Contents

Industrial Investment and Economic Policy

The purpose of this paper is to examine the contention that investment in the UK is in some sense below its optimum levels and to explore what could be done about it in the current economic context that is consistent with the need to return the public sector borrowing requirement to sustainable levels over the next few years.

It is a statistical fact that the UK has devoted a smaller proportion of economic activity to investment than almost all its main competitors, even after allowing for the smaller share that capital intensive manufacturing industries have in the UK. As has become clear in recent years it is possible to show in theoretical terms how greater investment can lead to faster economic growth and to greater employment (lower unemployment). Since it is also a stylised fact that growth rates among the industrialised countries are correlated with investment shares, it might therefore appear that there is a prima facie case for further action to try to increase investment.

It is, however, a significant jump to move from this prima facie case to a specific case for policy intervention. We do this by employing the following arguments. First we explore the contention that there is an optimum level for investment in the long run compared to GDP, since we need some sort of criterion for judging whether current and forecast investment are 'too high' or 'too low'. We show that there is indeed a sustainable case that UK investment is below the optimal levels. Part of the problem lies in the non–neutrality of the UK corporate tax system.

We then explore what can be done about it, first by considering the actions of the UK's competitors and their apparent success and, second, by establishing the characteristics of the UK economy, which are thought to lead to this lower investment rate. This therefore provides both an identification of where the problem lies and what can be done about it.

In particular, although the problem can be identified at the macroeconomic level, merely increasing investment does not solve it unless that investment is indeed productive and increases the long–run rate of growth. It is not possible to establish in advance exactly which investments will give a high rate of return and which fail to achieve their objectives although naturally investors and lenders in all sectors try to do just that. We can only see after the event where the greatest successes lay and, while we can point to missed opportunities, it is still a hypothetical judgement to suggest what could have been done to take them.

We therefore also explore whether there are some specific deficiencies or 'market failures' which lead to productive opportunities not being followed up. We consider three specific cases, first whether small firms are unduly

disadvantaged by the current system, second whether investment focuses adequately on bringing through innovation and technical change into production in the UK and last, whether the system is biased in favour of past success in investment rather than future success.

Taken together this enables us to suggest a number of measures which could be taken to increase the level of investment in the UK but our main emphasis is on measures which focus investment on areas of deficiency. As a result these suggestions do not run counter to the precepts of 'sound public finance'. They do not put a substantial upward pressure on the deficit in the short run but put downward pressure on it in the longer run thus assisting the current thrust of current government policy.

Section One: Introduction

Investment is twice blessed: it increases aggregate demand for the nation's output and increases its capacity to meet aggregate demand both now and in the future. It is this dual purpose nature of investment that explains its popularity and why it is often seen to be a more desirable activity than other more ephemeral items of aggregate expenditure such as consumption.

Yet it is by no means obvious that investment should be viewed as a better use of the nation's resources than consumption. As Keynes put it 'all production is for the purpose of ultimately satisfying a consumer'[1]. The question really is whether by giving up consumption today a sufficiently greater amount of future consumption is generated to compensate current consumers for their sacrifice.

Elementary growth models indicate that there is a unique saving rate that maximises the level of consumption per head on the steady state growth path. The 'golden rule' that achieves this is that the rate of saving, or equivalently investment, be set such that the rate of profit is equal to the natural growth rate given by the rate of growth of population plus the rate of technical progress. The golden rule can alternatively be expressed as the adage that society should 'invest its profits and consume its wages'.

The welfare implications of this are not symmetric. Current investment below the golden rule level is not necessarily sub-optimal. It might be that current consumers are simply not prepared to make sacrifices to benefit their descendants. If this is the case it would be difficult to argue for a policy that forced the inter-generational welfare transfer. But it can be shown that a Pareto improvement can be made if investment is above the golden rule level: a reduction in investment can be introduced that improves the consumption of

1 Keynes (1936) chapter 5, p46.

some generations without worsening that of others. A society that is investing too much is said to be 'dynamically inefficient'.

In a recent paper, Abel, Mankiw, Summers and Zeckhauser (1989) assessed the dynamic efficiency of the Group of Seven countries and found none of them to suffer from dynamic inefficiency. This evidence indicates that the UK along with the other countries is not investing too much, but provides no means of assessing whether it is investing too little.

To do this it is necessary to show that that further investment will produce returns in excess of what savers require to compensate them for giving up current consumption. This generally requires a discussion of possible 'market failures' which prevent the market from achieving this outcome on its own. These include the following:

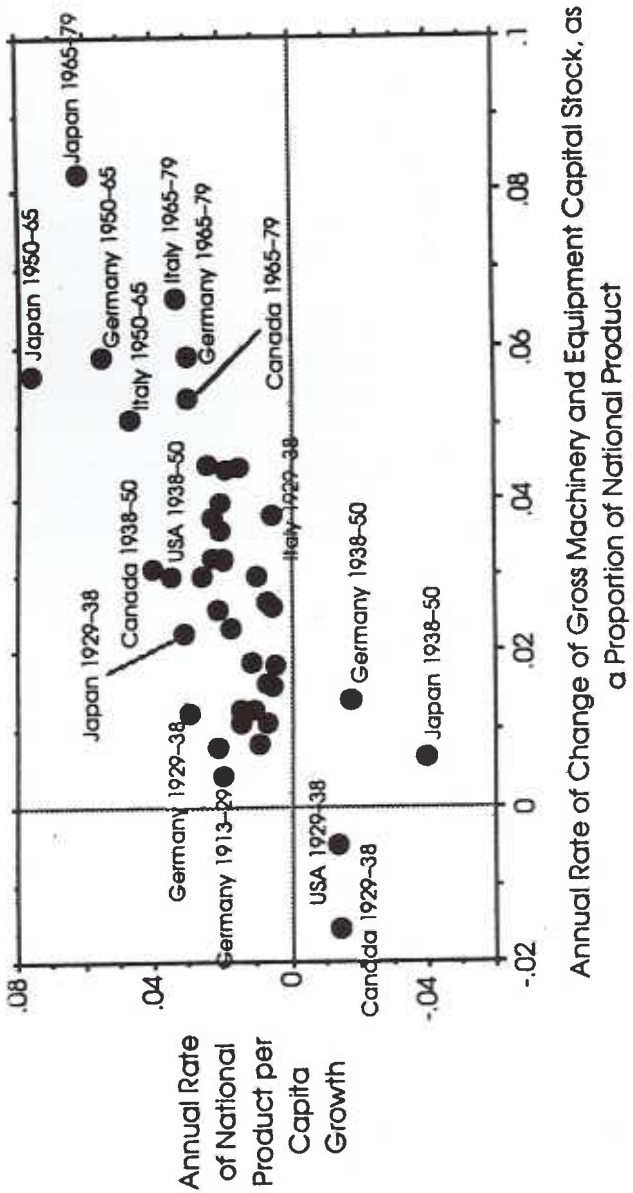
(a) Capital markets in the UK suffer from 'short – termism' in requiring too high a return on long term investments. See Nickell and Wadhwani (1987) and Yates (1992) for the arguments in support of this case and Marsh (1990) for the case against;

(b) Capital markets are generally prone to informational problems and find it difficult to discriminate between good quality and bad quality borrowers. This may lead lenders to ration credit rather than allowing prices to adjust to clear the market. This occurs when higher interest rates discourage good quality borrowers more than low quality borrowers so that a higher price actually leads to lower *expected* revenue for the lenders because the risk of default increases. The consequences of this type of problem are generally thought to involve under investment in the sense that the rate of return to investment at the margin exceeds the costs of capital (see the papers in Hubbard, 1990 and the survey by Stiglitz, 1992) although de Meza and Webb (1987) argue that it can lead to over investment.

(c) Recent developments in growth theory have suggested that there may be externalities associated with the investment process, see Romer (1986). In Romer's model investment by one firm raises the productivity of others as the knowledge embodies in new equipment spills over into the public domain. Because firms do not take account of these externalities in formulating their investment decisions, the rate of return to society on a particular investment ends up being larger than the cost of the original investment so that investment is below the socially optimum level. Chart one (drawn from De Long, 1992) indicates that there is some evidence in favour of this idea. Oulton (1992) argues against;

(d) The tax system can distort saving and investment decisions so as to reduce investment below the socially optimal level. Thus the tax system may raise the required rate of return on investment projects above the level

Chart 1. Machinery investment and output per capita growth



required by savers. This means that some projects which would be worthwhile in the absence of taxes do not go ahead. See King (1977), King and Fullerton (1984), Jorgenson and Yun (1991) and OECD (1991) for discussion.

The first three of these arguments generally point in the direction of there being too little investment in *all* market economies, although it is sometimes argued that short – termism is less acute in financial systems where the banks and firms have a close relationship (examples are Germany and Japan). The tax system may distort the investment decision in either direction, although we argue, in common with others (see, for example, Bond, Denny and Devereux, 1993) that the tax system in the UK acts to reduce investment.

There are various policies which may be used to correct these distortions. The appropriate policy is generally that which offsets the distortion at least cost. For example, if 'short–termism' is seen to be a form of market failure that policy should correct, it may be better to attempt to offset it by subsidies/tax concessions for long term investment rather than changing the financial system.

As noted above, these arguments apply to market economies generally. However it is useful to examine the rate of investment in the larger industrial economies to see how the performance of the UK compares with others.

Table 1 shows gross domestic fixed capital formation as a percentage of GDP in the OECD economies from 1960 to 1990. On average over this period the UK had the lowest investment output ratio of all industrial countries other than the US. In some ways it is not surprising that the US invests less of its output than other countries as it is starting from a much more developed position. But this cannot be said for the UK whose relative state of development has long been a cause for concern.

However part of the explanation for the low level of overall investment in the UK is due to the very low levels of residential construction in the UK. Table 2 shows investment in Machinery and Equipment as a percentage of GDP. The relative position of the UK here is not as bad. Out of the 24 countries considered, the average rate of investment over the period from 1960 to 1990 was lower than in the UK in seven of them: United States, Canada, Belgium, Denmark, Greece, Iceland, Sweden, Turkey.

This pattern can be slightly misleading as it makes no allowance for differences in industrial structure in these different countries. Apart from Belgium, all of the countries which had a lower share machinery and equipment investment than the UK also had a smaller share of manufacturing in GDP (see Table 3).

