross debt 1924-1984 (Break in series 1960 related to debt of the Congo)

DENMARK
    Gross debt of central and local government (1949-1984) (Break in series 1958)

FINLAND
    Central government gross debt (total State debt) 1926-1983 (Break in series 1938, 1960)

NETHERLANDS
    General government net debt 1900-1984 (Break in series 1939)

NORWAY
    Central government gross debt 1865-1983 (Break in series 1965)

SPAIN
    General government gross debt 1901-1984

SWEDEN
    Central government gross debt 1938-1984

SWITZERLAND
   Central government gross debt 1925-1984 (Break in series in 1950)

CHART B

RECENT AND PROJECTED EVOLUTION OF NET DEBT/GNP RATIOS

DEBT PROJECTIONS ASSUMING

——— 1) A CONSTANT RATIO OF NON-INTEREST BUDGET
BALANCES TO GNP

········ 2) A RATIO OF NON-INTEREST BUDGET BALANCES TO GNP
MOVING TOWARDS ITS MID-CYCLE VALUE BY 1989

— — — 3) AS IN 2) BUT WITH INTEREST RATES FALLING TO
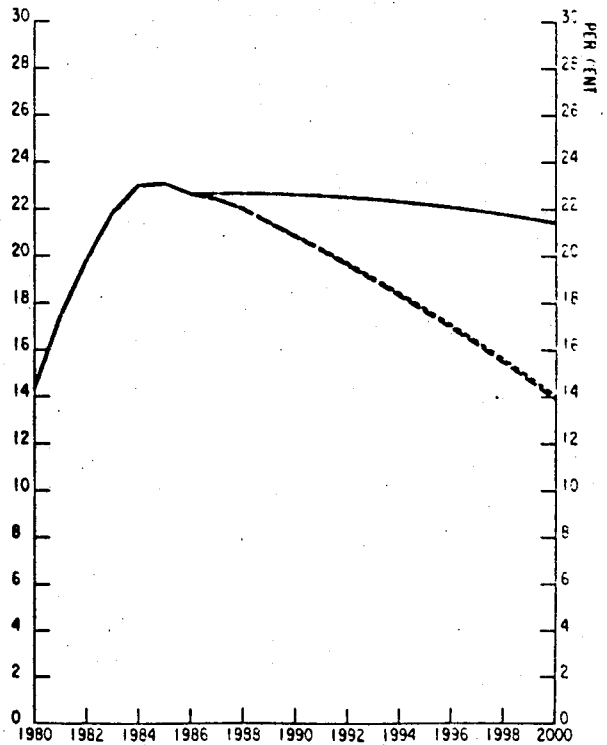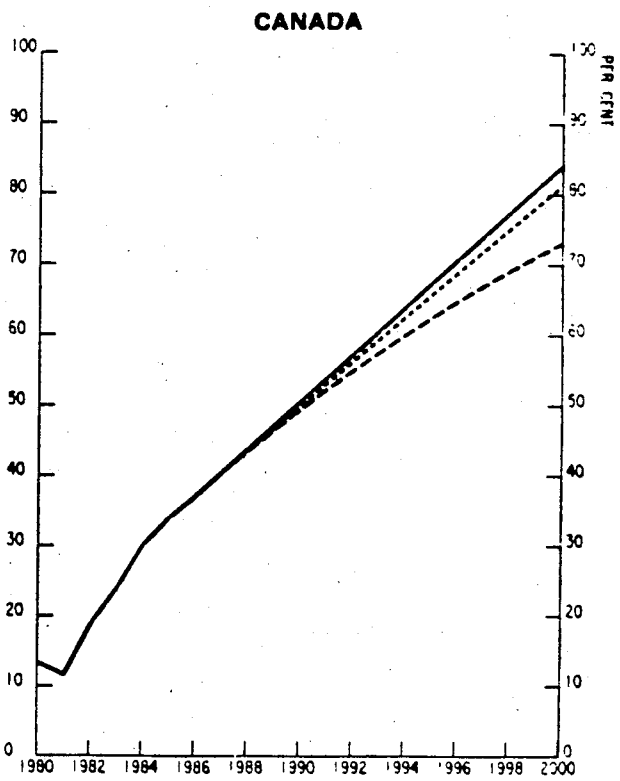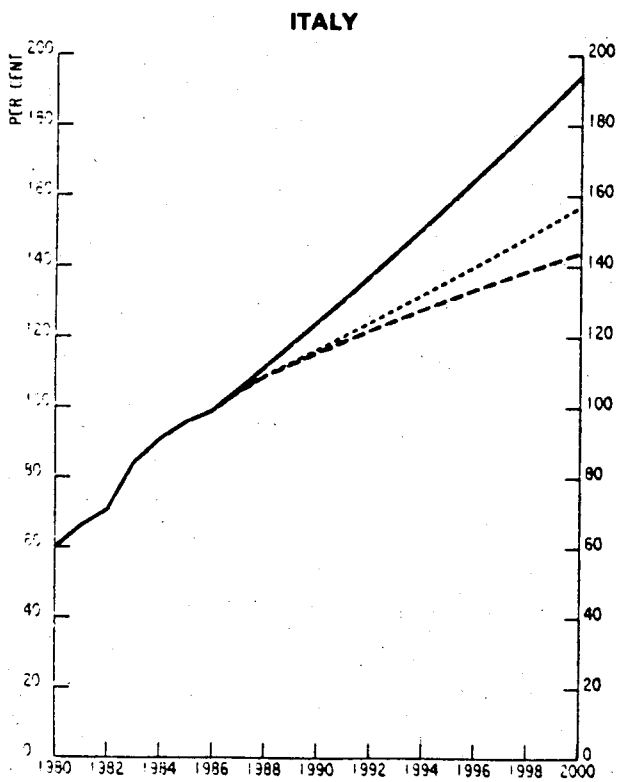NOMINAL GROWTH RATES BY 1989