Table 2. Machinery and equipment as a percentage of GDP

	1960	1968	1974	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Average - Moyenne 60-67	68-73	74-79	80-90	60-90
United States	6.4	7.3	7.7	8.3	8.2	7.7	7.6	8.0	8.0	7.7	7.7	7.9	7.8	...	6.7	7.3	8.0	...	7.5
Japan	..	..	12.7	10.3	10.3	10.2	10.0	10.6	11.0	11.0	11.3	12.0	12.6	13.7	..	14.4	10.8	11.2	12.4
Germany	9.0	8.1	7.4	8.6	8.3	7.8	8.1	7.8	8.4	8.4	8.5	8.7	9.2	9.8	9.2	8.9	7.9	8.5	8.6
France	8.4	8.5	9.5	9.0	8.6	8.5	8.2	7.8	8.3	8.4	8.8	9.3	9.6	9.7	8.9	9.2	8.6	8.7	8.9
United Kingdom	8.4	8.8	8.9	8.4	7.4	7.4	7.4	8.0	8.5	8.1	8.3	8.6	9.1	8.5	8.5	8.7	8.8	8.2	8.5
Italy	10.8	8.6	11.1	11.5	10.9	10.2	9.3	9.7	9.6	9.2	9.7	10.2	10.2	10.0	9.8	9.2	10.5	10.0	9.9
Canada	6.8	7.1	7.7	8.2	8.6	7.8	6.7	6.5	6.7	7.0	7.2	7.7	7.8	7.2	7.2	7.1	7.7	7.4	7.4
Total of above countries	8.0	8.8	8.9	9.0	8.8	8.4	8.2	8.5	8.7	8.5	8.6	9.0	9.3	9.3	8.3	8.9	8.7	8.7	8.6
Austria	12.2	10.9	10.3	10.7	10.5	9.5	9.0	9.1	9.8	9.8	9.7	9.9	10.2	10.1	11.9	11.6	10.1	9.8	10.8
Belgium	8.8	8.7	8.9	6.9	6.7	6.8	6.8	7.4	7.2	7.4	7.7	8.5	9.9	10.4	9.3	8.8	7.8	7.8	8.4
Denmark	8.3	7.7	7.9	7.0	6.1	6.9	6.9	7.7	8.8	9.7	8.5	7.5	7.8	8.1	8.4	7.7	7.8	7.7	7.9
Finland	11.6	7.8	10.6	9.4	9.9	9.5	9.3	8.9	9.3	9.3	9.9	10.3	11.0	10.0	9.9	9.7	10.0	9.7	9.8
Greece	5.3	7.3	9.0	8.6	7.9	8.5	8.3	7.6	8.0	7.2	6.9	7.0	8.3	8.7	6.3	8.6	8.4	7.9	7.8
Iceland	11.6	8.7	9.5	8.7	8.6	5.9	5.2	6.5	6.4	6.0	6.3	5.8	5.0	6.2	8.3	7.7	7.0	5.9	7.1
Ireland	6.7	9.2	11.3	13.6	14.2	12.0	11.1	10.2	9.1	8.4	8.2	8.6	9.5	9.3	8.3	11.2	13.1	10.4	10.5
Luxembourg	..	..	8.3	10.0	8.6	9.2	8.2	8.2	8.4	10.7	12.6	9.5	10.8	..	..	10.1	8.3	..	9.8
Netherlands	12.2	11.0	9.3	8.0	7.3	7.3	8.0	8.4	9.4	10.1	10.0	10.2	10.7	10.7	11.8	10.0	8.7	9.1	9.9
Norway	14.9	12.8	10.8	8.8	9.8	9.4	7.9	7.6	6.9	7.9	7.8	9.1	9.4	7.1	14.6	11.9	12.3	8.3	11.4
Portugal	7.4	7.0	7.8	13.3	14.6	14.5	13.4	10.0	9.4	9.8	11.6	13.7	13.5	...	6.5	8.4	9.4	...	9.5
Spain	10.4	9.7	10.9	7.4	7.3	7.3	7.1	6.4	6.6	6.8	7.5	8.1	8.5	...	10.9	9.9	9.1	..	9.1
Sweden	7.3	7.1	8.1	7.6	7.0	7.3	7.7	7.8	8.8	8.3	8.7	9.0	9.7	8.9	7.5	7.1	8.0	8.3	7.8
Switzerland	9.3	9.7	9.2	7.6	7.4	6.9	7.2	7.3	8.0	8.4	8.8	9.3	9.5	9.1	10.5	10.0	7.5	8.2	9.0
Turkey	5.7	5.7	7.8	5.2	7.6	9.1	8.2	8.6	9.3	12.0	11.7	..	..	..	5.3	6.6	8.4	...	7.6
Smaller European	9.7	9.1	9.5	8.1	8.1	8.1	8.0	7.8	8.2	8.7	8.9	9.3	9.7	9.6	9.8	9.3	8.9	8.8	9.1
Australia	10.6	11.3	10.2	11.4	12.0	11.0	10.8	11.1	11.7	11.8	11.5	11.8	10.7	...	11.4	11.6	10.3	...	11.2
New Zealand	..	..	11.2	9.7	11.6	12.6	12.3	13.3	13.8	10.5	10.2	8.6	9.9	9.9	..	9.8	10.7	11.1	10.5
Total smaller	9.8	9.3	9.6	8.5	8.8	8.6	8.4	8.3	8.8	9.1	9.3	9.6	9.8	9.6	10.0	9.6	9.1	9.0	9.4
Total EEC	9.2	8.7	9.2	9.1	8.6	8.3	8.2	8.1	8.5	8.4	8.7	9.1	9.5	9.6	9.2	9.1	8.9	8.7	9.0
Total OECD-Europe	9.2	8.7	9.2	8.9	8.6	8.3	8.1	8.1	8.5	8.6	8.9	9.2	9.6	9.5	9.3	9.1	8.9	8.8	9.0
Total OECD *less* USA	9.7	9.7	9.9	9.3	9.1	8.8	8.6	8.7	9.1	9.1	9.4	9.9	10.3	10.4	9.9	10.1	9.3	9.3	9.6
Total OECD	8.2	8.7	9.0	8.9	8.8	8.4	8.2	8.4	8.7	8.6	8.7	9.1	9.4	9.4	8.5	9.0	8.8	8.3	8.8

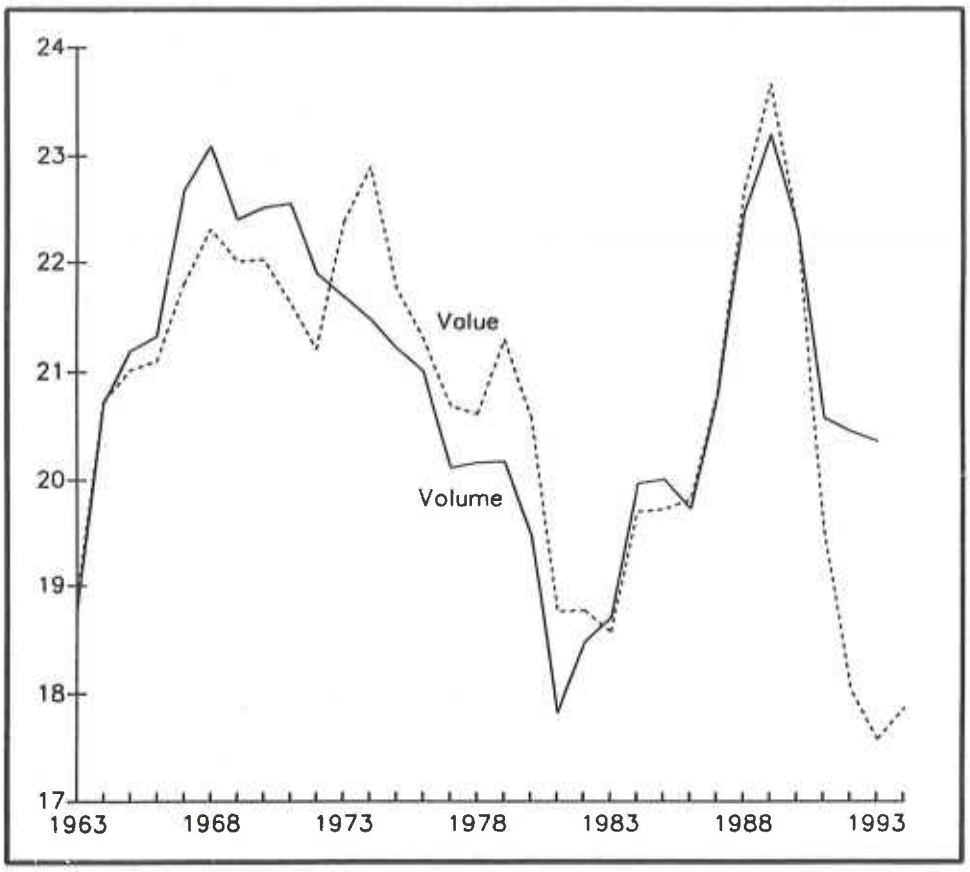
Source: OECD Historial Statistics, 1960–90.

Table 1. Gross fixed capital formation as a percentage of GDP

	1960	1968	1974	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Average - Moyenne 60-67	68-73	74-79	80-90	60-90
États-Unis	18.0	18.1	18.6	19.1	18.6	17.2	17.2	18.0	18.1	17.8	17.3	17.1	16.6	16.1	18.1	18.4	18.6	17.6	18.1
Japon	29.0	33.2	34.6	31.6	30.6	29.5	28.0	27.7	27.5	27.3	28.5	29.9	31.0	32.2	31.0	34.6	31.8	29.4	31.3
Allemagne	24.3	22.4	21.6	22.6	21.6	20.4	20.4	20.0	19.5	19.4	19.4	19.6	20.3	21.2	25.2	24.4	20.8	20.4	22.5
France	20.9	24.3	25.8	23.0	22.1	21.4	20.2	19.3	19.3	19.3	19.8	20.6	21.1	21.2	23.2	24.6	23.6	20.6	22.6
Royaume-Uni	16.4	19.5	20.9	18.0	16.2	16.1	16.0	17.0	17.0	16.9	17.6	19.1	20.0	19.2	17.7	19.1	19.4	17.6	18.2
Italie	26.0	23.4	25.9	24.3	23.9	22.3	21.3	21.0	20.7	19.7	19.7	20.1	20.2	20.2	24.9	24.0	24.0	21.2	23.3
Canada	22.6	22.0	23.7	23.5	24.4	21.9	20.2	19.2	19.9	20.3	21.3	22.2	22.8	21.4	22.6	22.1	23.5	21.5	22.3
Total des pays ci-dessus	20.4	21.6	22.9	22.3	21.7	20.5	20.0	20.1	20.1	19.9	20.0	20.4	20.7	20.7	21.2	22.4	22.0	20.6	21.4
Autriche	25.0	25.7	28.4	25.7	25.4	23.2	22.4	22.2	22.6	22.8	23.1	23.8	24.2	24.3	26.4	27.2	26.4	23.6	25.6
Belgique	19.3	21.5	22.7	21.1	18.0	17.3	16.2	16.0	15.6	15.7	16.0	17.7	19.5	20.3	21.6	21.7	21.9	17.6	20.2
Danemark	21.6	23.4	24.0	18.8	15.6	16.1	16.0	17.2	18.7	20.8	19.7	18.1	17.8	17.7	23.4	24.4	22.1	17.9	21.4
Finlande	28.3	23.1	29.8	25.5	25.3	25.3	25.5	23.8	23.9	23.4	23.8	25.2	27.7	26.3	26.6	26.2	27.4	25.1	26.1
Grèce	19.0	23.2	22.2	24.2	22.3	19.9	20.3	18.5	19.1	18.5	17.2	17.5	19.2	19.7	20.1	25.4	22.8	19.7	21.5
Islande	29.6	31.0	32.1	25.3	24.4	24.3	21.5	21.0	20.5	18.7	19.7	18.9	18.5	19.4	26.9	27.6	27.4	21.1	25.1
Irlande	14.4	20.9	24.6	28.6	29.7	26.5	23.1	21.4	19.0	18.0	16.5	16.7	18.2	19.1	18.7	23.3	25.9	21.5	22.0
Luxembourg	20.9	22.1	24.6	27.1	25.4	26.0	21.2	20.0	17.7	22.1	25.6	26.9	23.4	25.3	26.7	25.1	25.1	23.6	25.0
Pays-Bas	24.1	26.9	21.9	21.0	19.2	18.2	18.2	18.6	19.2	20.1	20.2	21.3	21.7	21.5	25.1	24.9	21.0	19.9	22.4
Norvège	29.0	26.9	30.5	24.8	28.0	25.5	25.7	26.0	22.0	28.3	28.0	29.2	27.5	18.9	29.0	27.4	32.9	25.8	28.3
Portugal	23.2	22.2	26.0	28.6	30.6	31.1	29.2	23.6	21.8	22.1	24.2	26.8	26.4	26.4	23.7	24.4	26.3	26.4	25.3
Espagne	20.4	26.0	28.4	22.5	22.1	21.6	20.9	19.0	19.2	19.5	20.8	22.6	24.2	24.6	23.1	25.9	24.9	21.5	23.4
Suède	22.1	23.3	20.9	19.7	18.5	18.3	18.3	18.2	18.9	18.1	18.9	19.7	21.5	20.7	23.5	22.0	20.1	19.2	21.0
Suisse	24.8	25.6	27.6	23.8	24.1	23.1	23.3	23.4	23.8	24.2	25.3	26.6	27.5	27.1	28.0	27.9	22.7	24.7	25.8
Turquie	16.0	17.3	18.6	16.0	19.0	19.0	18.6	18.5	21.1	24.0	25.2	24.0	22.8	22.7	15.3	17.6	20.2	21.0	18.7
Petits pays européens	22.2	24.3	25.1	22.3	21.8	21.0	20.5	19.7	20.0	20.8	21.4	22.3	23.1	22.9	23.8	24.6	23.5	21.4	23.1
Australie	24.8	26.2	23.5	24.2	25.9	25.4	22.9	22.9	24.7	24.3	23.7	24.1	25.0	23.1	25.4	25.6	23.7	24.2	24.7
Nouvelle-Zélande	21.3	19.6	27.5	20.6	23.6	24.6	24.2	24.9	25.8	22.0	21.4	19.4	20.2	19.8	22.1	22.4	25.1	22.4	22.8
Total des petits pays	22.5	24.4	25.0	22.4	22.3	21.6	20.9	20.2	20.7	21.2	21.7	22.5	23.3	22.8	23.9	24.7	23.6	21.8	23.2
Total CEE	21.5	22.8	23.8	22.1	21.1	20.2	19.6	19.2	19.1	19.0	19.3	20.1	20.8	20.9	22.8	23.4	22.2	20.1	21.9
Total OCDE-Europe	21.8	22.9	24.0	22.1	21.3	20.4	19.9	19.5	19.4	19.5	19.9	20.6	21.3	21.3	23.0	23.6	22.4	20.5	22.1
Total OCDE *moins* É.-U.	22.8	24.7	26.1	24.3	23.7	22.7	21.9	21.5	21.5	21.5	22.1	23.0	23.8	24.0	24.2	25.7	24.4	22.7	24.0
Total OCDE	20.7	22.0	23.2	22.4	21.8	20.7	20.1	20.2	20.2	20.1	20.2	20.7	21.1	21.0	21.6	22.8	22.3	20.8	21.7

Source: OECD Historial Statistics, 1960–90.

Chart 2. The ratio of investment to output in the UK economy (per cent)



Source: Economic Trends.