UNITED STATES

JAPAN

GERMANY

FRANCE

UNITED KINGDOM

ITALY

CANADA

AUSTRALIA

AUSTRIA

BELGIUM

DENMARK
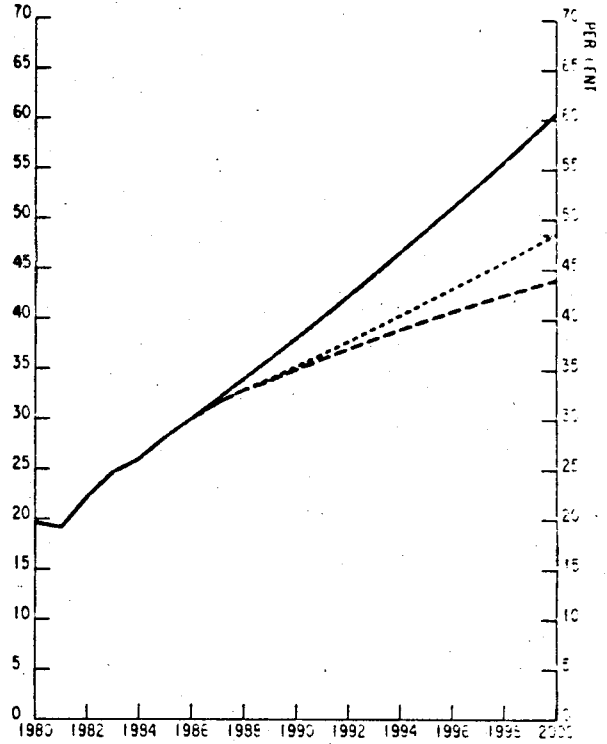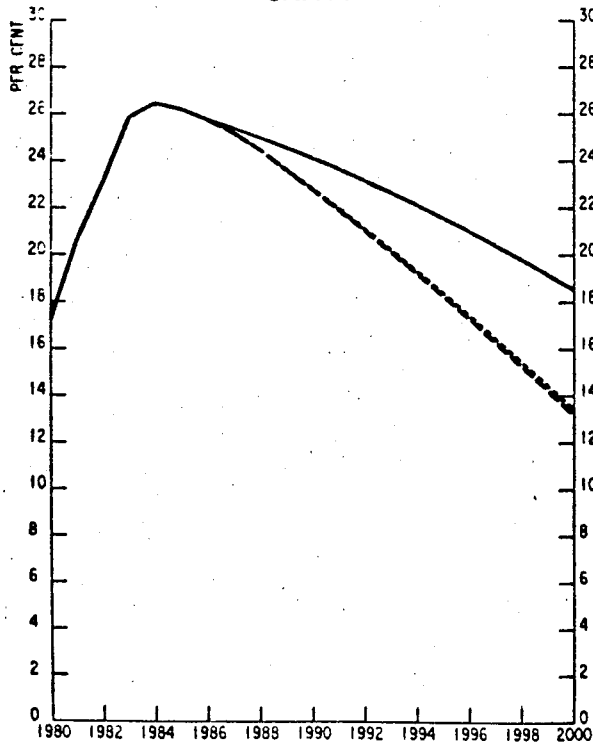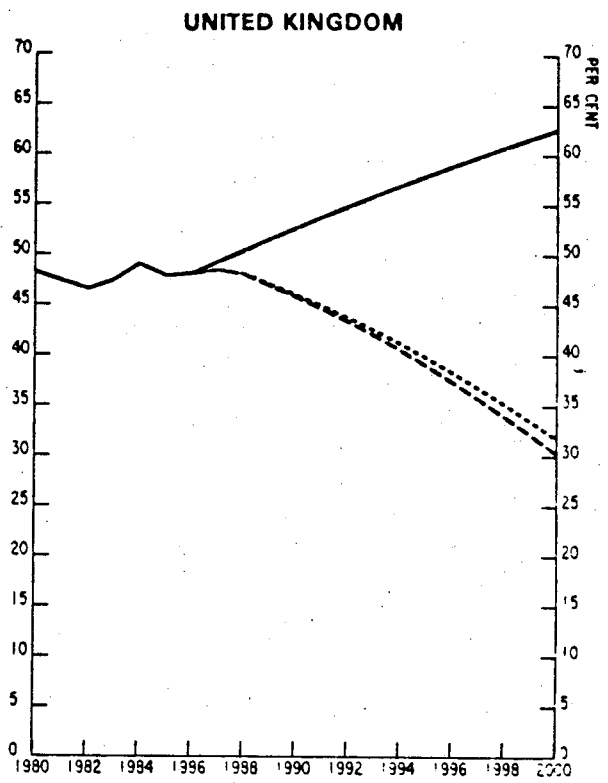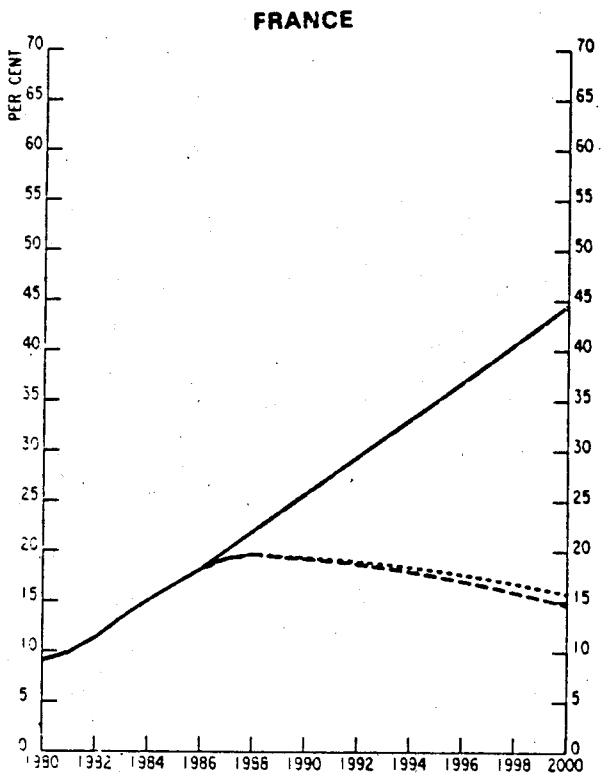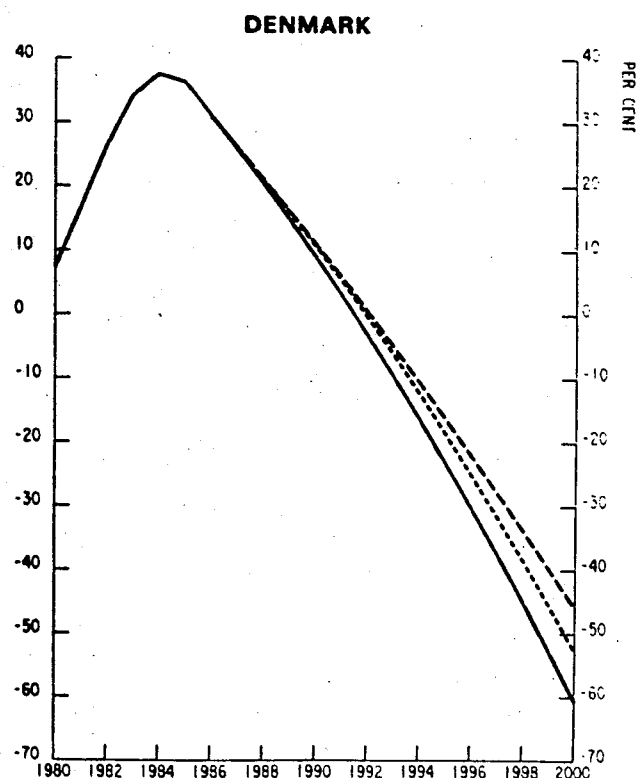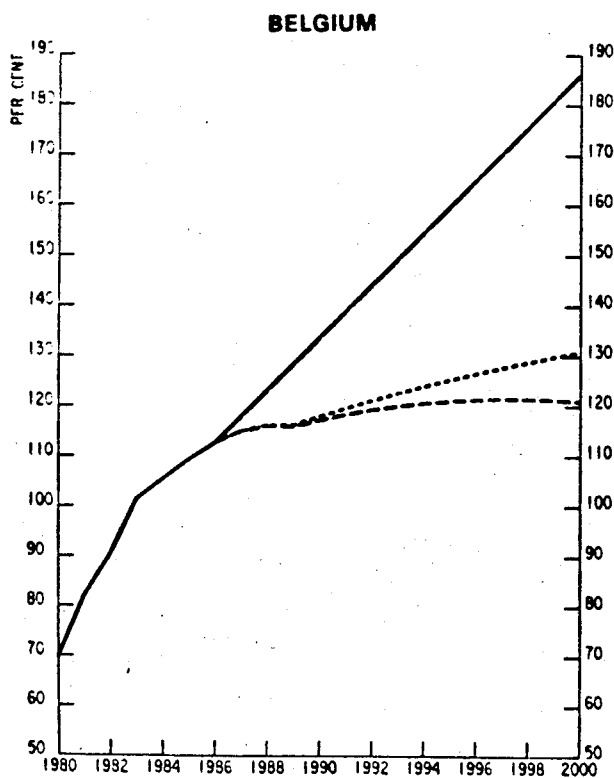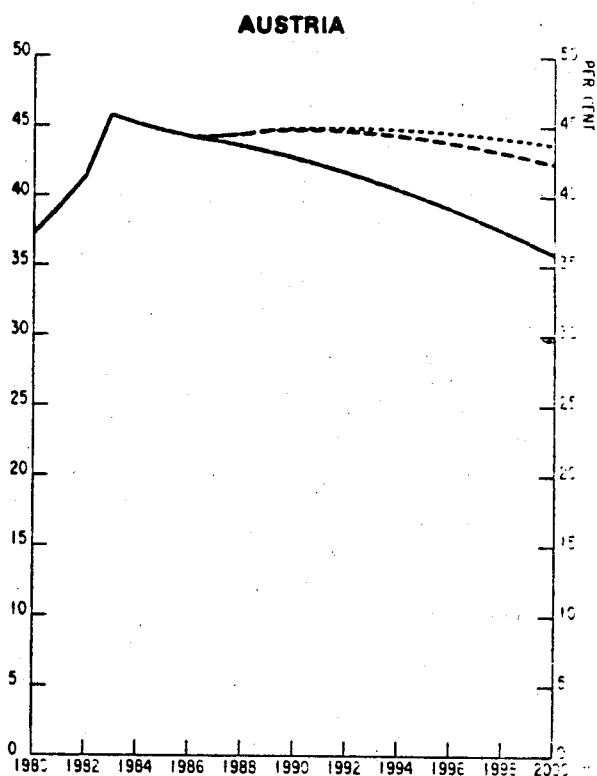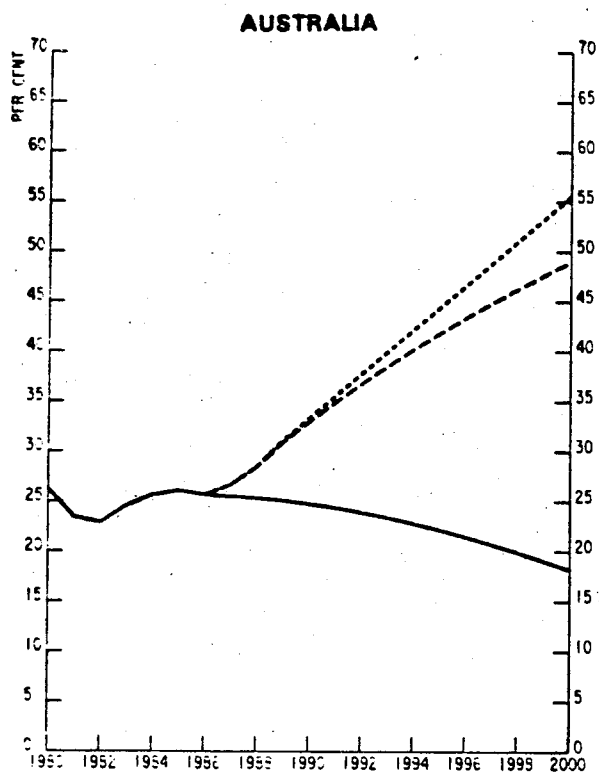
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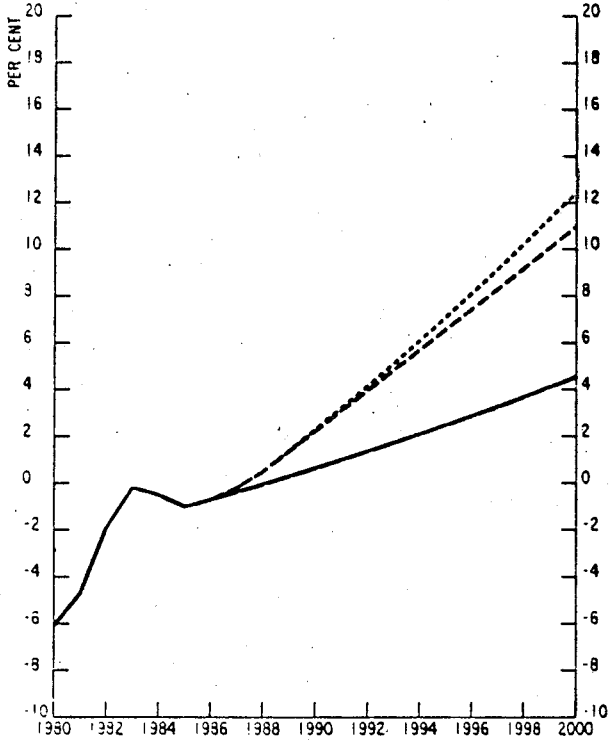
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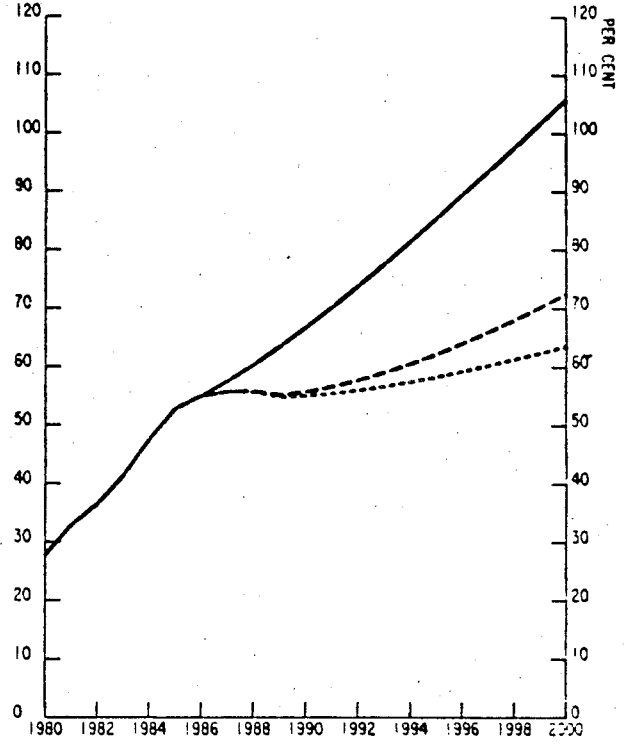
IRELAND

NETHERLANDS

NORWAY

SPAIN

SWEDEN
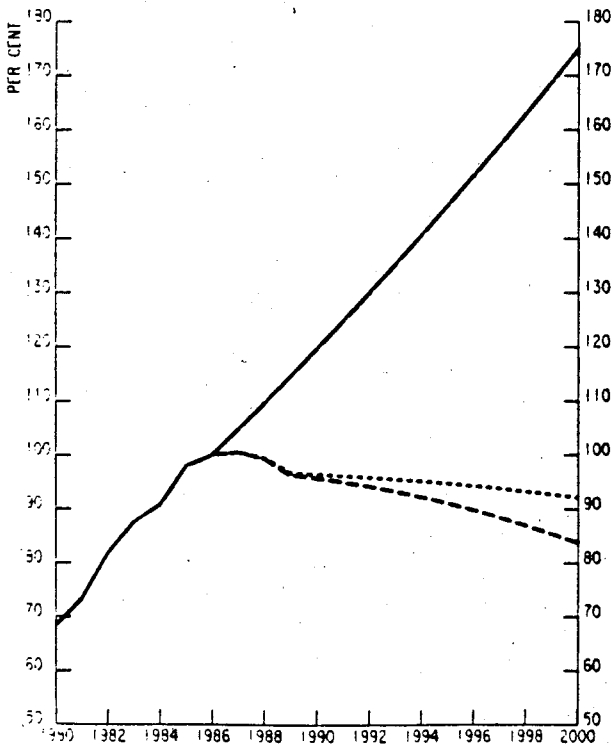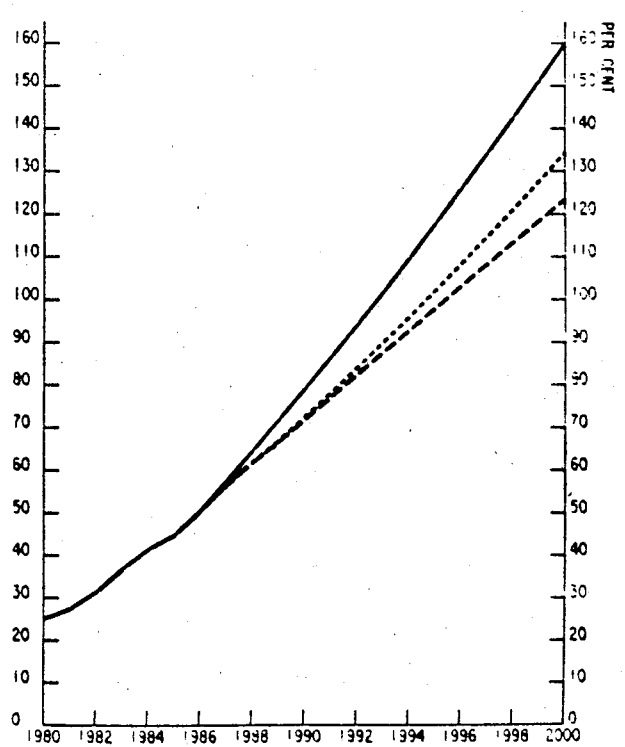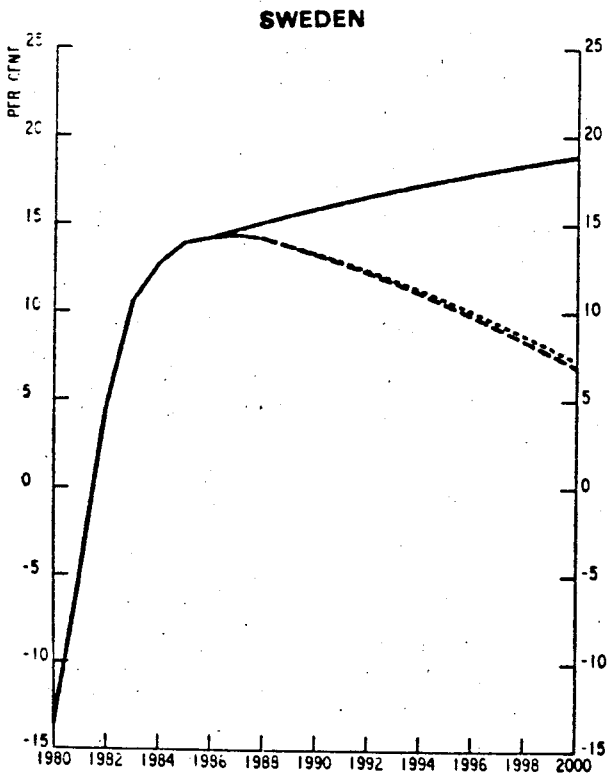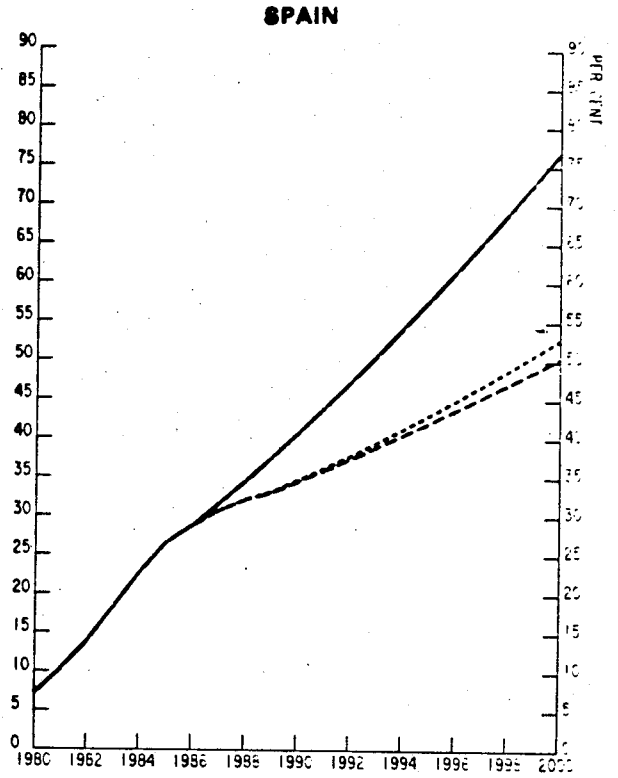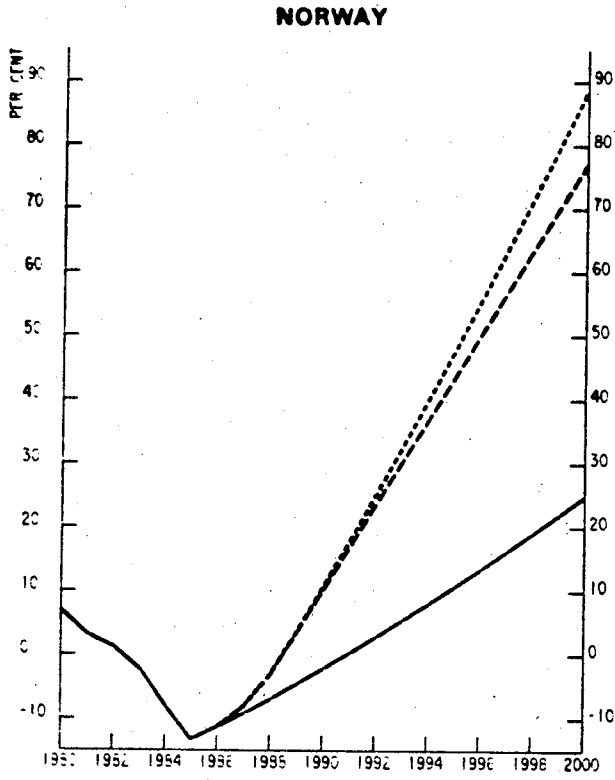
CHART C

PROJECTED EVOLUTION OF NET DEBT/GNP RATIOS,

INCLUDING DEMOGRAPHIC-INDUCED CHANGES IN PENSION COSTS

UNITED STATES

DEBT PROJECTIONS ASSUMING

——— 1) A RATIO OF NON-INTEREST BUDGET BALANCES TO GNP MOVING TOWARDS ITS MID-CYCLE VALUE BY 1999(EQUIVALENT TO ASSUMPTION 2 IN CHART B)

········ 2) AS IN 1) BUT WITH PROJECTED PENSION PAYMENT CHANGES AND WITH ANY MODIFICATIONS IN TAXES

JAPAN

GERMANY

- 48 -

CHART C (continued)