Table 3. Value added in manufacturing as a percentage of GDP

	1960	1968	1974	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Average - Moyenne 60-67	68-73	74-79	80-90	60-90
United States	28.3	27.6	23.4	21.8	21.6	20.5	20.8	20.9	20.1	19.8	19.3	..	..	..	28.0	25.5	23.3	..	23.9
Japan	34.6	34.8	33.6	29.2	29.1	29.0	29.0	29.7	29.5	28.6	28.5	28.7	28.9	28.9	34.5	35.2	30.8	29.0	31.9
Germany	40.3	37.6	36.0	32.4	31.6	31.2	31.1	31.0	31.7	32.2	31.4	31.1	31.1	30.6	39.9	37.3	34.5	31.4	35.3
France	29.1	28.0	27.9	24.2	23.2	22.7	22.5	21.9	22.0	22.1	21.4	21.6	21.3	21.1	29.0	28.4	26.7	22.2	26.0
United Kingdom	32.1	27.7	26.8	23.2	21.4	21.1	20.4	20.5	20.7	20.7	19.8	..	..	..	30.0	27.9	25.9	..	25.4
Italy[1]	28.6	27.8	28.6	27.8	26.7	25.9	24.7	24.4	24.2	23.7	23.3	23.5	23.4	22.2	27.9	27.1	26.5	24.5	26.7
Canada	..	21.5	19.7	17.9	17.4	15.6	16.2	17.1	17.2	17.3	17.3	17.6	..	..	22.3	20.4	18.5	..	19.4
Total of above countries	30.4	29.4	27.2	24.7	24.2	23.5	23.3	23.5	23.2	22.9	22.4	22.4	22.4	22.4	30.0	28.5	26.3	23.2	26.6
Austria	35.3	32.7	30.8	27.8	27.4	27.2	26.9	26.6	26.9	26.4	25.9	26.1	26.1	26.3	33.6	32.8	28.7	26.7	30.1
Belgium	30.5	30.6	30.8	24.2	22.6	23.5	23.4	23.2	23.5	23.2	22.2	22.2	22.7	22.5	30.6	31.0	26.5	23.0	27.2
Denmark	29.5	19.2	18.1	17.2	16.5	16.4	16.8	17.2	17.1	16.8	16.3	16.4	16.3	16.5	26.8	18.3	17.3	16.7	19.7
Finland	22.5	21.0	26.3	25.2	24.3	23.3	23.0	22.9	22.3	21.4	21.9	21.2	20.6	19.0	21.5	23.1	24.5	22.3	22.7
Greece	14.5	14.8	18.2	17.4	17.6	16.4	16.3	16.2	16.3	16.5	15.5	15.3	15.3	14.3	14.0	16.3	17.3	16.1	15.8
Iceland[1]	..	..	13.4	15.6	15.2	14.5	13.8	15.0	14.5	15.2	15.7	14.7	14.5	..	..	..	14.6	..	15.9
Ireland	..	..	22.8	..	..	..	..	..	..	..	..	..	..	..	..	20.0	21.3	..	..
Luxembourg	41.7	37.9	41.8	28.5	27.8	29.5	28.5	29.6	30.0	29.8	26.7	27.4	28.4	..	36.1	38.8	32.0	..	33.7
Netherlands[2]	33.6	31.0	25.0	17.9	16.9	17.5	17.7	18.1	18.0	19.4	18.9	19.8	20.2	20.5	32.6	28.4	21.2	18.6	24.2
Norway	21.3	21.0	21.9	16.0	14.8	14.2	14.1	14.3	14.0	14.7	15.1	15.3	14.5	13.6	21.2	21.4	19.7	14.6	18.5
Portugal[1]	27.9	30.3	33.8	31.0	31.3	29.5	29.4	30.6	30.4	29.2	29.3	28.4	28.8	..	29.4	30.8	30.5	..	30.0
Spain[1]	26.7	25.8	27.7	28.2	28.0	27.2	27.7	27.5	27.7	26.5	25.6	24.6	..	..	26.8	28.7	26.4	..	26.6
Sweden	..	25.8	27.2	21.1	20.1	20.5	20.9	21.6	21.6	21.9	21.6	21.3	21.1	19.7	27.4	24.8	24.0	21.0	24.0
Switzerland	..	..	..	..	..	..	..	..	25.7	..	..	..	..	..	..	..	..	..	..
Turkey	14.6	19.0	19.6	22.4	23.5	24.1	25.2	25.5	25.2	26.1	26.0	26.8	26.8	26.8	16.5	19.1	19.5	25.3	20.7
Smaller European	27.4	26.0	26.2	23.4	23.0	22.8	23.1	23.2	23.2	23.1	22.6	22.5	22.6	22.3	27.0	25.6	23.9	22.9	24.7
Australia	..	24.8	21.4	19.3	19.1	18.1	18.0	17.8	17.3	16.6	16.4	16.3	15.9	..	25.7	23.6	20.1	..	21.3
New Zealand	..	..	23.5	22.0	23.3	23.1	22.3	22.8	21.1	20.2	18.6	17.8	17.7	..	..	..	22.5	..	22.1
Total smaller	27.1	25.7	25.5	22.9	22.5	22.2	22.4	22.4	22.3	22.1	21.7	21.5	21.6	21.4	26.7	25.3	23.4	22.1	24.1
Total EEC	32.4	29.9	29.4	26.5	25.5	25.0	24.6	24.5	24.7	24.6	23.9	23.8	23.7	23.3	31.6	29.7	28.1	24.6	28.0
Total OECD-Europe	31.8	29.4	29.0	26.1	25.2	24.7	24.4	24.3	24.5	24.5	23.8	23.7	23.6	23.3	30.9	29.2	27.6	24.4	27.8
Total OECD *less* USA	31.3	29.8	29.1	26.1	25.4	25.0	24.6	24.9	25.0	24.8	24.3	24.3	24.2	24.1	30.8	29.7	27.4	24.8	27.8
Total OECD	30.0	28.8	26.9	24.5	23.9	23.3	23.2	23.4	23.1	22.8	22.3	22.3	22.3	22.2	29.8	28.0	25.8	23.0	26.2

Source: OECD Historial Statistics, 1960–90.

In general, this information suggests that the UK has been one of the laggards in investment. While it is possible that other countries have been investing too much, it is much more likely that the UK has been investing too little. There is little to suggest that this pattern has changed significantly in recent years. Chart 2 indicates that the investment output ratio in the whole economy is at an historically low position when measured by the ratio of the value of investment to the value of output. The position is not so bad when the investment output ratio is measured by the ratio of the volume of investment to the volume of output. The difference reflects the change in the price of investment goods over time so that the UK is spending less of its income on investment but getting relatively more for its money. The remainder of this note outlines some policy options that might be considered as a means of remedying the situation. However, before doing that we set the encouragement of investment in the wider context of the factors which lead to growth.

Section Two: Investment and Growth - the wider picture

Investment in physical capital is only one vehicle among many to achieve a higher rate of economic growth. International comparisons of successful industrial policies (Mayes, 1986; Begg, 1992) list a range of characteristics, with a strong emphasis on other inputs, particularly human capital through education and training and technology and innovation through R&D. They are also concerned with the organisation of these inputs through management competence and the pursuit of quality. There are various different assessments of particular sources of market failure, but finance, the role of smaller firms (SMEs) and the problems of linkages among firms, both in the production chain and between manufacturers and the providers of business services are usually highlighted. Even within physical capital it is important to distinguish between the plant and equipment operated by the firm and the public and private infrastructure which surrounds it.

Any approach which does not take all of these into account is likely to be flawed and a concentration purely upon the role physical capital within the firm is likely to be flawed as the rate of return it can achieve will depend upon all these other factors. If we take a simple accounting approach to the explanation of economic growth, we can see (Oulton, 1992) that private physical capital accounts for between 13 and 25% of growth in the advanced countries depending upon whether the figure is intended to refer to the whole economy or just to manufacturing, where the role of capital is greatest. Thus, taking the upper limit of 25%, any policy prescription must also take the remaining 75% into account.

One specific question that has been raised is whether the social rate of return (the return to the economy as a whole) from any particular investment exceeds the private rate of return (the return to the investing company itself). If it does, then a neutral system of incentives to the private sector for investment will tend to result in a level of investment below that which is socially desirable, i.e. optimal for the economy as a whole.

Evidence from other studies is rather mixed. DeLong and Summers (1991) who remove a lot of the distortions from mismeasurement that have dogged previous work suggest that there is strong independent role for private investment in equipment. The social rate of return implied by their analysis ranges from 25 to 34%, when only the 25 countries which were richest in 1960 are included in the analysis. This is much larger than any figures which are quoted for private rates of return and therefore implies that there are very significant externalities to be obtained from investment over and above what would be delivered by the private sector in a neutral system.

Oulton (1992) casts doubt on these figures and with redefined variables

suggests that there is little evidence for any social rate of return over and above the private rate. Scott (1989) on the other hand argues that the role of investment in the process of growth is heavily understated. More particularly he argues that whereas the difference between the average rates of private and social rates of return in the UK may be small, the difference between the marginal rates is much larger, 6 as opposed to 13%. A discrepancy this large would certainly imply that there is a case for encouraging investment at the margin.

Scott's approach helps clarify some of the basic arguments about the role of physical capital in the growth process. The rate of growth of output is constrained first of all by the inputs available and secondly by the technology which enables those inputs to be transformed into output. However, if we are primarily concerned about how well off people in the economy are it is measures which relate to output per head which are more appropriate. Indeed if the population and participation rates were not varying and there was no unemployment the two would be equivalent. This is not of course the case for the UK. Nevertheless the suggestion that it is the rate of technical change, i.e. scientific advance or innovation, which is the fundamental determinant of growth, would meet with widespread agreement. What Scott adds is the insight that investment is not merely the mechanism by which most technical advance is incorporated into the production process but the expenditure on investment itself tends to increase the rate of scientific advance.. This is clearly the case if we consider R&D as part of investment. However, Schmookler (1966) showed clearly that invention and investment were correlated – this correlation could imply that the process is as much demand driven – investment leads to innovation – as supply driven – innovations lead to investment. However, the evidence suggests that both forces are present. Thus a higher rate of investment not merely leads to a more youthful capital stock and hence to higher productivity but it also itself tends to lead to higher rate of innovation.

Innovation

The role of innovation is particularly important as it is one of the features which imparts dynamism to the process of growth. This dynamism can be seen in a number respects, first of all because many innovations either lead to a reduction in production costs for existing goods and services or to new products which can gain higher margins until their novelty is eroded. In either case there is a profit gain which can in turn be fed back into investment in capital and more R&D. Thus success allows a firm or region to stay ahead. A successful economy generates higher tax revenues which can then

be fed back into the system as higher expenditure on the infrastructure and other services which make the location more attractive to investors and employers.

Another argument is that success breeds economies of scale which gives a second round advantage. Similarly the innovator will tend to be further down the learning curve thus reaping dynamic economies. Even if followers can always have lower costs at each point on the learning curve because they avoid some of the innovators mistakes nevertheless they may never overhaul the innovator. By the time the learning curve levels off the innovator will have moved on to the next product and will be reaping the costs gains from that thereby replacing the exhausted opportunity by a new one.

Finally there are likely to be external economies or spin–offs from one activity to another. This can occur because of the existence of a pool of highly skilled labour and of complementary services or producers, whether among electronics manufacturers or among financial service providers as in the City of London. Activities which have greater skill and capital intensities tend to generate higher wages for those involved and are hence a sensible area for specialisation in economies which are hoping to raise productivity and standards of living. Investment in equipment, infrastructure, R&D and training/education is thus an essential ingredient in achieving this faster rate of growth (Dosi *et al.*, 1990).

Market Failure

The discussion thus far in this section suggests the general framework in which investment could beneficially be encouraged. However, in addition to economy wide deficiencies in the allocation of resources there are a number of specific 'market failures' which suggest where activity might be concentrated.

The Role of Small Firms (SMEs)

One of the best documented areas of market failure lies in the case of small firms (usually defined by the epithet SME (small and medium sized enterprises) with varying definitions usually in the UK following that of the Bolton Committee (1971) where 200 employees or less was used for manufacturing industry, Mayes and Moir (1989).) Small firms face both barriers to initial entry and barriers to growth. Lack of capital both in the sense of finance and equipment represent one of the main difficulties identified by Bolton and reinforced by the Wilson Committee of 1979 (Wilson, 1980).

Small firms are important both because they offer a very important facet of flexibility in the economy and because they, in common with very large firms, play a disproportionately large role in the process of innovation

(Rothwell, 1986). In part this occurs because they are an effective vehicle for adopting new ideas – the firm can decide what it wants to do and does not have to clear the innovation with a hierarchical bureaucracy and second because the innovators can themselves benefit directly from proceeds without seeing the property rights being vested in a large company of which they are but a small part.

Small companies are not without their problems as risks are also very high in the sector and death rates as well as birth rates are extremely high. Only half of small businesses lasted 5 years and less than a third 10 years during the 1980s (Mayes and Moir, 1989). Hence on of the reasons for high costs of finance and indeed reluctance to lend at all is the chance of loss. Similarly any scheme for encouraging the provision of physical capital to small firms is also likely to encounter high rates of premature scrapping unless the equipment has a ready secondhand market.

Section Three: The Incentives to Business Investment

The standard measure of the incentive to business investment is the 'user cost of capital'. This can be defined as the minimum real rate of return that a project must generate before tax in order to provide those who supply finance for the project with the particular real rate of return that compensates them for giving up consumption. This is affected by corporate taxes and allowances, inflation and the required rate of return of the investor which in its turn is affected by personal taxes, interest rates, inflation, perceptions of risk and risk aversion.

Governments can therefore affect the incentive to invest through a number of routes:

- they can subsidise the purchase or production of capital goods by making grants to purchasers or suppliers.
- they can can subsidise the cost of borrowing to finance purchase
- they can encourage purchases through allowances against taxes
- they can reduce tax rates thereby increasing the funds available for purchase and
- they can reduce the risks by reducing inflation and variation in policy for example
- they can increase the threat of competition
- they can increase the incentive to innovate which will increase the flow of profitable opportunities to invest

In the absence of corporate taxes the user cost of capital would be given by the rate of return required by investors plus an allowance for depreciation. Provided a project could generate a return that exceeded the

sum of these items it would be worthwhile. With taxes the position is somewhat more complicated; the tax system may raise or lower the user cost of capital. On the one hand taxation of the returns to a project obviously raises the user cost of capital because the project now has to generate sufficient returns to pay the taxes in addition to depreciation and the returns required by the suppliers of finance. But on the other hand the corporate tax system typically offers allowances and grants for capital investment that reduces the outlay which must be provided by the firm. The following formula for the cost of capital accounts for these various effects:

$$c = \frac{(1 - A)}{(1 - t)} P (r + d) \qquad (1)$$

where c is the user cost of capital, A is the present value of allowances and grants (to be discussed further below), t is the rate of corporation tax, P is the real price of investment goods, r is the real rate of return demanded by investors and d is the rate of depreciation.

The formula stated above applies only when the company is in a position where it has a corporation tax liability in every period. A different formula applies when companies are tax exhausted. Under these circumstances the effective rate of corporation tax is reduced because the company will not pay taxes on the profits generated by extra capital investment until some future date. At the same time the value of allowances is reduced because these cannot be used until some future date. The net effect is that the user cost of capital is generally higher for tax exhausted firms than for tax paying firms. However, for current purposes we shall focus on the user cost of capital for tax paying firms.

A general expression for grants and allowances (A) is given by:

$$A = f_1 A_d + f_2 t + f_3 g \qquad (2)$$

where A_d is the present discounted value of tax savings from standard depreciation allowances on a unit of investment, f_1 is the proportion of the asset's cost entitled to such allowances, f_2 is the proportion of the asset's cost qualifying for immediate expensing at the corporate tax rate and f_3 is the proportion of the cost qualifying for grants, payable at the rate g.

The value of these allowances can be as large or small as the authorities wish. It is certainly possible for the allowances to be so generous that the value of A exceeds the tax rate so that the user cost of capital is lower than it would be in the absence of taxes. This is usually the case when the

authorities give grants or investment tax credits (ITCs) for investment in addition to the usual depreciation allowances.

It is useful at this stage to consider some examples of the effects of various tax policies on the user cost of capital. Suppose that the real cost of finance is 5 per cent and the annual rate of depreciation is 10 per cent. Let the real price of investment goods be normalised at one. Then, in the absence of corporation taxes, the minimum rate of return that a project needs to earn to be profitable is 15 per cent: 5 percentage points of this to cover the cost of finance and 10 percentage points to provide for depreciation of capital. Any return over and above 15 per cent is profit for the owners of capital.

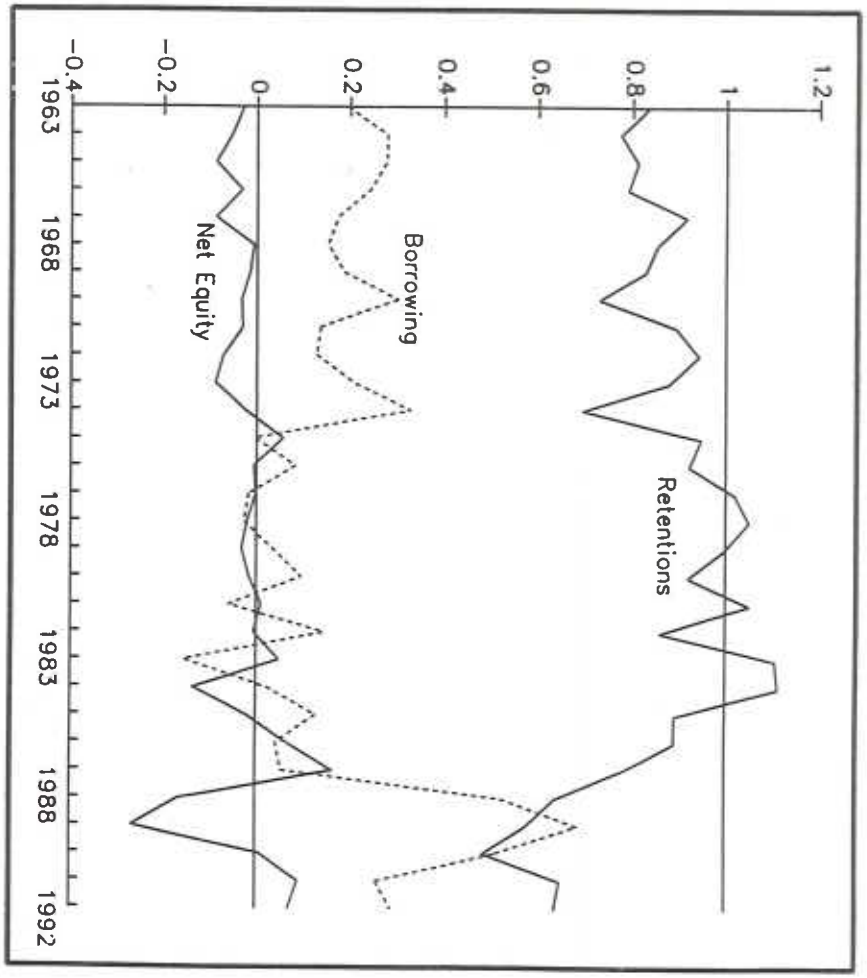
Suppose now that the rate of corporation tax is 52 per cent and companies are allowed to deduct investment expenditure from their profits in arriving at their corporation tax liability. This corresponds to 'free depreciation' and a value of f_2 of 1 so that A is 0.52 in (2). Under these circumstances the user cost of capital remains at 15 per cent: the corporation tax is neutral in not affecting the required rate of return on investment. The tax does of course reduce the payoff to investments that generate a rate of return greater than the user cost of capital, but it does not affect the decision to undertake them as they will still generate a return in excess of the cut off rate.

If a grant of 10 per cent of the cost of the project were provided in addition to the capital allowances then the total value of allowances A would be 0.62 (ie 62 per cent of the cost of the project is being met by grants and tax allowances). The user cost of capital is then 11.875 per cent, a significant reduction equivalent to a reduction in the real rate of interest of 3.125 percentage points.

Suppose instead of free depreciation, investment expenditure is written down over a period of years. In particular suppose that the rate of writing down allowances is 25 per cent on a declining balance basis. This means that of an initial outlay of £100, £25 is deductible in the first year leaving £75 to be carried forward to the next year, £18.75 (25 per cent of £75) is deductible in the second year leaving £56.25 to be carried forward, £14.0625 (25 per cent of £56.25) is deductible in the third year and so on. The present value of these allowances depends on whether they are indexed to the rate of inflation or not. With indexation, the present value is:

$$A_d = t\left(.25 + \frac{.1875}{1.05} + \frac{.140625}{(1.05)^2} + \ldots\right) = t\ .25\ .\ 3.5$$

Chart 3. The finance of investment (as a proportion of total)



Source: Financial Statistics

without indexation, the real value of allowances gets smaller over time as it is eroded by inflation. Suppose inflation is 5 per cent per annum. Then the present value of the writing down allowances is:

$$A_d = t\left[.25 + \frac{.1875}{1.10} + \frac{.140625}{(1.10)^2} + \ldots\right] = t\ .25\ .\ 3.1429$$

The effect of these different depreciation schemes on the user cost of capital can be evaluated using equation (1). If the tax rate is 52 per cent as in the previous example, then the user cost of capital when writing down allowances are indexed is 17.03 per cent and 18.48 per cent when they are not indexed. This is a significant increase on the user cost of capital that applies when free depreciation is granted.

The purpose of these examples is to illustrate how the corporation tax system influences the incentives for investment by corporate firms. The particular numbers chosen represent tax rates and allowances that have prevailed in the UK in recent years. The 1984 corporation tax reform changed the system of capital allowances that applied to plant and machinery from one where free depreciation was granted to one where non-indexed writing down allowances at a rate of 25 per cent on a declining balance basis may be claimed. In themselves these changes raise the user cost of capital substantially as the examples demonstrate. Furthermore they have changed the nature of the UK corporation tax system from one which was neutral for investment in plant and machinery to one which discriminates against business investment: the degree of discrimination depends on the rate of inflation. In the example above the change to the system of capital allowances in an environment where inflation averages 5 per cent adds 3.5 percentage points to the user cost of capital.

At the same time that the system of capital allowances was changed, the rate of corporation tax was reduced from 52 per cent to 35 per cent and has since been reduced further to 33 per cent. This offset to some extent the rise in the user cost of capital. In particular the user cost of capital in the above examples would be 15.92 per cent with indexed allowances and 16.58 per cent with non-indexed allowances and inflation of 5 per cent.

It may seem surprising that a *reduction* in the rate of corporation tax could be associated with a reduced incentive to invest but it should be remembered that the 1984 reforms consisted of two parts, the change to capital allowances which raised the user cost of capital and the cut in the corporation tax which offset this somewhat.

The above discussion has focused on the effect of the corporate tax

system on the incentive to invest taking as given the real rate of return required by investors. It is possible for the tax system to be used to provide some relief for the financing costs of investment. Indeed the current system provides some relief for the costs of debt finance by allowing nominal interest payments to be deducted in calculating the tax liabilities of corporations. This has the effect of reducing the user cost of capital for debt financed investment.

However, it is not clear to what extent the deductibility of interest payments is a useful subsidy for investment. This is because the major source of finance for corporate investment in the UK is retained profits (see Mayer, 1990). Chart 3 shows the proportion of funds that industrial and commercial companies in aggregate derive from retentions, net issues of equity and borrowing. This shows that retentions remains the most important source of finance despite the increase in borrowing in the late 1980s.

Calculations of the benefits of different sources of finance suggests that the tax system provides a clear incentive to debt financed investment rather than by retentions. The fact that it is not used more would suggest that either firms or lenders would not feel comfortable with higher levels of corporate debt. This suggests that borrowing is not the marginal source of finance for the average corporation. As such the deductibility of interest is not an incentive to investment for the typical firm.

This is probably not the position for small, growing firms who tend to rely more on debt as a source of finance for investment (see Cosh and Hughes, 1993). This is partly due to the fact that it is difficult for them to raise new equity finance but then large firms do not rely on this to any great extent. The main reason for the greater use of debt finance by small firms is that they have less profits to retain to finance investment. Indeed it may well be the case their investment is limited by the amount that they are able to borrow.

This discussion suggests that for large firms at least interest deductibility does not provide much of an incentive to investment: the marginal source of investment finance is retentions. Because of this, the user cost of capital is greater than it would be in the absence of corporate taxation. This has prompted the *Institute for Fiscal Studies* (see Devereux and Freeman, 1991) to suggest introducing tax relief for retention financed investment.

An alternative approach to removing the disincentive to business investment would be to restore free depreciation. The bias in favour of debt finance could then be removed by limiting the extent to which interest may be deducted against the corporation tax liability. This would have a number of

advantages. First, it would reduce the incentives to debt finance which can have undesirable macroeconomic side effects (see Young, 1993, for discussion). Second it would reduce the incidence of tax exhaustion which acts as a disincentive to business investment. Third, corporations would be in a position where they need to invest in order to qualify for capital allowances in contrast to the current situation where they can obtain the reliefs without necessarily using the borrowed funds to finance investment. They would therefore be better targetted. Fourth, the reduction in the cost of interest relief could be used to finance the increased capital allowances.

Section Four: Evidence on Investment Incentives in OECD countries

The concept of the user cost of capital is very useful because it summarises the effects of quite complex tax arrangements in a single number. This is particularly convenient for describing the effect of changes in the tax system in a particular country as well as describing the effects of the tax systems applied in different countries. However it is also useful to describe differences in the various components of the user cost of capital expression. In doing these sorts of comparisons it is usual to assume a common inflation rate and real return required by investors to show the differences due to differences in the tax system as well as using the actual inflation rates and best estimates of the real rate of return required by investors.

It is generally the case that governments in the OECD countries do not provide fiscal incentives for investment that are available in all regions or for all types of capital equipment. Table 4 (taken from OECD, 1991) indicates that such measures are rare. This is not to say that governments do not offer targetted investment incentives. Regional investment incentives are available in France, Germany and Italy, for example, but these may be seen as correcting for particular regional disadvantages rather than as a means to generate more investment in the economy as a whole. Ireland is probably the only one of the OECD countries to offer investment grants which are generally available to the manufacturing sector.

A more common investment related fiscal measure is the investment reserve whereby funds paid into the reserve are under certain conditions exempted from corporation tax. This scheme tends to be used for counter cyclical purposes so that the funds paid into the reserve can only be used in certain years. This type of scheme has operated in Sweden, Austria, Finland and Norway. In commenting on the Swedish system where 50 per cent of the allocation had to be deposited interest – free at the central bank, King and Fullerton (1984) noted that less than 20 per cent of investment by firms in their sample was financed out of the investment reserve and as such it was unlikely that the *marginal*

Table 4. General investment reliefs[1]

Country	Under tax system		General cash grants available irrespective of sector or activity
	General investment allowance available	General investment credit available	
Australia	No	No	No
Austria	Yes, 20% of the cost of acquisition	No	No
Belgium	Yes, the rate depends on the development in the inflation index (minimum 3%, maximum 10%)	No	No
Canada	No	No	No
Denmark	No	No	No
Finland	Yes, investment reserve provisions	No	No
France	No	No	No
Germany	No	No	No
Greece	Yes, 40-70% of the investment cost	No	No
Iceland	Yes, investment reserve provisions	No	No
Ireland	No	No	No
Italy	No	No	No
Japan	No	No	No
Luxembourg	No	Yes, if investment exceeds average of last 5 years	No
Netherlands	Yes, between 2-18% of investment costs (with ceiling)	No	No
New Zealand	No	No	No
Norway	No	No	No
Portugal	No	No	No
Spain	No	Yes, new fixed assets	No
Sweden	Yes, (investment) reserve provisions[2]	No	No
Switzerland	No	No	No
Turkey	Yes, 30-100% of the investment cost	No	No
United Kingdom	No	No	No
United States	No	No	No

1. The tax treatment of reinvested capital gains is described in Table 3.3.
2. An amount of maximum 30% of equity according to closing balance sheets or maximum of 15% of payroll may be allocated to a special reserve.