FRANCE

UNITED KINGDOM

ITALY

CANADA
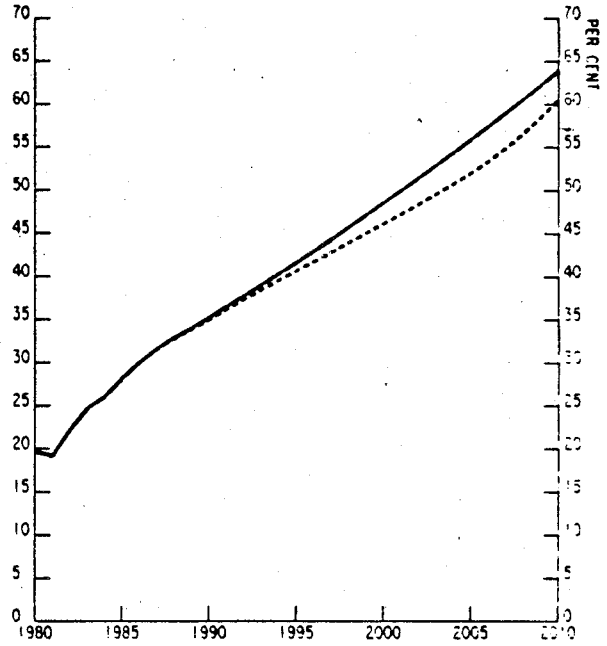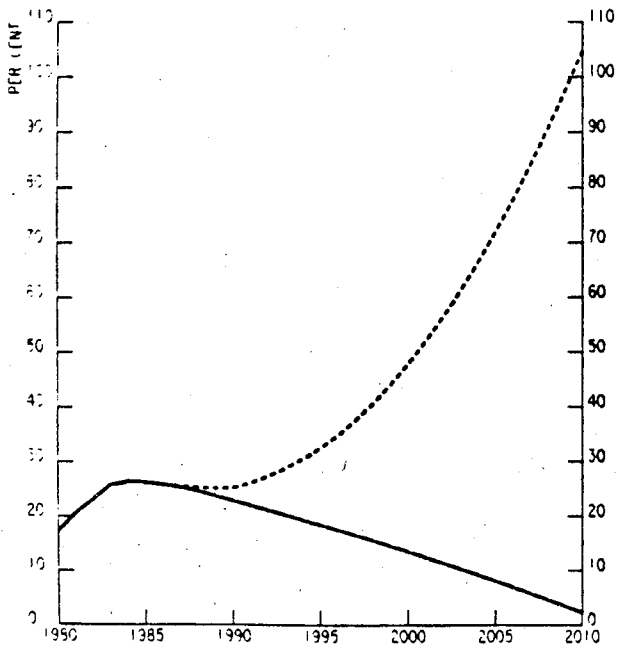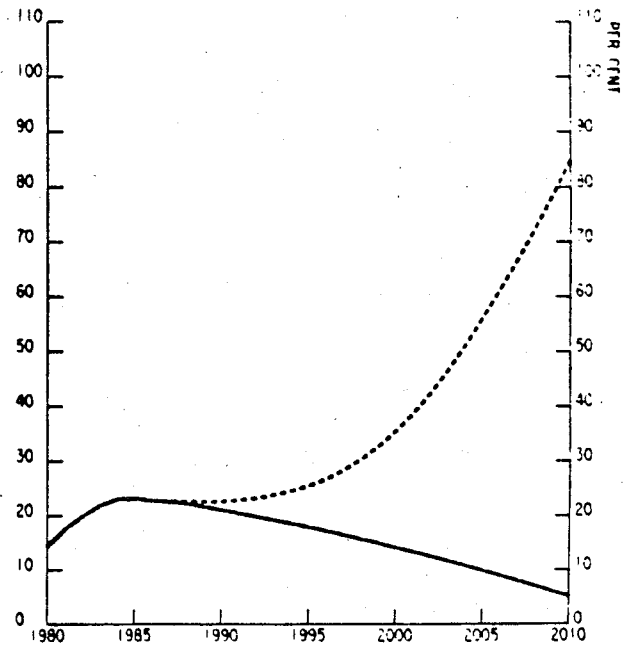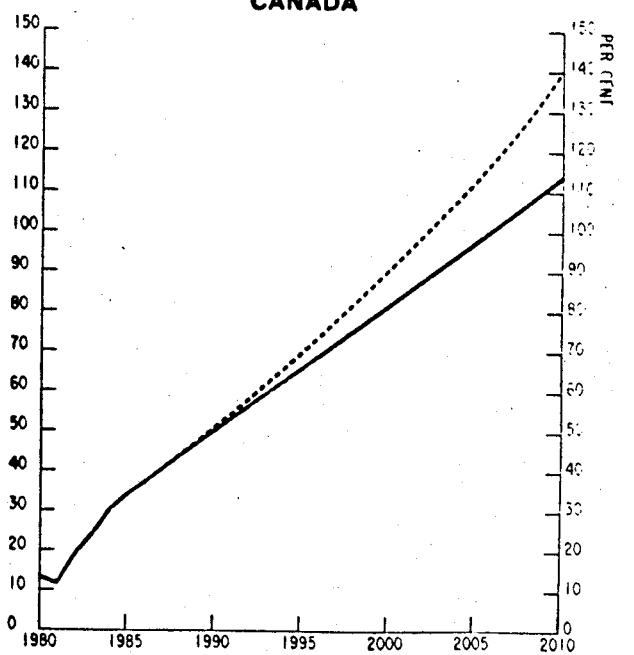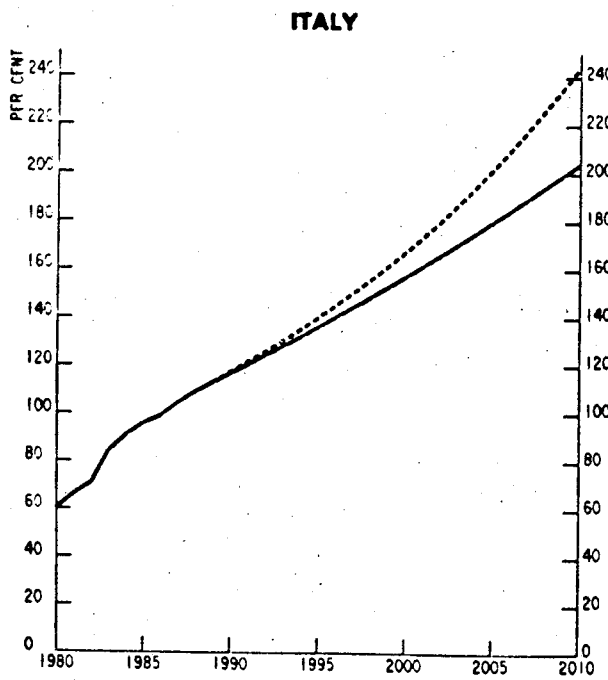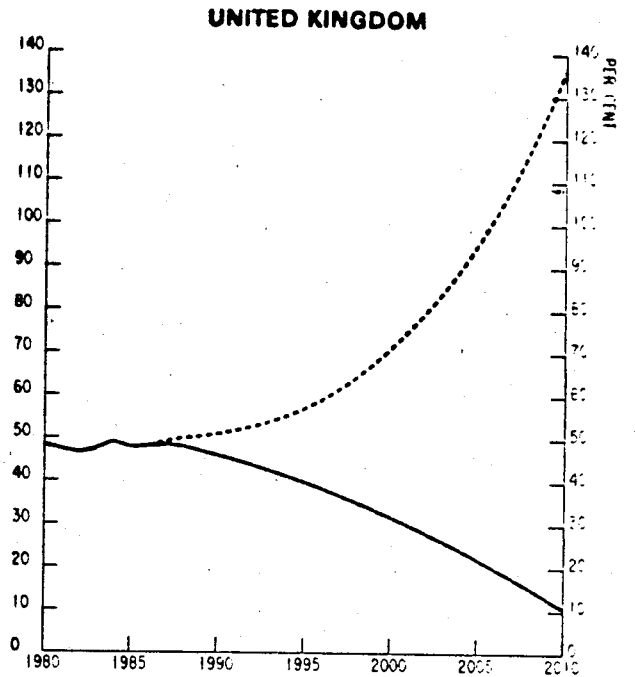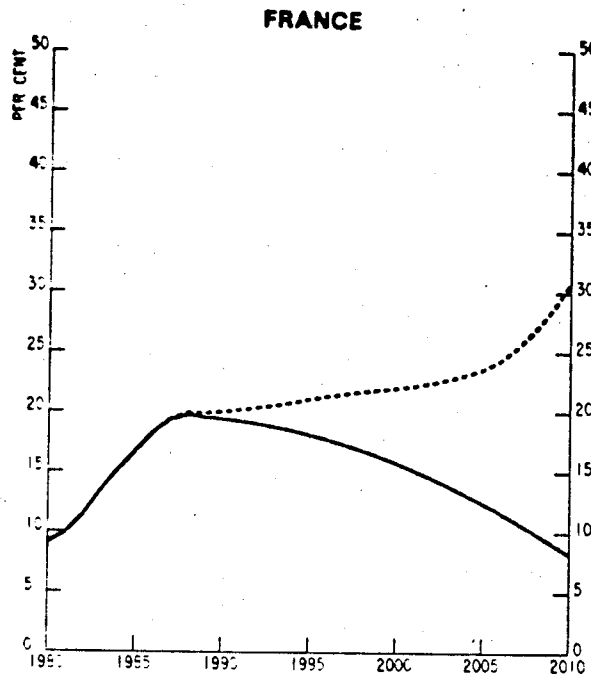
CHART C (continued)

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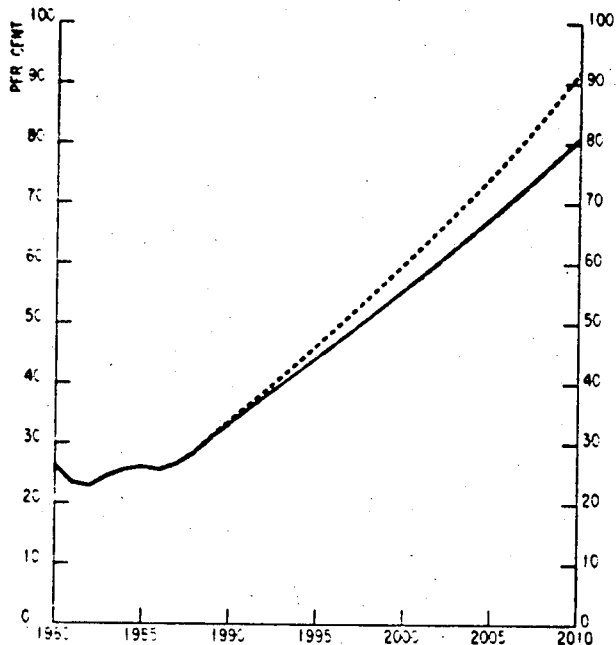
DENMARK
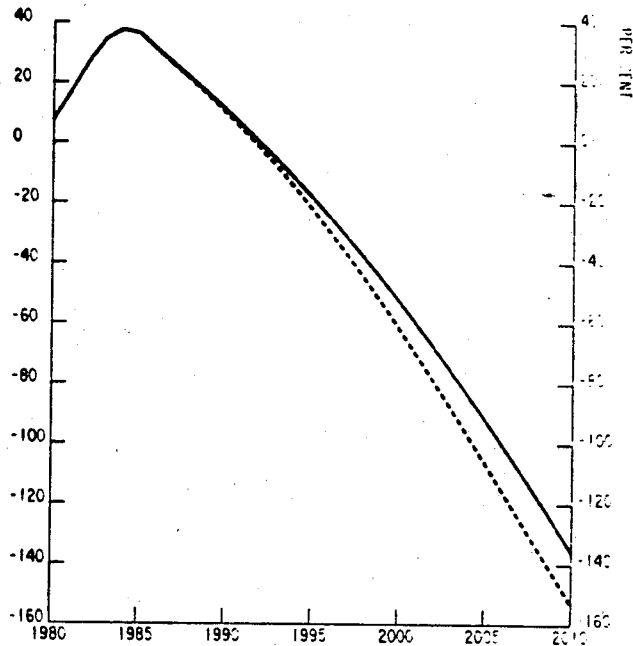
FINLAND
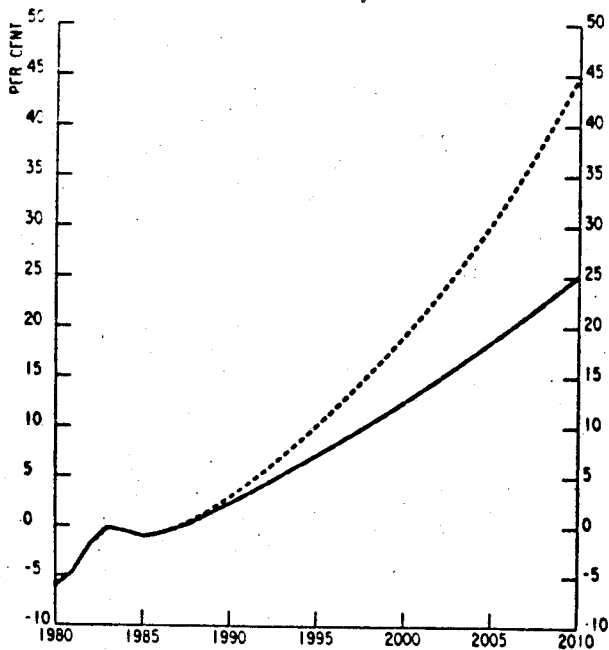
SWEDEN

CHART C (continued)