Source: OECD (1991).

investment was financed in this way. This suggests that the effects of the tax system on investment decisions should be evaluated using the regular rules of fiscal depreciation rather than through the investment funds system. This is the approach taken here. A similar approach has been adopted in recent comparative work by the OECD (OECD, 1991).

The major fiscal influence on investment incentives comes from the system of capital allowances. These can generally be expressed in terms of the framework outlined in the previous section.

Table 5 shows the present value of depreciation allowances in the OECD countries using the tax systems in force at the beginning of 1991. This corresponds to the value of A/t in terms of the terms in equation (1).

This information shows that the value of allowances provided in the UK is similar to that provided in other countries whether this is evaluated at common or prevailing interest rates and inflation. This has not always been the case and Table 6 shows that allowances in the UK have generally been considerably more generous than that available in other countries.

The relative generosity of investment incentives provided by the UK in the past is well known. Whiting (1976) noted that 'the details of investment incentives .. indicate that the free depreciation of plant and machinery and the high initial allowance on buildings available in the UK are considerably more generous than the incentives available in other countries'.

Table 7 shows the user cost of capital after deducting the rate of depreciation (that is it shows $c - d$) for the same set of countries on the basis that investors require a rate of return of 5 per cent and that inflation is 4.5 per cent. This shows that the user cost of capital in the UK on this basis is exactly equal to the average across all of the different countries. Indeed the variation among the different countries is relatively small with the average user cost varying from 5.0 per cent in Greece and Sweden to 7.2 per cent in Turkey.

However this information takes no account of differences between countries in the the value of the rate of return required by investors. This is generally given as the weighted average of the cost of debt finance and the cost of equity finance. It is likely that this rate of return has been higher in the UK than in other countries although difficulties in calculating the cost of equity finance mean that there is some uncertainty about the reliability of these estimates.

Table 5. Net present values of depreciation allowances

Country	Industrial Buildings			Machinery		
	Actual nominal interest rate	Nominal interest OECD Average	Common real interest rate of 3 per cent	Actual nominal interest rates	Nominal interest OECD Average	Common real interest rate of 3 per cent
Australia	32.6	31.5	57.8	77.2	76.4	89.4
Austria	66.2	63.2	89.1	90.7	88.4	105.3
Belgium	65.1	60.7	80.4	88.1	86.1	94.0
Canada	29.4	32.9	55.2	62.3	65.1	76.6
Denmark	57.9	51.1	73.3	85.8	79.7	90.3
Finland	52.3	54.5	74.8	78.3	79.7	90.3
France	56.9	51.0	74.4	85.9	83.2	92.6
Germany	64.5	60.3	79.7	84.0	81.5	91.8
Greece	34.8	63.4	82.4	58.8	80.9	91.6
Iceland	21.7	25.9	51.5	46.6	48.6	55.0
Ireland	79.7	76.0	88.5	84.9	82.1	91.4
Italy	30.3	36.4	62.7	63.1	68.6	85.3
Japan	36.0	28.0	52.7	72.4	66.2	81.6
Luxembourg	49.2	44.6	69.7	85.6	83.4	92.8
Netherlands	47.1	39.1	65.1	78.6	73.2	87.7
New Zealand	27.6	25.9	51.5	58.8	57.1	76.7
Norway	56.2	53.7	74.9	81.2	79.7	90.3
Portugal	31.8	51.0	74.4	67.9	80.3	90.5
Spain	35.7	41.1	67.5	62.9	68.1	87.2
Sweden	25.7	39.1	65.1	70.4	79.7	90.3
Switzerland	50.6	51.6	72.6	79.1	79.7	90.3
Turkey	10.7	51.8	73.0	27.1	75.8	88.1
United Kingdom	39.3	44.6	69.7	73.3	76.7	88.7
United States	38.0	37.2	63.2	81.0	80.5	91.3

Note: The net present values are calculated on the basis of hypothetical streams of depreciation allowances in each country resulting from an investment of 100 units of local currency, using the information shown in tables 3.8 to 3.10. The nominal interest is calculated as predicted inflation in each country in 1991 (see table A.5.5) plus 3 percentage points real interest.

Source: OECD (1991)

Table 6: Net Present Value of Depreciation Allowances

a) Evaluated at common interest rate

Country	at end of: 1970	1975	1980	1985	1990	1992
Canada	81.3	73.3	85.9	85.9	69.6	69.6
France	80.9	80.9	80.9	80.9	85.9	85.9
Germany	73.3	73.3	78.6	82.5	82.5	82.5
Italy		64.0	64.0	64.0	64.0	64.0
Japan	76.7	76.7	76.7	76.7	82.5	82.5
UK	98.0	100.0	100.0	85.7	78.6	78.6
US	66.0	85.5	86.0	85.4	81.5	81.5

b) Evaluated at prevailing nominal interest rate

Country	at end of: 1970	1975	1980	1985	1990	1992
Canada	91.3	74.3	76.0	89.9	67.6	74.0
France		85.6	78.9	82.1	85.9	85.1
Germany		86.3	79.2	90.3	84.1	83.8
Italy		67.2	51.7	56.1	59.3	56.0
Japan		78.4	76.7	81.5	84.8	87.9
UK		100.0	100.0	84.1	73.3	72.5
US	75.3	94.4	76.5	90.3	84.4	89.5

The cost of equity finance can be expressed at the sum of the dividend yield and the expected real capital gain on holding equity. While measures of the former component are quite widely available, there are no comprehensive survey measures of expected real capital gains on equity. For the purposes of the current exercise, expected real capital gains have been measured by the actual average growth rate in real equity prices obtained over the period. Table 8 shows estimates of the real cost of equity finance at various dates for the G7 economies.

Table 7. The pre-corporate tax required; rate of return necessary when the real interest rate is 5 per cent[1]

Country	Average for each source of finance			Average for each type of asset			Overall average	Standard deviation
	retained earning	new equity	debt	buildings	machinery	inventories		
Australia	9.0	9.0	3.6	7.0	6.4	8.9	7.1	2.8
Austria	7.3	7.3	2.3	5.4	4.1	8.9	5.5	3.0
Belgium	7.1	7.1	2.4	5.3	4.0	8.9	5.4	2.9
Canada	8.1	5.5	3.5	6.3	5.3	8.1	6.2	2.4
Denmark	7.5	7.5	2.8	6.0	5.3	7.0	5.9	2.3
Finland	8.0	2.8	2.8	5.3	4.9	7.7	5.6	2.8
France	7.3	3.1	3.2	5.4	4.5	7.6	5.4	2.4
Germany	9.5	1.6	0.6	5.9	5.1	6.2	5.6	4.5
Greece	7.3	2.2	2.2	4.9	4.8	5.5	5.0	2.6
Iceland	8.0	8.0	4.3	7.7	5.8	7.6	6.7	2.0
Ireland	5.5	5.0	4.5	4.8	5.0	5.6	5.1	0.5
Italy	9.1	1.9	1.9	6.5	5.5	5.7	5.9	3.6
Japan	9.0	9.0	1.6	7.0	5.9	6.7	6.4	3.6
Luxembourg	8.1	8.1	3.0	6.8	4.9	8.9	6.3	2.9
Netherlands	7.1	7.1	2.8	6.0	5.2	5.9	5.6	2.1
New Zealand	8.3	8.3	3.9	6.7	6.3	8.0	6.8	2.2
Norway	10.0	4.5	2.4	6.4	5.3	10.6	6.8	4.2
Portugal	7.5	7.5	2.3	6.1	5.2	6.1	5.7	2.5
Spain	7.8	7.8	3.2	5.7	5.5	8.4	6.2	2.5
Sweden	6.6	4.3	2.7	5.0	4.3	6.6	5.0	2.0
Switzerland	6.6	6.6	3.1	5.6	5.1	5.8	5.4	1.7
Turkey	9.8	9.8	2.5	6.5	6.0	10.9	7.2	4.0
United Kingdom	7.7	4.6	3.5	5.7	5.2	7.8	5.9	2.3
United States	7.6	7.6	2.6	6.6	5.2	6.1	5.8	2.5
Average	7.9	6.1	2.8	6.0	5.2	7.5	5.9	2.7

[1] No personal taxes, average inflation at 4.5 per cent, average weights

Source: OECD (1991)

The evidence presented in table 8 suggests that among these countries the cost of equity finance has, on average, been highest in Japan with the UK slightly behind. The estimated high cost of equity capital in Japan has come about because of the high rate of growth in real equity prices observed in Japan over the sample period (mid 1960's to date). There is surprisingly little international evidence on the extent to which the cost of equity capital varies across countries (see Fukao, 1993, for a recent survey) but it is generally thought that the cost of equity capital has been lower in Japan than in other countries (see McCauley and Zimmer, 1989). However this view has been disputed by Kester and Luehrman (1992) in a piece entitled 'The Myth of Japan's low-cost capital'. For current purposes it is sufficient to note our estimates have been obtained by applying the same methods across different countries although there is considerable uncertainty about these estimates.

Table 8. The Real Cost of Equity Finance in the G7 Countries

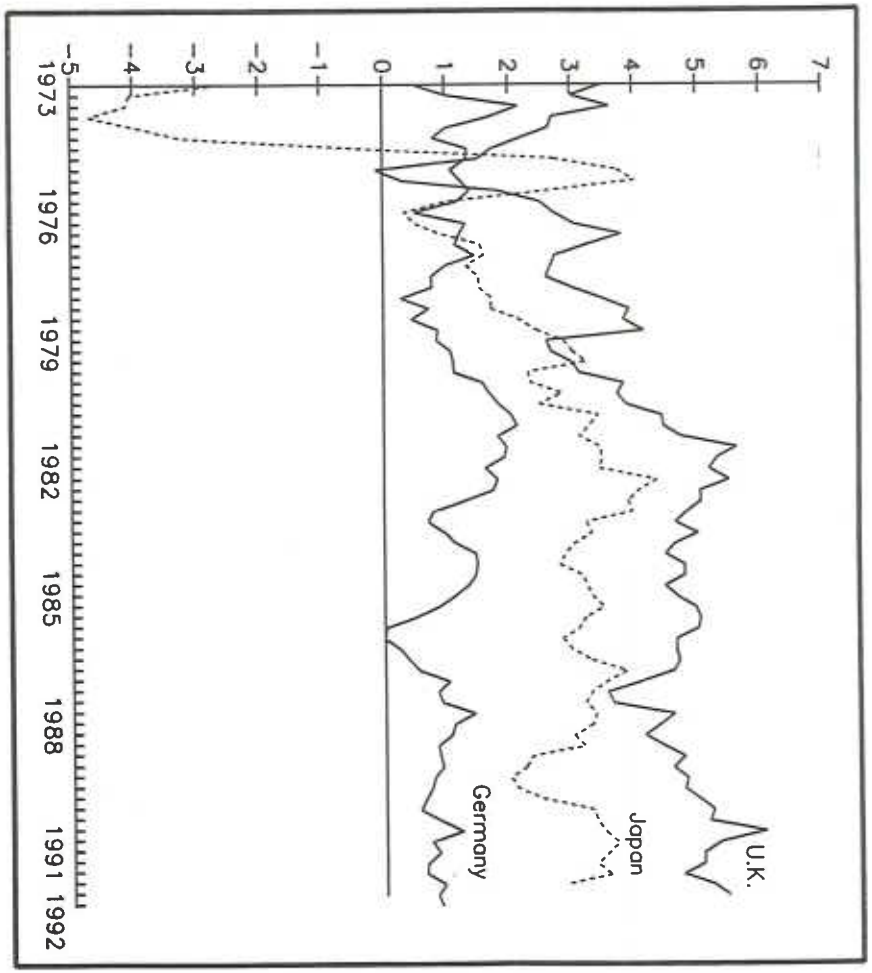
Country	at end of:					
	1973	1975	1980	1985	1990	1992
Canada	3.4	6.0	3.3	2.1	2.5	2.2
o/w dividend yield	4.3	6.9	4.2	2.9	3.4	3.1
France	3.5	4.6	5.9	3.4	4.1	3.8
o/w dividend yield	3.4	4.4	5.7	3.3	3.9	3.7
Germany	3.5	3.1	3.4	1.2	1.7	1.8
o/w dividend yield	4.1	3.6	3.9	1.7	2.3	2.4
Italy		−2.8	−1.8	−4.0	−3.8	−1.7
o/w dividend yield	2.8	3.8	1.6	1.8	3.9	3.9
Japan	7.8	7.7	6.9	6.3	6.0	6.2
o/w dividend yield	2.6	2.5	1.7	1.0	0.8	1.0
UK	5.5	6.0	6.8	5.3	6.4	5.2
o/w dividend yield	4.5	5.1	5.9	4.3	5.4	4.2
US	4.0	4.9	5.6	4.7	4.5	3.6
o/w dividend yield	3.2	4.1	4.8	3.9	3.6	2.7

Source: Datastream and OECD Business Sector Database

The overall cost of capital (or cost of funds) is obtained by weighting together the cost of equity capital and the cost of debt. The weights used are the relative shares of equity and debt in company balance sheets. This then provides a measure of the rate of return required by investors (r in equation (1)). Chart 4 shows the required rate of return in the UK, Germany and Japan. Table 9 provides summary information for the G7 countries. This shows clearly that the rate of return required by UK investors has generally exceeded that in other countries except the US. This is in agreement with other international evidence that the overall cost of capital is higher in the UK and US than in Germany and Japan (see Chart 5 reproduced from McCauley and Zimmer, 1989). This reflects differences in personal taxes (incentives to saving), the propensity to save, inflation, perceptions of risk, risk aversion and perhaps differences in the structure of financial markets. In any case the high levels shown for the UK suggest that this provides some disincentive to investment by UK firms.

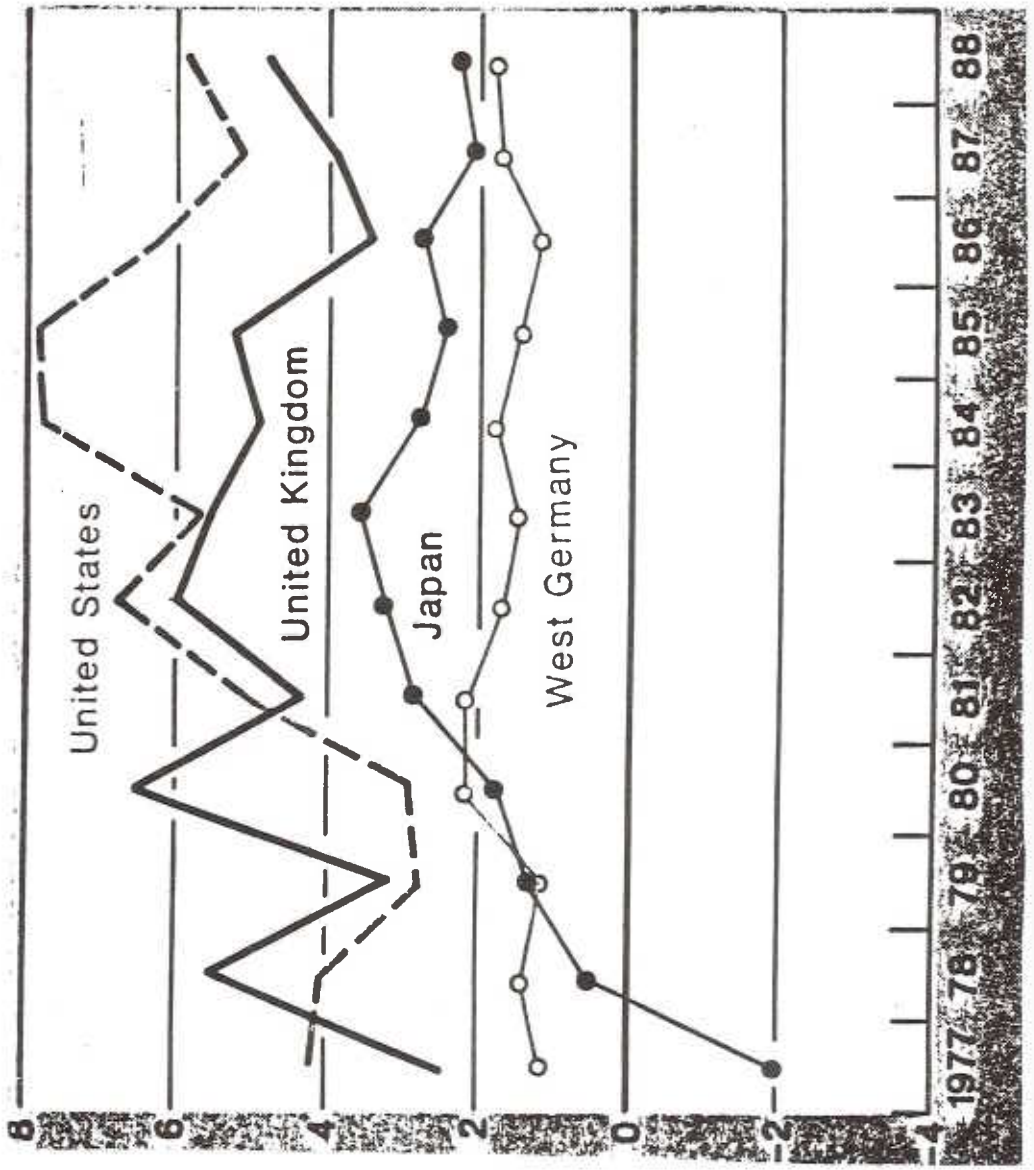
It should be noted that according to our estimates, the weighted average cost of capital is relatively low in Japan despite the fact that the cost of equity capital is highest there. This arises because the weight on debt finance is much higher in Japan than it is in the UK and US, and the cost of debt finance is much lower than the cost of equity finance in all countries. However this should not be taken to mean that the weighted average cost of capital could be reduced in the UK say by increasing the use of debt finance. One of the fundamental theorems of finance, the Modigliani – Miller theorem (Modigliani and Miller, 1958), asserts that the weighted average cost of capital is independent of the way in which it is financed. According to this view, an increase in the proportion of capital that is financed by debt will raise the cost of equity finance in such a way that the weighted average cost of debt and equity finance remains the same. This is because such an increase in gearing raises the riskiness of the remaining equity thereby necessitating an increase in its return in order to compensate equity investors for the extra risk they face.

Chart 4. The Real Cost of Funds in the UK, Japan and Germany



Source: Datastream and OECD Business Sector Database

Chart 5. Real after-tax cost of funds



Source: McCauley and Zimmer (1989)

One interesting factor to emerge from an examination of the development of the cost of funds in different countries is the reduction in the extent of differences over time. Chart 6 shows the variance of the cost of funds in the G7 countries over the sample period. The continuation of this process, probably attributable to a reduction in controls over capital movements, may lead to an approximate equalisation of the cost of funds in different countries. The evidence suggests that this will be to the advantage of the UK in the sense that the real cost of funds will be brought down towards the international average.

As has been emphasised earlier, the incentives to invest in real capital are measured by the user cost of capital. The earlier discussion indicated that when the cost of funds and inflation are the same in all countries then the user cost of capital in the UK is equal to the international average. However, when account is taken of the higher cost of funds typically observed in the UK the user cost of capital is also higher than in other countries.

Chart 7 shows the user cost of capital (for machinery financed by retentions) for the UK, Germany and Japan. Table 10 shows summary information for the G7 countries. The differences between the user cost of capital reflect both the corporate tax system and the rates of return required by investors. This shows that the corporate tax system may be used to reduce the disparities between the required rates of return. This appears to have happened until 1984 in the UK.

Table 9 The Real Cost of Funds in the G7 Countries

Country	at end of:					
	1973	1975	1980	1985	1990	1992
Canada	0.8	3.8	2.3	2.0	2.7	2.3
France	-0.5	0.0	1.7	1.6	3.9	4.2
Germany	1.7	1.2	2.0	0.0	0.7	0.9
Italy	-9.9	-7.5	-5.0	-1.4	-1.1	1.6
Japan	-4.7	1.0	3.4	3.1	3.7	2.9
UK	2.7	2.5	4.5	5.0	5.4	5.5
US	3.7	4.6	5.3	4.6	4.3	3.5

Source: Datastream and OECD Business Sector Database

Chart 6. The variance of the real cost of funds in the G7 countries

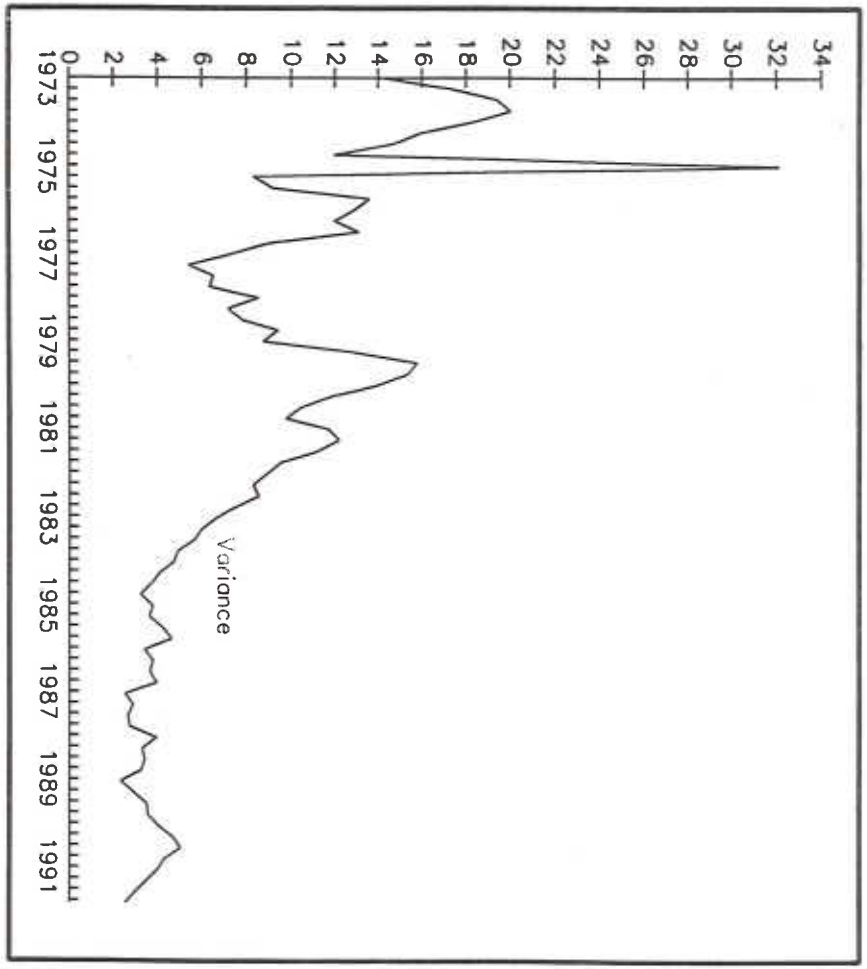


Table 10. The User Cost of Capital (Manufacturing Machinery)

a) Evaluated at common cost of funds

Country	at end of:					
	1973	1975	1980	1985	1990	1992
Canada	8.2	8.2	6.6	6.6	7.8	7.6
France	9.4	8.0	8.0	8.0	6.2	6.0
Germany	11.2	11.2	10.6	9.5	8.6	8.6
Italy	9.7	9.7	8.2	9.9	9.9	10.2
Japan	8.6	9.2	9.2	9.8	7.7	7.7
UK	4.8	4.8	4.8	6.4	6.6	6.6
US	8.4	7.4	7.1	7.3	6.8	6.3

b) Evaluated at prevailing cost of funds

Country	at end of:					
	1973	1975	1980	1985	1990	1992
Canada	9.4	14.1	7.0	2.6	2.5	0.2
France	2.4	2.3	4.8	3.3	3.8	4.0
Germany	6.5	4.2	5.5	1.4	1.9	1.7
Italy	−9.5	−6.4	−3.3	1.3	0.8	2.0
Japan	−0.9	6.4	8.0	5.8	3.9	2.6
UK	4.3	3.5	6.0	6.7	6.9	4.5
US	7.9	9.2	12.4	6.4	5.0	3.1

Source: Datastream and OECD Business Sector Database

Chart 7. The user cost of capital in the UK, Japan and Germany (per cent, after depreciation)

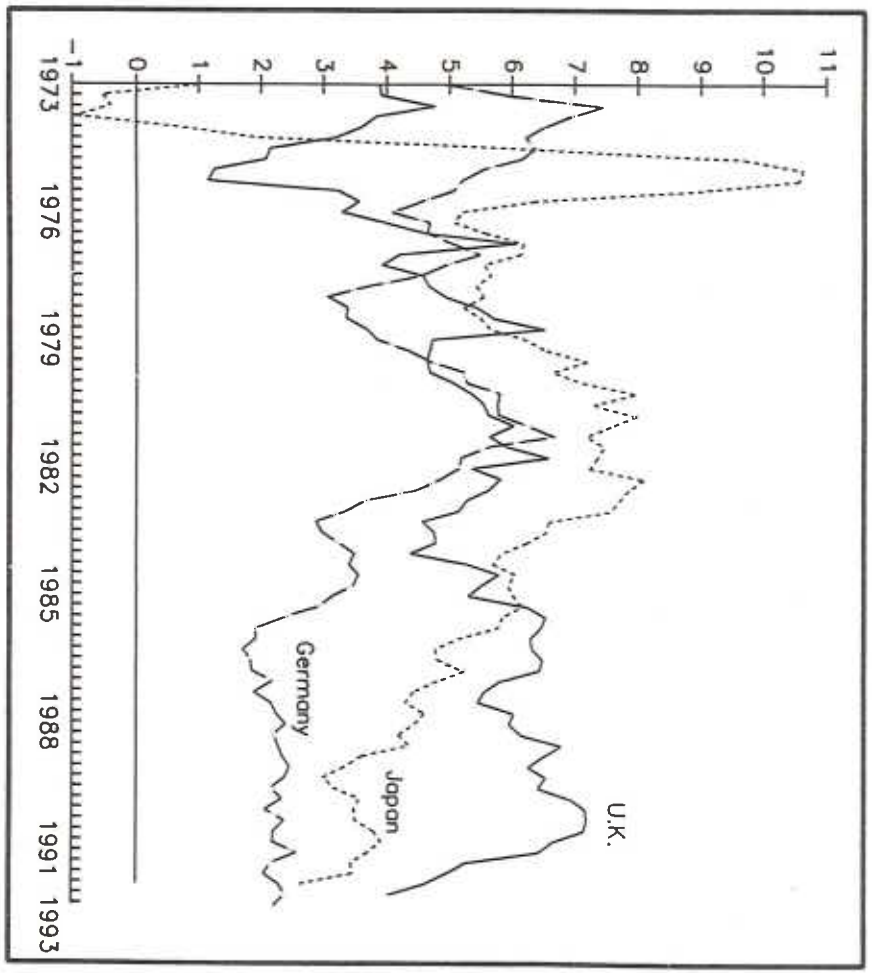


Chart 8. The user cost of capital in the UK and G7 (per cent, after depreciation)