NETHERLANDS
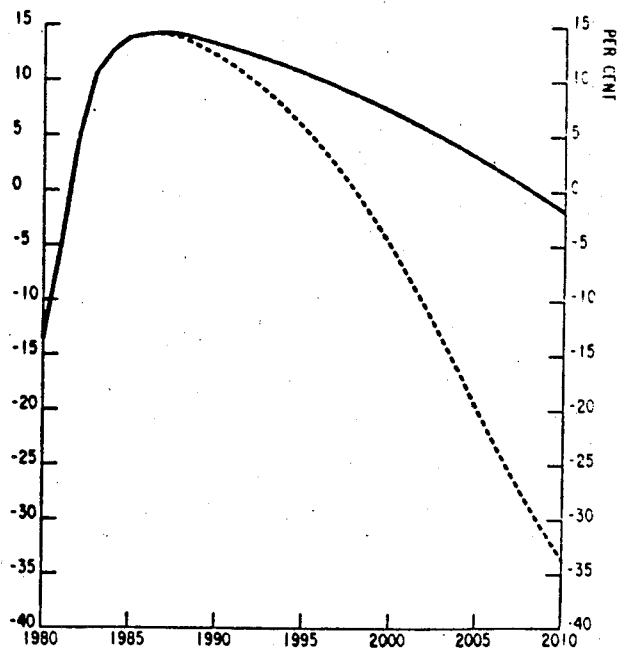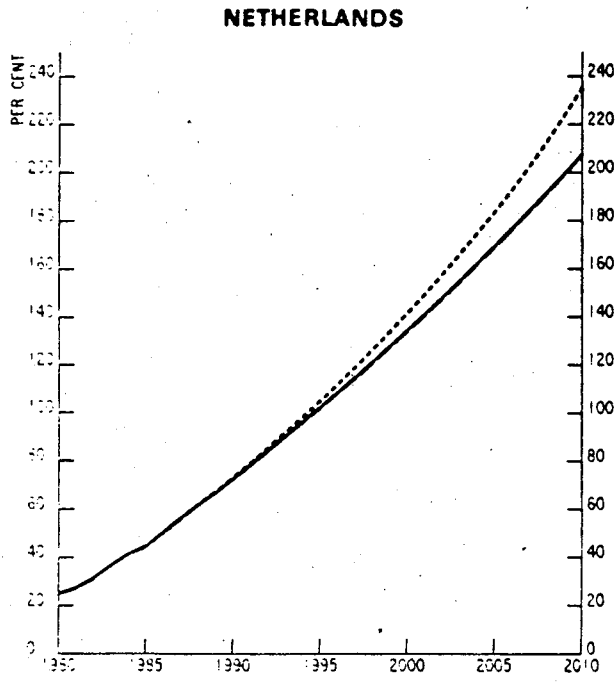
PROJECTIONS OF NET DEBT/GNP RATIOS
UNDER DIFFERENT FISCAL POLICY SCENARIOS

UNITED STATES

PER CENT

1) BASE CASE SCENARIO (EQUIVALENT
TO ASSUMPTION 2 IN CHART C)

2) 2% PERMANENT REDUCTION IN NON-
INTEREST BUDGET DEFICIT OVER
THE PERIOD 1987-1999

3) AS IN 2) OVER THE PERIOD
1989-1990

JAPAN

PER CENT

1) BASE CASE SCENARIO (EQUIVALENT
TO ASSUMPTION 2 IN CHART C)

2) 1% TEMPORARY INCREASE IN NON-
INTEREST BUDGET DEFICIT OVER
THE PERIOD 1987-1988

3) 1% PERMANENT INCREASE IN NON-
INTEREST BUDGET DEFICIT OVER
THE PERIOD 1987-2000

GERMANY

PER CENT

1) BASE CASE SCENARIO (EQUIVALENT
TO ASSUMPTION 2 IN CHART C)

2) 1% TEMPORARY INCREASE IN NON-
INTEREST BUDGET DEFICIT OVER
THE PERIOD 1987-1988

3) 1% PERMANENT INCREASE IN NON-
INTEREST BUDGET DEFICIT OVER
THE PERIOD 1987-2000

FRANCE

PER CENT

1) BASE CASE SCENARIO (EQUIVALENT
TO ASSUMPTION 2 IN CHART C)

2) 1/2 % PERMANENT REDUCTION IN NON-
INTEREST BUDGET DEFICIT OVER THE
PERIOD 1987-2000

3) 1/2 % PERMANENT INCREASE IN NON-
INTEREST BUDGET DEFICIT OVER THE
PERIOD 1987-2000.

UNITED KINGDOM

1) BASE CASE SCENARIO (EQUIVALENT
   TO ASSUMPTION 2 IN CHART C)
2) 1/2 % PERMANENT REDUCTION IN NON-
   INTEREST BUDGET DEFICIT OVER THE
   PERIOD 1987-2000
3) 1/2 % PERMANENT INCREASE IN NON-
   INTEREST BUDGET DEFICIT OVER THE
   PERIOD 1987-2000

ITALY

1) BASE CASE SCENARIO (EQUIVALENT
   TO ASSUMPTION 2 IN CHART C)
2) 2% PERMANENT REDUCTION IN NON-
   INTEREST BUDGET DEFICIT OVER
   THE PERIOD 1987-1988
3) AS IN 2) OVER THE PERIOD
   1989-1990

CANADA

1) BASE CASE SCENARIO (EQUIVALENT
   TO ASSUMPTION 2 IN CHART C)
2) 2% PERMANENT REDUCTION IN NON-
   INTEREST BUDGET DEFICIT OVER
   THE PERIOD 1987-1988
3) AS IN 2) OVER THE PERIOD
   1989-1990

THE CONCEPT OF GOVERNMENT NET WORTH

The case for a government balance sheet approach

The major rationale for using a balance sheet approach is that, by focussing on net worth, it provides a better measure of the government's overall position than do the usual concepts of gross or net debt. Because such an approach considers both financial and non-financial assets and liabilities of the government sector, changes in net worth are less subject to misinterpretation than changes in debt. For example, considering net worth rather than debt would allow for the distinction between government borrowing for public investment, justified when it generates a sufficient return, and borrowing for consumption, which is generally regarded as inadvisable, except for cyclical considerations. In addition the balance sheet approach avoids the danger of inappropriate conclusions being drawn from a failure to distinguish between income and outlay transactions and the purchase or sale of assets. In particular it allows a more appropriate treatment of the sale of public corporations and other assets or of the rapid depletion of natural resources. This is useful since fiscal policy is often analysed in terms of the extent of government saving or dissaving, which is itself closely related to changes in net worth.

Finally, a balance sheet approach can provide a benchmark for assessing the general orientation of fiscal policy. Constant net worth relative to GNP is a better approximation (especially if cyclically adjusted) to "neutral" policy than a constant debt/GNP ratio. However a constant net worth "strategy" will clearly only be useful if initial levels of net worth are considered appropriate. For instance, if present levels of government total assets are too high (because government is too active) or if the present extent of leverage (the debt to total assets ratio) is felt to be constraining the government's financial flexibility, then net worth should fall (in the first case) or rise (in the second). Net worth rules are less useful for setting fiscal policy because they do not uniquely determine the composition of the balance sheet nor the appropriate changes to spending and taxation.

Definition and measurement problems

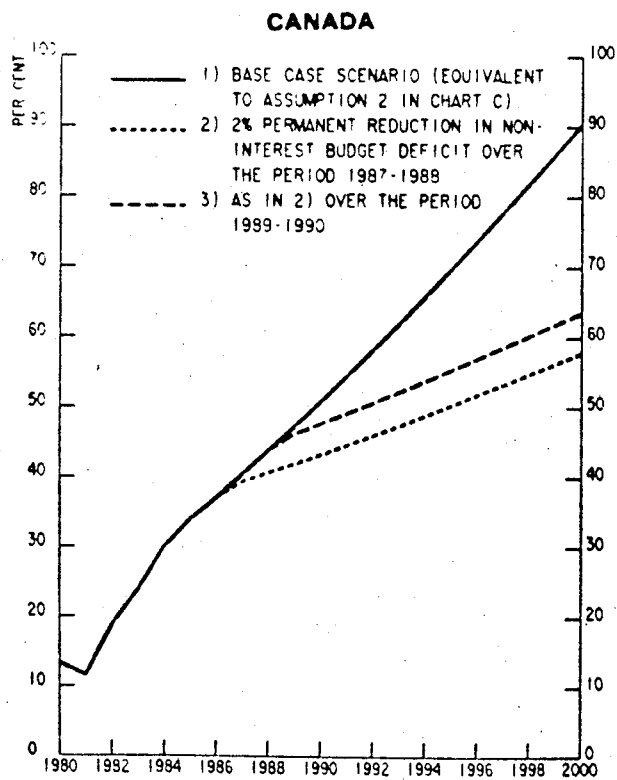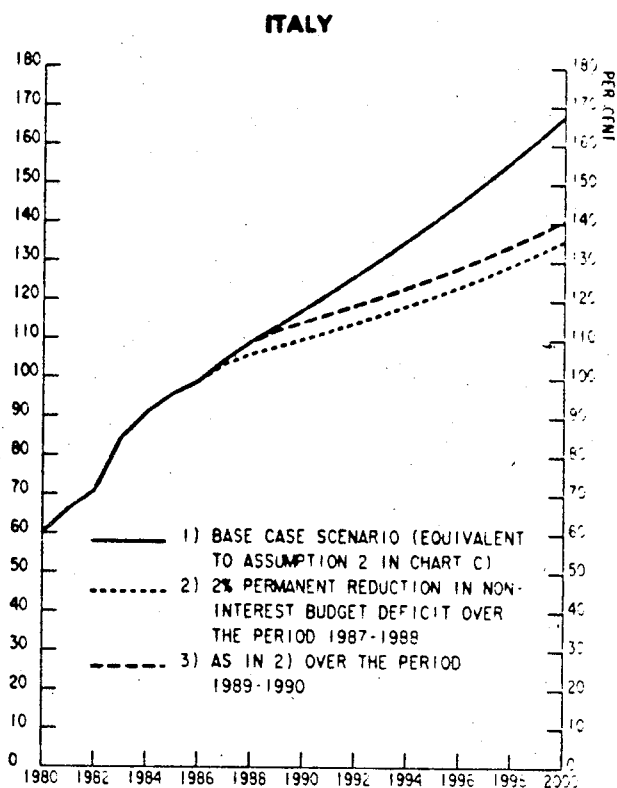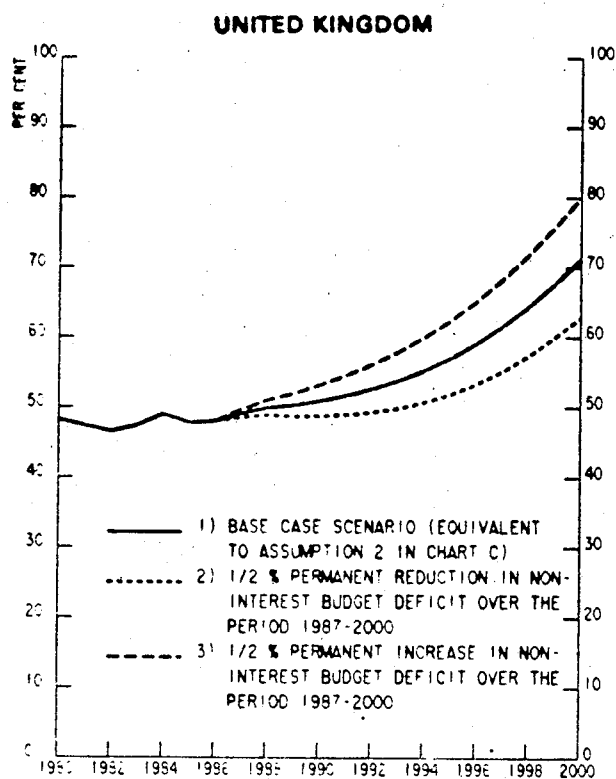The use of net worth as an indicator of fiscal policy raises a number of conceptual problems. First, the broadest concept of net worth, which includes the net present value of all taxes less government transfers and government consumption (on the basis of unchanged policies), is not very useful. This "solvency" approach, proposed by Buiter (1), can suggest that policies need to be changed at some point, but not when to change them. Furthermore, it is difficult to calculate such present values in a meaningful way. The attention paid to net worth in this paper is thus primarily limited to a discussion of how to measure and interpret specific, tangible non-financial assets and liabilities. The single exception is the treatment of future social security spending (pensions), where the budgetary consequences of unchanged policy are significant for many countries and where there are also conceptual issues closely related to public debt. Second, net worth itself is only a summary of the government balance sheet. The same net