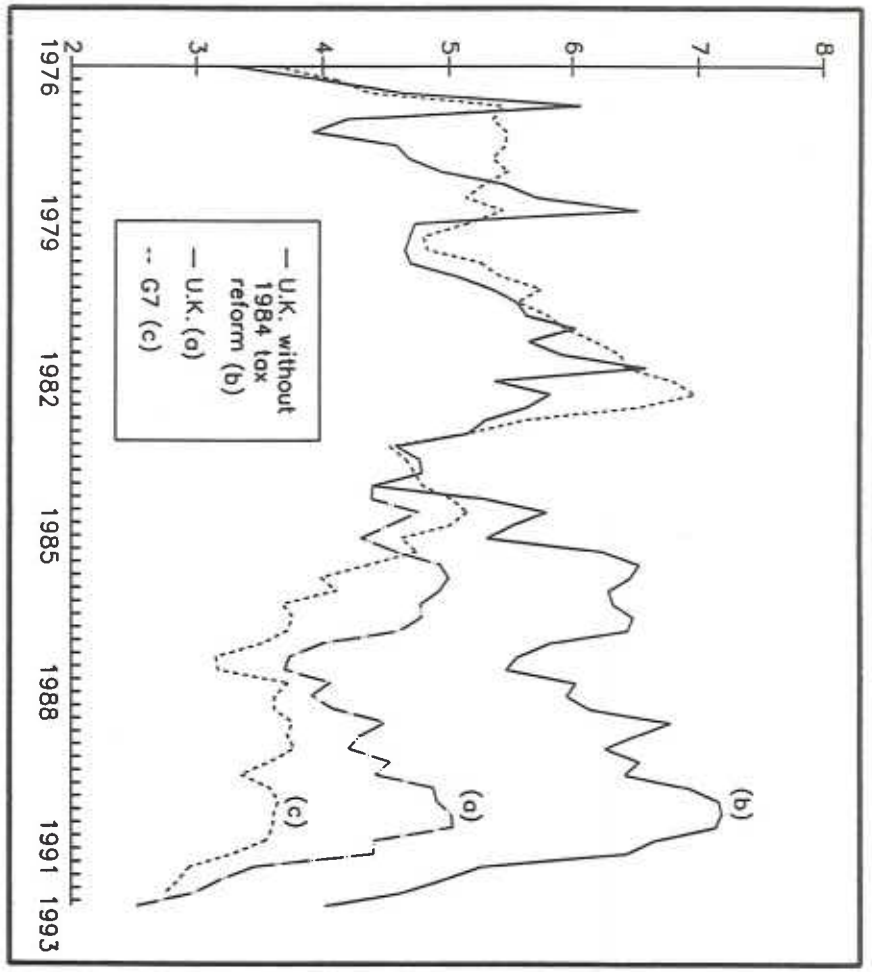


Chart 8 plots the user cost of capital in the UK against the average user cost of capital in the G7 and what the user cost of capital in the UK would have been without the 1984 corporation tax reforms. Until 1984, the user cost of capital in the UK was very similar to that pertaining in the G7 on average. But since then the user cost of capital has increased in the UK and decreased elsewhere. Part of the explanation for this is that the reforms to corporation tax raised the user cost of capital in the UK but it is also the case that the user cost fell in other countries. This partly reflects a fall in the real price of investment goods but is also due an increase in the value of existing investment allowances as nominal interest rates fell from the high levels seen in the 1970s.

It now appears that the user cost of capital in the UK is significantly higher than that observed in other major economies. This is mainly a reflection of the high real cost of funds seen in the UK, but the situation has been made worse by the ending of free depreciation which in the past provided some offset to the high cost of funds.

Section Five: The Effects of Investment Incentives on Business Investment

The preceding discussion has focused on the effects of policy on the user cost of capital without mentioning whether changes in the user cost of capital actually affect investment. There is very little consensus in the literature as to how large such effects might be. A recent survey style paper by the OECD (Ford and Poret, 1991) concluded that 'there is considerable doubt that such incentives do, in fact, raise investment demand'. Similarly pessimistic conclusions have been reached by Clark (1993).

A review of empirical research into the relationship between investment demand and tax incentives in the UK suggests that there is a statistically significant effect but that such effects are small in magnitude. This ignores the effect of announced changes in capital allowances of the type introduced in the 1984 Budget and the 1992 Autumn Statement which, in the former instance, stimulated large switching of investment expenditures into periods where capital allowances were most generous (see Devereux, 1989, Sumner, 1992 , Young, 1992). These switching effects provide very little information about the effects on investment of permanent changes in the cost of capital.

The standard way of measuring the effects of investment incentives on the demand for capital is by the elasticity of substitution between factors of production. Under certain assumptions, the optimum capital demand of a firm can be written as:

$$K = b\ Y\ c^{-s} \qquad (3)$$

where K is the desired capital stock, b is a constant, Y is the expected output of the firm, c is the user cost of capital as before and s is the elasticity of substitution. Thus if the user cost of capital goes up by x per cent, the demand for capital at given levels of demand will fall by sx per cent.

Hence if the user cost of capital were to rise by 3 percentage points from 15 per cent, a rise of 20 per cent, the demand for capital would also fall by 3 percentage points if the elasticity of substitution were equal to one, by 1.5 percentage points if it were equal to a half, and by .75 percentage points if it were equal to a quarter.

The estimate of the elasticity of substitution for the manufacturing sector in the National Institute's macroeconomic model is 0.25. This is relatively low by the standard of other estimates in the literature. For example, Bond, Denny and Devereux (1992) assume a value of 0.5 and Meyer, Prakken and Varvares (1993) assume a value of 0.6. Moreover, the speed of adjustment of investment to changes in the desired stock of capital is estimated to be quite slow.

Section Six: Simulation of the effect of policy changes

The earlier discussion showed how corporation tax neutrality could be achieved by restoring free depreciation for business investment. This section uses the National Institute's macroeconomic model to simulate the effects of this on investment and on the economy as a whole.

The first simulation to be presented assumes that free depreciation is restored to manufacturing investment in plant and machinery from the beginning of 1994. The ex ante effect (that is before taking account of changes in prices which arise as a consequence of the induced change in investment) on the user cost of capital is shown in chart 9. This shows the effect on the user cost of capital of tax paying and tax exhausted firms of the change in allowances. It also shows the effect on the weighted average cost of capital for manufacturing which determines investment.

The user cost of capital for tax paying firms falls by over one percentage point for the reasons noted in the examples given above. However the user cost of capital for tax exhausted firms is likely to rise. This is because the increased capital allowances raise the benefits to waiting to invest at a time nearer to when the allowances may be used. The combination of these two effects reduces the weighted average cost of capital by about half one percentage point or about 4 per cent. This should raise the desired capital stock in manufacturing at given output levels by about 1 per cent.

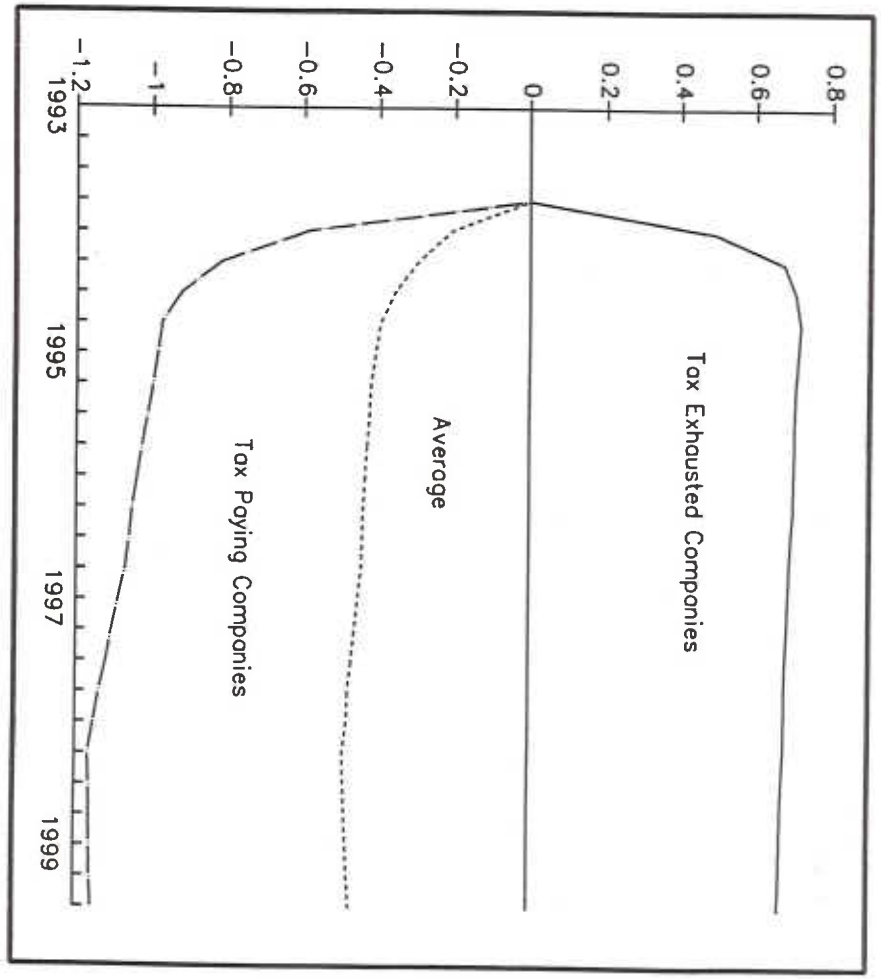
The simulation is run under the assumption that the exchange rate and nominal interest rates are fixed at their base levels. It is implicitly assumed that the cost of the extra capital allowances is financed by public borrowing. This assumption is considered further later. Table 11 provides a summary of the results of this simulation.

Table 11 Effects of a restoration of free depreciation for manufacturing investment in plant and machinery

per cent difference from base unless otherwise stated

At end of:	1st year	2nd year	3rd year	10th year	15th year
Output:					
whole economy	0.10	0.10	0.20	0.4	0.5
manufacturing	0.10	0.30	0.4	0.9	1.0
Output price	0.10	0.20	0.30	−0.5	−1.5
Investment:					
manufacturing	0.5	1.1	1.70	2.00	1.9
total	0.3	0.6	0.80	+ 0.8	+ 0.6
Employment:					
manufacturing	0.0	0.1	0.2	0.1	+ 0.0
Capital stock:					
manufacturing	0.0	0.1	0.2	1.1	1.3
unemployment (thousands)	−1.0	−4.4	−9.4	−24.6	−30.5
Productivity:					
manufacturing	0.1	0.2	0.3	0.7	1.0
whole economy	0.1	0.1	0.2	0.3	0.3
Capital allowances	24.0	18.8	14.6	4.8	2.8
Public sector deficit (£million per annum)	+ 300	+3500	+4000	+2500	+3000

Chart 9. Change in the user cost of capital when free depreciation is restored (per cent)



The effects of the policy change are largely beneficial. Investment in the manufacturing sector is about 2 per cent higher throughout most of the simulation. This raises aggregate demand and aggregate supply. In the short term the effects of investment on aggregate demand are responsible for the increase in output and through this on prices. But in the longer term the effects of investment on the supply side build up through the effects on the capital stock and as technical progress is embodied in the capital stock. This sustained effect on the supply potential of the economy means that domestic prices get driven down so that firms are more competitive and able to find a market for their increased capacity.

Despite the fact that the change in the user cost of capital is causing firms to substitute capital for labour, employment is slightly higher throughout the simulation and unemployment is correspondingly lower.

The increase in capital allowances does have an adverse effect on the public finances and adds about £3000 million a year to the budget deficit. This is the equivalent of about a penny on the rate of income tax. This largely comes about as a consequence of the extra capital allowances provided in the short term. This effect tends to die away over time as cost of providing extra first year allowances is outweighed by the benefits of providing lower writing down allowances. However this may well be an overestimate of the cost of the policy. This is because the calculation has not taken account of the incidence of tax exhaustion and instead assumed that all of the extra allowances are claimed against tax. An alternative estimate that does take account of the effects of tax exhaustion suggests that the costs will be about £2000m per annum.