worth can correspond to many different levels of gross government assets
-- which may be a measure of the extent of government activity. Moreover, a
given net worth may not provide an unambiguous indication of the government's
financial position. Non-financial assets are usually less liquid than
financial assets or liabilities, and for this reason net worth may
overestimate government's financial flexibility. Finally, non-financial
assets often yield non-pecuniary returns so that they will not represent
budgetary offsets to the burden imposed by debt service.

In addition to the conceptual limitations just described, there are
substantial measurement difficulties in implementing the net worth approach.
The following list gives an indication of the major problems involved:

i) Although United Nations guidelines recommend the use of market
valuations, these are often even more difficult to obtain for
non-financial assets and liabilities than for financial ones.
Public sector capital stock is usually estimated at replacement
value, which could differ substantially from market value since no
allowance is made for the quality of assets. For instance, in the
case of social infrastructure capital (with a non-pecuniary
return) replacement cost may be a poor indication of the price
governments would actually be prepared to pay to replace an
existing asset.

ii) The value of publicly-owned non-renewable natural resources
usually refers to the discounted flow of future royalties that can
be derived from them. This is extremely difficult to measure, in
part because known reserves are dependent on both existing
technology and commodity prices, but also because of the
probability of future discoveries. Moreover, great uncertainty
must be attached to any assumption about projected prices and thus
to estimated present values of royalties. For the United Kingdom,
estimates of North Sea oil reserves (and some of the measurement
problems involved) are discussed in Odling-Smee and Riley (2).

iii) In principle, the market value of government equity in public
corporations ought to be easier to estimate, using the "shadow
price" of comparable private sector enterprises. In practice,
this is not feasible for most cases. Published balance sheet
estimates for public corporations may be a poor indicator of their
true net worth, even if they are not based on historic cost. For
example, the true value of a loss-making public enterprise would
typically be less than its replacement value.

iv) Government contingent liabilities, representing guarantees of
loans to corporations or individuals, can also be hard to
evaluate. The correct procedure for such liabilities would be to
develop an actuarial estimate of the present expected value of all
future claims. This can change over time as a result of new
commitments as well as of changes in the probability of claims and
the possibility of claims in excess of formal guarantees. It is
obviously not possible to measure these with any precision.
However, it is not appropriate to simply include the total value
of loans guaranteed by the government in the balance sheet, even
though such information can be useful for assessing the extent of
government involvement in the economy.

Net worth estimates and the treatment of social security

The measurement difficulties posed by the balance sheet approach have so far deterred efforts to evaluate total government net worth. Exceptions in this respect concern the United States, Japan, the United Kingdom and Canada. There is, however, one category of non-financial asset -- the government capital stock -- for which figures are available for a larger number of countries. These are shown in Table A below -- from which Table 6 of the main text has been derived. They include both published data for eight countries (3)and Secretariat estimates for other economies, based on government investment flows. The latter are, of course, only broadly illustrative of the movements in the capital stock, but even the published figures are subject to a number of caveats. Adding these capital stock data to net financial assets provides a proxy for a narrow definition of net worth (see Table B).

Among the government liabilities not included in estimates of the debt, an ideal measure of the pension commitments from the point of view of the government's balance sheet would be net social security wealth -- calculated on the basis of the announced policies with regard to future benefit rates, including indexing arrangements. This measure would evolve over time with demographic changes and the resulting profile of social security debt could be compared with (and added to) the estimates of (non social security) debt derived from projections of non-interest budget deficits (net of pension benefits and contributions). Unfortunately it was not feasible to perform these calculations for a reasonable number of countries, using detailed institutional information. Estimates exist, however, for two countries, suggesting large numbers: a study on the United States (4), using a wide range of assumptions, presents estimates of the private sector's net social security "wealth" (the counterpart of the government's social security "debt") that differed by as much as a factor of 2. Even the smallest estimate was 92 per cent of GNP for 1977, compared with 43.4 per cent for conventionally measured gross debt (and 24.7 per cent for net debt). For Japan one analysis (5) suggests a figure of 90 per cent of GNP for the implied debt of that country's social security system in 1985 (compared with gross and net debt ratios of 69.5 and 27.5 per cent).

In order to quantify the evolution of pension costs in a relatively consistent manner across countries the paper considers how non-interest budget deficits (and thus the debt) may vary over time -- on an unchanged policy assumption -- as increased numbers of retired people affect the cost of social security. Constant policy explicitly ignores possible changes in real (relative) benefit rates or contributions, although in some countries these are envisaged (and even specifically allowed for in legislation). This assumption about benefits is useful for cross-country comparisons, while that about contributions is consistent with the policy goal (in many countries) of not increasing the tax burden. The OECD demographic projections are used to forecast the evolution of the dependency ratio from now to 2030. This ratio is taken to be the number of retired people (those over an age between 60 and 65 determined on the basis of current national practices) divided by the number of males and one half of the number of females between the age of 20 and retirement (as a proxy for the labour force). The ratio of pension costs to GNP for an initial year is determined (6) and thereafter is projected to be directly proportional to the dependency ratio. The baseline deficit-debt scenarios are then recalculated by adding to the non-interest deficit the

TABLE A

GENERAL GOVERNMENT CAPITAL STOCK
(AS A PERCENTAGE OF NOMINAL GNP/GDP)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
UNITED STATES	61.9	62.0	61.2	64.6	68.9	68.4	65.1	64.2	63.8	65.3	67.3	64.2	63.2	61.2	56.2
JAPAN	30.1	32.1	35.2	40.4	43.5	43.9	45.6	46.8	49.2	54.0	57.3	59.0	60.2	61.6	64.1
GERMANY	62.7	63.7	63.3	63.0	65.6	66.7	65.7	67.3	69.4	74.4	78.0	78.7	77.4	77.0	75.8
FRANCE	29.0	28.6	28.7	29.7	30.0	31.1	30.5	31.2	31.2	31.8	33.0	34.3	34.1	34.1	34.4
UNITED KINGDOM	62.6	64.5	69.6	78.7	84.3	81.9	78.0	73.6	73.0	77.1	79.1	75.9	69.2	65.5	67.7
ITALY (A)	40.0	40.5	40.3	38.6	38.0	40.5	39.3	39.4	39.0	39.4	40.3	43.0	46.2	49.3	50.8
CANADA	48.5	49.9	49.3	47.7	50.3	52.4	50.3	51.2	51.2	50.7	50.7	51.3	53.6	51.6	53.6
AUSTRALIA (A)	50.0	50.2	51.1	50.6	52.8	55.1	56.0	58.3	58.8	59.4	60.3	60.0	61.1	62.1	60.1
AUSTRIA (A)	50.0	51.4	52.4	53.6	55.4	59.4	60.0	60.7	65.2	63.5	64.8	67.5	68.4	69.2	69.3
BELGIUM (A)	50.0	51.0	51.2	50.4	50.3	53.0	52.3	54.0	54.9	55.7	57.1	61.3	62.6	64.2	65.2
DENMARK (A)	50.0	52.2	52.7	53.3	56.3	59.0	57.6	59.0	60.7	61.8	65.9	68.0	65.8	64.4	63.6
FINLAND	51.0	53.3	52.7	52.7	55.2	57.5	58.2	60.4	59.1	56.2	57.2	57.9	57.2	57.7	50.8
GREECE (A)	40.0	41.0	41.5	42.1	46.0	45.9	45.8	46.7	45.6	45.7	48.0	51.9	52.9	55.9	58.2
NETHERLANDS (A)	50.0	51.4	52.6	52.2	52.7	55.7	55.4	56.2	58.1	60.7	63.5	65.9	65.2	64.8	64.1
NORWAY	65.8	65.6	66.9	66.6	69.9	71.2	72.4	74.2	74.6	72.3	69.9	68.5	69.9	67.8	65.5
SPAIN (A)	40.0	40.2	38.9	37.7	37.2	38.5	38.7	39.1	39.4	39.8	40.6	41.7	43.0	43.2	42.7
SWEDEN (A)	50.0	54.2	57.3	58.7	60.2	61.4	63.4	67.3	69.0	68.6	69.2	71.3	71.0	69.9	66.9

(A) ILLUSTRATIVE SECRETARIAT ESTIMATE

NOTE: FOR DEFINITIONS AND METHODOLOGY SEE ANNEX II

Table B

GOVERNMENT NET WORTH AS A PROPORTION OF GNP/GDP
(Per cent)

		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
UNITED STATES																
General government	(a)	34.2	34.2	35.5	41.7	46.7	43.7	40.4	40.4	42.2	45.5	47.7	45.1	41.0	36.6	30.2(b)
JAPAN																
General government	(a)	36.6	39.4	41.8	46.6	48.9	46.1	43.7	41.4	38.0	39.2	40.1	38.4	37.1	35.8	37.7(b)
	(c)	40.8	42.8	46.7	52.2	51.9	47.7	44.0	40.2	36.3	37.6	39.2	37.1	34.4	31.0	n.a.
GERMANY																
General government	(a)	70.9	70.8	69.1	69.7	70.3	65.8	61.1	60.3	60.0	62.9	63.7	61.2	57.6	55.2	52.8
FRANCE																
General government	(a)	17.6	17.7	19.6	21.4	21.3	20.1	19.6	21.0	21.0	22.1	23.9	24.5	22.8	20.8	19.3
UNITED KINGDOM																
General government	(a)	-12.4	-6.0	4.8	21.2	29.4	24.3	21.0	17.7	19.5	28.4	30.9	28.6	22.7	18.1	18.7(b)
	(d)	n.a.	n.a.	37.1	n.a.	n.a.	55.6	53.6	44.9	48.0	54.9	56.2	53.2	40.1	35.7	n.a.
Public sector	(d)	n.a.	n.a.	n.a.	n.a.	n.a.	94.3	89.6	80.9	85.1	94.2	96.0	92.5	76.1	69.1	n.a.
ITALY																
General government	(e)	0.8	-3.6	-9.7	-13.4	-11.2	-19.4	-21.6	-21.3	-25.5	-26.2	-19.6	-23.1	-24.6	-34.8	-40.2
CANADA																
General government	(a)	42.2	45.2	45.1	45.0	49.3	48.1	45.1	44.2	39.7	38.3	37.5	39.8	34.9	27.7	23.6
	(f)	46.1	49.1	49.1	50.0	55.7	55.5	52.5	52.6	48.2	47.5	46.9	49.5	45.4	37.8	34.7
Public sector	(f)	59.4	63.7	64.3	65.3	71.5	72.4	70.3	71.9	71.4	70.3	69.0	72.2	67.7	59.7	57.1
AUSTRALIA																
General government	(e)	8.3	11.9	15.2	18.8	23.7	26.5	28.2	29.2	28.6	30.2	34.0	36.6	38.2	37.6	34.5
AUSTRIA																
General government	(e)	30.6	33.2	34.9	36.1	37.8	35.5	32.6	30.7	29.4	27.5	27.6	28.3	27.1	23.5	24.2
BELGIUM																
General government	(e)	-11.4	-10.2	-8.6	-6.3	-3.5	-1.1	-1.9	-4.1	-6.0	-9.8	-12.7	-20.8	-27.8	-35.2	-40.2
DENMARK																
General government	(e)	52.9	57.7	61.8	65.6	69.9	69.1	65.3	64.0	62.8	59.9	58.7	51.5	39.5	30.3	26.1
FINLAND																
General government	(a)	56.0	60.7	60.8	63.4	65.8	67.0	68.8	70.4	67.4	63.0	63.3	62.6	59.1	58.0	51.3(b)
GREECE																
General government	(e)	18.7	19.1	18.4	22.7	25.7	23.5	23.7	24.3	16.2	18.1	20.3	19.0	16.5	14.5	10.8
NETHERLANDS																
General government	(e)	21.0	23.7	28.1	31.2	33.6	36.0	35.1	36.9	38.1	38.8	38.6	38.5	34.0	28.0	22.7
NORWAY																
General government	(a)	63.3	63.0	66.3	68.0	71.7	70.5	68.9	64.7	60.5	55.5	63.0	65.4	68.7	70.0	73.6
SPAIN																
General government	(e)	37.1	37.3	36.8	36.0	35.8	37.2	38.0	37.1	36.4	34.8	33.5	31.4	29.2	25.0	20.1
SWEDEN																
General government	(e)	74.0	81.7	86.9	89.9	90.3	90.2	93.1	96.2	94.3	88.5	82.8	76.5	66.5	59.4	54.2

a.   Capital stock (national sources) less net financial liabilities (OECD data).

b.   Using Secretariat estimates of capital stocks for 1984.

c.   As published (includes land, timber tracts and corporate shares which have declined as a proportion of GNP).

d.   Capital stock plus "net financial wealth" (measured at market prices, data from "Financial Statistics").

e.   Capital stock (illustrative Secretariat estimates) less net financial liabilities (OECD data). The levels shown are arbitrary, but the changes from year to year should be broadly correct.

f.   As published in the "National Balance Sheet Accounts" with non-financial assets valued at market prices (includes land and inventories).

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difference between the projected pension costs and the starting level (as a share of GNP). This assumption allows the simulations to consider the consequences of demography at the margin (7). It is, of course, only a stylised representation of the pension systems (8).

An alternative perspective on the magnitudes of social security "debt" is to consider how much it would cost to liquidate the social security system. Governments would have to maintain payments to those presently retired (or provide them with bonds of an equivalent value) while the minimum that could credibly be offered those still working would be the present value of past contributions (by both employers and employees), with no allowance for pension promises implying an actuarial value greater than contributions. This minimum can, under suitable simplifying assumptions, be calculated to provide a cross-country comparison of the debt associated with public pension schemes. Under the assumptions that:

    i) the plans are mature, operating in a steady state;

    ii) pensions increase with the average salary so that it is possible to use the growth rate of nominal wages as a discount rate;

    iii) the length of contributions over a lifetime averages 36 years;

and using the 1983 benefit and contribution rates, the debt issue that would be required to liquidate the pension system would be as indicated (for the large OECD countries) in Table C, which also shows the conventionally measured net debt. There would, in some cases, be an offset from social security assets but, except for Japan, these are generally fairly small.

Table C

SOCIAL SECURITY LIABILITIES AND CONVENTIONAL MEASURES OF PUBLIC DEBT

	Cost of ending social security as a percentage of GNP	Ratio of net debt to GNP
United States	135.0	26.8
Japan	66.5	27.4
Germany	161.1	23.0
France	130.1	15.1
United Kingdom	91.8	49.2
Italy	229.6	84.1
Canada	25.8	31.0

Source: OECD estimates.

NOTES TO ANNEX II

1. W. Buiter, "A Guide to Public Sector Debt and Deficits", Economic Policy, November 1985.

2. J. Odling-Smee and C. Riley, "Approaches to the PSBR", National Institute Economic Review, August 1985.

3. Data for net capital stock of the general government sector valued at current replacement prices are available for the United States, Japan, Germany, France, the United Kingdom, Canada, Norway and Finland. Detailed sources are available from the Secretariat on request. The data for Norway are for the gross capital stock, and there are minor differences in coverage across countries. For instance, the data for France exclude roads and include inventories, while the data for Germany exclude structures other than buildings but include roads. It is the exclusion of roads that explains the relatively low figures for France.

4. D.R. Leisner and S.D. Lesnoy, Social Security and Private Saving: A Re-examination of the Time Series Evidence Using Alternative Social Security Wealth Variables, Social Security Administration Office of Research and Statistics Working Paper, November 1980.

5. Economic Planning Agency of Japan, The Current State of the Japanese Economy, 1985.

6. For the six largest economies, Australia, Denmark and the Netherlands, the data are taken from Peter Saunders and Frielrich Klau, "The Role of the Public Sector", OECD Economic Studies, No.4, Spring 1985, Table 9, p.52, for Canada from the federal budget for 1983, and for Sweden and Finland from national statistical year books for 1982.

7. The debt simulations that incorporate pension cost changes do not include a measure of social security debt; they only take account of the effect at the margin of social security payments. The surplus/deficit of the social security system in the initial year is already included in the non-interest deficit of the base case projections. The net debt projections also do not show what is happening to social security assets. For instance these may be growing but for a given net debt outlook this would mean a higher gross debt for the general government sector.

8. Specific national characteristics should be noted. The starting point for the Japanese pension costs would underestimate the growth in outlays with unchanged benefit rates because of the fact that present retirees have lower entitlements relative to lifetime earnings than will be the case in the future. This has been offset by using estimates that take account of the maturing of the pension system. A similar approach has been used for the United Kingdom, where the costs of the existing state earnings-related pension scheme would, in the absence of reform, rise quickly despite a favourable demograhic situation. The Canadian public pension system is also in transition but the estimate of costs for the initial year may not be as much of an underestimate because it includes payments under a means-tested scheme, which should shrink as the coverage of the income-related plan increases among those retired.

ANNEX III

METHODOLOGY UNDERLYING THE PUBLIC DEBT PROJECTIONS

This annex describes the method used to calculate the projections of debt/GNP ratios presented in Parts III and IV. It first defines the link between a fixed overall budget deficit/GNP ratio and a constant long-run debt/GNP ratio. Given that a fixed government deficit will not be compatible with unchanged fiscal policies if debt interest payments are growing, it then determines the conditions under which a fixed "non-interest" budget deficit/GNP ratio will allow the debt/GNP ratio to "explode" (namely where interest rates are greater than growth rates and the non-interest budget balance is less than a threshold value). Finally from this analysis of debt stability, it develops a model allowing the evolution of debt/GNP ratios to be simulated. This is used to quantify the effect of fiscal policy on public debt levels and to investigate the consequences for debt of alternative fiscal policy scenarios.

A.   Projections of the debt/GNP ratio with a fixed overall budget deficit

With $b(t)$ representing the budget deficit as a proportion of nominal GNP in year t and y the annual rate of growth of nominal income, the debt/GNP ratio $d(t)$ will then evolve as follows:

$$d(t) = d(t-1)(1+y)^{-1} + b(t) \tag{i}$$

If the budget deficit/GNP ratio is fixed (at b_0), then

$$d_t = d_0(1+y)^{-t} + b_0 \sum_{i=0}^{t-1} (1+y)^{-i} \tag{ii}$$

$$d_t = \frac{b_0(1+y)}{y} \text{ as } t \text{ tends to infinity.} \tag{iii}$$

It should be noted that, in such an equation, the long-run debt ratio does not depend on the initial level of debt. Moreover, the speed with which the debt evolves towards the steady-state value is a function of the rate of growth of nominal income. In particular the higher the rate of inflation the faster the adjustment of debt involved. Table D shows what the equilibrium general government debt/GNP ratios would be for most OECD countries, given the budget deficits and inflation rates projected for 1986 and the estimated trend growth in real output. In order to provide an indication of the speed with which this long-run value would be approached, the table also shows what the debt ratios would be in 1990 and 1995.

STEADY-STATE DEBT/GNP RATIOS CONSISTENT WITH 1985 BUDGET DEFICITS

Country	1985 net debt ratio	1985 deficit/ GNP ratio	Nominal income growth	Steady- state debt ratio	1990 debt ratio	1995 debt ratio
United States	30.0	3.4	5.5	65.5	36.8	43.5
Japan	25.8	0.8	4.4	17.9	24.5	23.2
Germany	22.5	0.3	3.6	23.7	22.8	22.9
France	18.2	2.6	4.7	58.1	24.9	31.7
United Kingdom	48.1	3.2	4.8	70.8	51.9	55.9
Italy	99.1	12.9	7.8	177.4	119.4	137.6
Canada	57.0	5.0	5.0	103.5	48.3	60.8
Australia	25.6	2.2	9.6	24.6	25.3	25.0
Austria	44.2	2.1	5.5	39.8	43.3	42.5
Belgium	112.6	9.7	4.4	228.1	131.0	149.9
Denmark	30.9	-2.9	6.0	-51.5	13.7	-2.9
Finland	-0.7	0.3	6.3	4.4	0.4	1.4
Greece	55.0	10.4	18.3	66.9	60.8	64.3
Ireland	100.1	10.5	6.9	164.1	115.1	128.9
Netherlands	50.4	6.9	0.8	924.3	76.0	107.0
Norway	-11.4	1.8	0.3	210.1	-4.1	4.7
Spain	28.7	5.3	11.0	53.1	37.0	43.5
Sweden	14.2	1.2	5.8	21.8	15.7	17.2

Source: OECD.

B.   Projections of the debt/GNP ratio with a fixed non-interest deficit

It is now supposed that the non-interest budget deficit is fixed as a proportion of GNP:

$$b(t) = g - s + i(t) \qquad \text{(iv)}$$

where $i(t)$ is the proportion of interest payments to output and g and s are the fixed ratios of non-interest expenditures and revenues to output (1). Interest payments in year t will then be:

$$i(t+1) = i(t)(1+y)^{-1} + r(g-s+i(t))(1+y)^{-1} \qquad \text{(v)}$$

where r is the average rate of interest on new debt -- neglecting the effect on interest costs of rolling over existing debt (2). The debt/GNP ratio in each year depends on the previous year's ratio and the budget deficit according to equation (i); by using equations (iv) and (v) the debt path can be determined.

One can show that this means that the debt ratio will always be stable if $y > r$ (3). On the other hand, if $y < r$, the debt ratio will tend to explode when $s-g < (i_0/r)(r-y)$, while the government would eventually accumulate infinite assets if the non-interest balance were greater than this threshold. If the original debt earned the average interest rate, this is the same as $s-g > (r-y)d_0$ (4). Thus the threshold value of the primary budget balance increases with both the initial debt ratio and the difference between the interest rate and the growth rate. It is, of course, implausible to assume that this balance will stay unchanged at some value different from the threshold, leading to infinite indebtedness or budget surplus. This stresses the limits of scenarios derived from such constant policy propositions when they are extrapolated out over very long time periods. Policies do change, so that the mechanical scenarios presented in Part III are mainly for illustrative purposes.

C.   Simulating the debt/GNP ratio

Equation (i) can also be used to simulate the future behaviour of the debt/GNP ratio. This requires assumptions about the course of fiscal policy, inflation, interest rates and real growth. The rationale for using such a simple approach is that the focus of the paper is the medium term. Large econometric models do not have satisfactory baselines over the requisite number of years. Moreover, to the extent that present policy configurations give rise to unsustainable debt accumulation (or decumulation) paths, the lessons from a mechanical simulation will be clear, even if the results do not take account of all the macroeconomic linkages. It would be very difficult to ensure that a macro model had features sufficiently sophisticated to guarantee appropriate treatment of expectations, financial market behaviour and crowding-out in the long run.

The simulations presented in the paper have been derived using the mechanical approach just described. The first, corresponding to curve 1 in Chart B, is based on the assumptions that:

     i) fiscal policy does not change (in the sense that the non-interest budget balance is held constant at its 1986 level);

    ii) inflation and interest rates remain at their 1986 levels; and

   iii) real growth is at trend rates from the 1986 level of output.

However, to the extent that the 1986 output is above or below its mid-cycle or trend level, it is legitimate to assume that this gap would not subsist over the time horizon considered. An alternative simulation (corresponding to curve 2 of Chart B) is thus that this gap disappears during the first three years of the projection. (The size of the gap between 1986 projected output and the mid-cycle level, as well as the implications for real growth of eliminating the gap over the years 1987-1989 are shown in Table E.) This

scenario does not necessarily imply that such a return to the mid-cycle position will occur at that time. Rather it is merely designed to ensure a medium-term debt profile consistent with the hypothesis of unchanged policy. It does presume that the economy will return to normal levels of output without changes in policy, in particular without fiscal stimulus. It should be noted that the simulations are more sensitive to the level of the gap assumed in 1986 than to the trend growth rate used. To illustrate this, Table F shows the debt/GNP ratio for the year 2000 under three different assumptions:

   i) those corresponding to curve 2 of Chart B;

   ii) as in i) if the gap were one percentage point bigger (i.e. a higher mid-cycle <u>level</u>) with no change in the trend growth rate; and

   iii) as in i) if economic capacity were growing by one per cent per year more with no change in the <u>level</u> of the gap in 1986.

   A third simulation, illustrated in Chart C, incorporates changing pension costs (as discussed in Part III) by modifying the non-interest budget balance profile of the second scenario. These adjustments affect non-interest expenditures relative to GNP by the amount that pension spending would change if the per capita transfers to the elderly grew with GNP per worker (assuming constant participation rates). The results are therefore a function of the projected change in the dependency ratio. As an approximation of the definition of unchanged fiscal policy it serves as a <u>base case</u> for assessing the impact of the policy changes discussed in Part <u>IV and</u> illustrated in Chart D.

   The assumption that inflation remains constant may be unrealistic if policy goals are to reduce further the rate of price increases. However, the real rate of interest is held fixed and non-interest government expenditures and revenues are a fixed share of GNP (the latter implying that unchanged policy means offsetting real and inflationary fiscal drag). In such circumstances any change in the inflation rate would not have major implications for the projected evolution of the debt/GNP ratio in the long run (although it could have important effects on the short-run evolution of debt if the change is big enough). The effect on debt of reducing real (and nominal) rates of interest can also be easily examined, and is illustrated by curve 3 in Chart B.

Table E

OUTPUT GAPS FROM TREND LEVELS AND REQUIRED GROWTH RATES TO CLOSE THESE GAPS

	Trend growth rate in real terms (a)	1986 gap between projected and mid-cycle output level (b)	Assumed annual real growth rate to close the gap over 1987-89 (c)
United States	2.75	1.35	3.20
Japan	4.25	0.63	4.46
Germany	2.50	0.83	2.78
France	2.00	2.41	2.80
United Kingdom	2.00	0.73	2.24
Italy	2.20	0.09	2.23
Canada	2.70	0.20	2.77
Australia	2.70	-3.95	1.39
Austria	2.50	-1.06	2.15
Belgium	1.70	4.57	3.22
Denmark	2.00	-0.66	1.78
Finland	3.00	-1.31	2.56
Greece	2.00	4.66	3.55
Ireland	2.30	7.95	4.95
Netherlands	1.00	2.63	1.88
Norway	2.30	-6.98	-0.03
Spain	2.50	3.66	3.72
Sweden	2.10	1.23	2.51

Source: OECD.

a. Real growth rate assumed in the projections for the years from 1990.

b. As a percentage of actual 1986 GNP. A negative value means that output is above the estimated mid-cycle level.

c. Growth rate assumed for this 3 year period in all the projections based on a return to mid-cycle.

Table F

SENSITIVITY OF THE DEBT PROJECTIONS TO THE ASSUMPTIONS
ABOUT TREND OUTPUT

| | Net debt/GNP ratio in the year 2000 | | |
	As shown in Chart B (a)	Larger output gap (b)	Faster trend growth (c)
United States	48.5	39.6	43.4
Japan	13.4	4.8	10.2
Germany	14.1	5.9	11.0
France	15.7	3.8	12.7
United Kingdom	31.7	-10.3	25.1
Italy	157.0	134.2	138.3
Canada	81.3	68.2	75.5
Australia	55.5	46.0	52.7
Austria	43.7	36.3	37.0
Belgium	130.9	118.9	115.5
Denmark	-52.8	-64.6	-53.5
Finland	12.5	6.4	11.8
Greece	63.6	54.5	56.9
Ireland	92.1	81.8	81.7
Netherlands	134.3	124.6	123.5
Norway	88.5	79.4	90.0
Spain	52.8	46.3	47.7
Sweden	7.3	-2.2	5.3

a. Corresponds to a return to mid-cycle position over 1987-89.

b. As in a) but with mid-cycle position one percentage point higher.

c. As in a) but with the assumed trend growth rate one percentage point higher.

NOTES TO ANNEX III

1. This specification does not take account of government tax collections on debt interest. Such a treatment differs from some other work on the subject (e.g. J.A. Bispham, "Growing Public Sector Indebtedness and Macro-Economic Policy", in _Private Saving and Public Debt, op. cit._) but is similar to that of Sargent and Wallace ("Some Unpleasant Monetarist Arithmetic" in _Federal Reserve Bank of Minneapolis Quarterly Review,_ Fall 1981, pp.1-17). It is based on the assumption that the funds lent to the government would have been loaned elsewhere and generated other interest income, leaving the tax base unchanged. This complete nominal crowding-out assumption seems more appropriate in a medium-term context such as the one dealt with here. However, it should be noted that this implies that over time an increasing proportion of the tax revenues collected (which are assumed to be a constant proportion of GNP) will be levied on public debt service payments. This could seem unrealistic but is in fact no more than another illustration of the unsustainability of particular policies in the long run.

2. In the following presentation it is assumed for simplicity that interest payments in a given year depend on the debt at the end of the previous year. The actual calculations reported in the text allow current year deficits to affect interest payments contemporaneously.

3. One can show that equation (ii) leads to:

$$i(t) = \frac{r(g-s)}{y-r} + [i_0 - \frac{r(g-s)}{(y-r)}] \ [\frac{1+r}{1+y}]^t ,$$

so that the budget deficit can be written as:

$$b(t) = (g-s) \frac{y}{y-r} + (i_0 - \frac{r(g-s)}{(y-r)}) (\frac{1+r}{1+y})^t .$$

Since $d(t) = d_0(1+y)^{-t} + \sum_{i=0}^{t-1}(1+y)^{-i}b(t)$

substituting the values of the budget deficit implies that:

$$d_t = d_0[1-\frac{i_0}{r}](1+y)^t + \frac{g-s}{y-r} + [\frac{i_0}{r} - \frac{g-s}{y-r}](\frac{1+r}{1+y})^t$$

This converges to a finite limit if y r but if y r the debt/GNP ratio grows without limit if the non-interest balance s-g is less than $(r-y)/r \ i_0$. If interest payments (i_0) on the original debt (d_0) have an average value equal to the marginal interest rate (r) -- i.e. if $i_0 = rd_0$ -- then this threshold is $(r-y)d_0$. If s-g is bigger than the threshold surplus, the debt ratio is "stable" but the government will eventually accumulate infinite assets.

4. The assumption that on average existing debt does not necessarily pay current interest rates is made here for completeness. In the simulations actual current interest payments are used as a starting point. It is implicitly assumed that the cheap sources of finance (such as postal savings) will not be available to governments for new debt, a hypothesis that seems reasonable in view of the atmosphere of increasing financial deregulation.