The model used for the above simulation does not include any effects of investment on the rate of technical progress of the type discussed earlier in this note. An alternative simulation which takes some account of these types of effects has been undertaken. This assumes that the rate of technical progress in manufacturing is higher the higher the investment to output ratio. In particular it is assumed that each percentage point increase in the investment output ratio raises technical progress by half of a percentage point. The main difference is on the effects on output and productivity. These are shown in charts 10 and 11.

This alternative is intended to be indicative of the effects of 'endogenous' technical progress on output. Clearly the more effect there is the more beneficial is investment.

One difficulty with the policy change outlined above is that it is assumed that the cost of the policy is met by an increase in public sector borrowing. In the current climate, with significant doubts about the

Chart 10 The response of output (percentage difference from base)

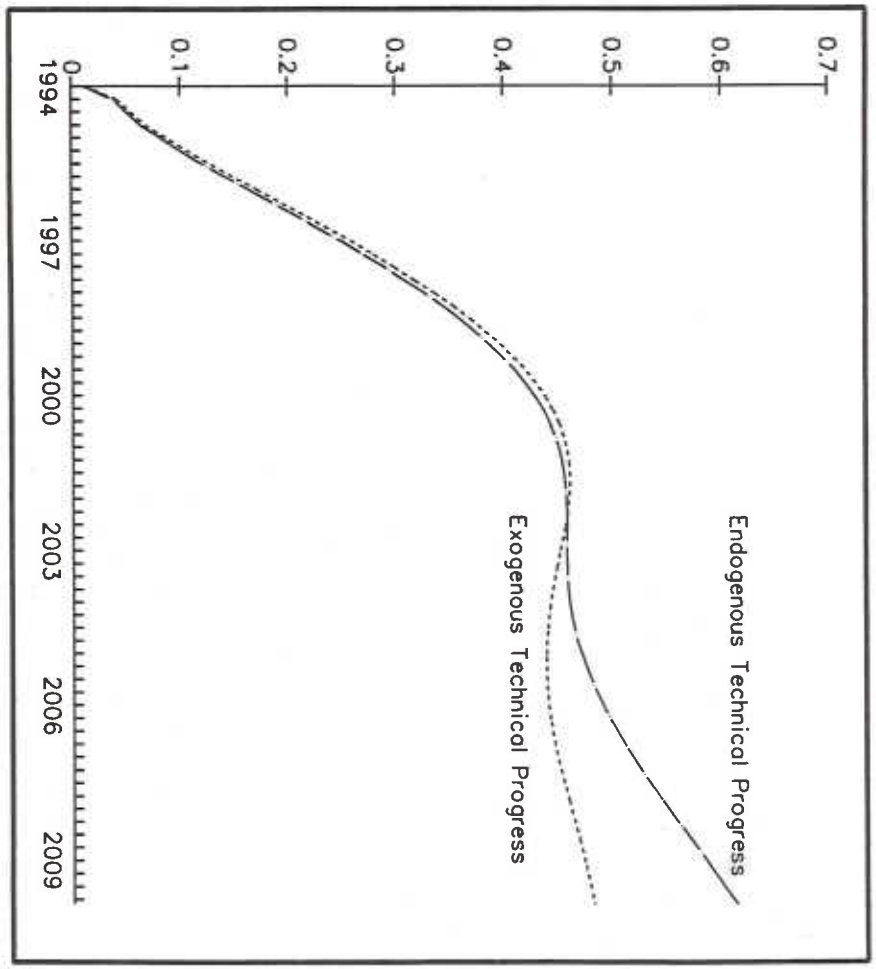


Chart 11. The response of manufacturing productivity

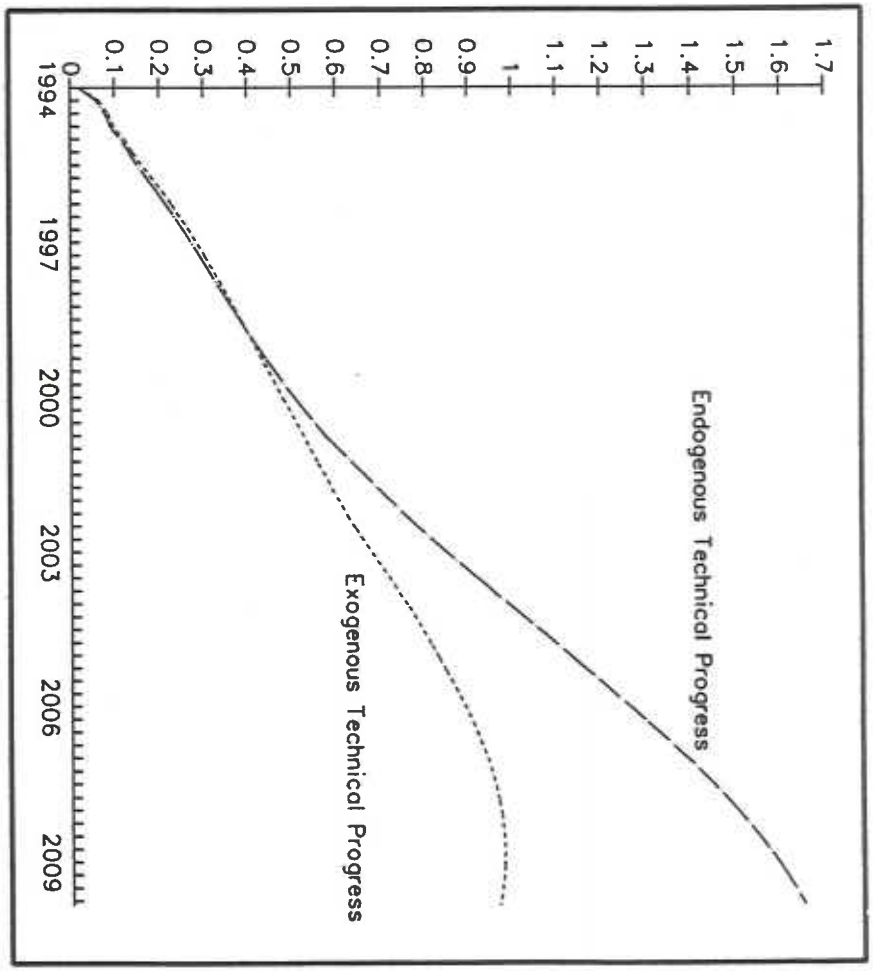


Table 12 Effects of a restoration of free depreciation for manufacturing investment in plant and machinery financed by a reduction in public procurement expenditure

per cent difference from base unless otherwise stated

At end of:	1st year	2nd year	3rd year	10th year	15th year
Output:					
whole economy	-0.3	-0.4	-0.3	0.3	0.4
manufacturing	-0.3	-0.3	-0.1	1.3	1.7
Output price	-0.7	-1.2	-1.5	-2.1	-3.4
Investment:					
manufacturing	0.2	0.0	0.2	3.1	2.5
total	-0.5	-0.8	-0.70	+ 0.9	+0.6
Employment:					
manufacturing	-0.1	-0.1	-0.1	0.7	+ 0.5
Capital stock:					
manufacturing	0.0	0.0	0.0	1.0	1.6
Unemployment (thousands)	15.0	39.0	54.0	2.4	2.0
Productivity:					
manufacturing	-0.3	-0.2	0.0	0.7	1.2
whole economy	-0.2	-0.1	0.0	0.3	0.4
Capital allowances	23.6	17.8	12.9	3.8	1.8
Public sector deficit (£million per annum)	-1900	+1700	+2600	-1000	- 500

sustainability of the fiscal position (see Pain, Young and Westaway, 1993 for a discussion), pressures for further borrowing are likely to be most unwelcome. Therefore we present an alternative simulation where the cost of introducing free depreciation for manufacturing plant and machinery is met by a cut back in public procurement expenditure of one and a half per cent per period. This is sufficient to ensure that the stock of public sector debt remains at a level similar to what it would otherwise have been at the end of the simulation. The results are shown in table 12.

The results of the simulation shown in table 12 indicate a substantial difference between the short run and medium run effects of different policies. In the short run the effects of the cut back in government expenditure dominate causing a reduction in output, prices and employment. The general reduction in activity also puts downward pressure on investment but this is offset in manufacturing by the reduction in the cost of capital. Activity gradually recovers as lower prices improve international competitiveness so that output is higher than it would otherwise have been by the 6th year. On its own the cut back in government spending would be beneficial for manufacturing in the medium term as a result of lower crowding out. This effect is accentuated by the lower cost of capital which boosts investment and productivity in the manufacturing sector. In the medium term the changes in the main macroeconomic aggregates are uniformly beneficial.

In section 4 we indicated that an alternative way of financing more generous capital allowances would be to limit the extent to which interest may be treated as a business expense for corporation tax purposes. Apart from the benefit of targetting the available tax allowances more closely on investment expenditures this would have the additional benefit of limiting the extent to which firms finance investment by borrowing. However much borrowing has taken place on the assumption that interest will continue to be treated as a business expense and equity valuations will have built in this assumption. This means that a policy whereby interest is no longer allowable as a business expense is not really a viable option. This is largely because it would raise much more revenue than is required to finance the scheme to enhance investment allowances and would be equivalent to a very sharp increase in taxes.

The best option, which also favours small firms, would be to reduce the rate of corporation tax at which interest may be deducted when borrowing rises above a particular threshold. This would work in a similar way to some of the changes made to personal taxation that were announced in the 1993 Budget. It will be recalled that mortgage interest relief is now given only at the new lower rate of income tax rather than at the basic rate as in the past. One simple method would be to allow interest to be deductible at the small

companies rate rather than at the corporation tax rate as is the case now.

Such a change would not affect small companies (who would gain from the change to capital allowances) but would raise the tax payments of large companies. CSO figures indicate that industrial and commercial companies in the UK paid interest of about £30 billion in 1991. At that level this measure would raise £2.4 billion per annum and go most of the way to meeting the cost of the change in capital allowances without having an excessive effect on equity values. In fact such a change would in the longer term raise a substantial amount of revenue for the authorities. The reason for this is that the change to capital allowances has a largely temporary effect on the public finances because the extra first year allowances are eventually matched by lower writing down allowances. By contrast the reduction in interest relief has a permanent effect on company tax payments and will grow over time with interest payments. These effects are illustrated in the model simulation shown in table 13.

The effects of such a policy are different in the short term from their effect in the medium term. The reasons for this arise from the changes in company financial behaviour as a consequence of the reduction in the desirability of debt finance. The reduction in interest relief causes companies to wish to reduce their indebtedness and this leads to lower dividend payments and hence lower equity prices, both of which affect consumer spending. But in the medium term the incentives to investment and the effects of lower prices on competitiveness lead to an increase in investment and output.

It should be noted that this policy on its own has a substantially beneficial effect on the public finances and a depressing effect on aggregate demand in the short term for the reasons noted above. Both of these effects could be offset by other policy actions. For example, the large ex ante decrease in the public sector deficit could be used to fund cuts in the rate of corporation tax or indeed to extend the generosity of the incentives to investment to the non manufacturing sectors or by offering grants for investment in manufacturing. These sorts of changes would offset the adverse effects on demand caused by money being taken out of the company sector and accentuate the improvements to the aggregate supply potential of the economy.

Table 13 Effects of a restoration of free depreciation for manufacturing investment in plant and machinery financed by a reduction in business interest relief

per cent difference from base unless otherwise stated

At end of:	1st year	2nd year	3rd year	10th year	15th year
Output:					
whole economy	–0.1	–0.2	–0.2	–0.1	0.1
manufacturing	–0.2	–0.3	–0.3	0.2	0.7
Output price	–0.3	–0.6	–0.9	–3.0	–4.1
Investment:					
manufacturing	0.3	0.5	0.6	1.2	1.9
total	–0.3	–0.6	–0.80	– 0.7	–0.4
Employment:					
manufacturing	0.0	–0.1	–0.2	–0.5	–0.2
Capital stock:					
manufacturing	0.0	0.1	0.1	0.4	0.8
Unemployment (thousands)	1.5	5.9	11.2	0.0	–36.9
Productivity:					
manufacturing	–0.1	–0.1	–0.1	0.7	0.9
whole economy	–0.1	–0.1	–0.1	0.0	0.0
Capital allowances	23.7	18.1	13.2	0.8	–0.7
Public sector deficit (£million per annum)	+ 200	–150	–1800	–10000	–16000

Section Seven: More Specific Measures for Encouraging Investment

Up to this point our discussion has concentrated on measures which apply across the whole of industry and across the whole of time. This has been because our first contention was that there was a general discouragement of investment in the UK by the system of public finance in the UK and that changes were desirable which at least took the system back to neutrality if not to a period of positive discrimination so that some of the past deficiencies could be made up. We now consider the case of more specific market failure where the imperfections relate aspects of investment not to investment as a whole.

We have highlighted two facets earlier namely the position of small firms and secondly the role of innovation. It is a characteristic of most systems that the user cost of capital fluctuates over the business cycle.

SEFIS

In the 1980s there were two schemes to encourage SMEs to purchase advanced technology machine tools entitled Small Engineering Firms Investment Scheme (SEFIS). Under the first scheme launched in March 1982 (SEFIS1) firms under 200 employees in the metal goods, engineering and vehicle industries were offered a grant of one third of the eligible purchase costs with a total budget of £30mn while in the second the size limit was raised to 500 and the industry limitation was removed. SEFIS2 was launched in March 1983 and had a budget of £100mn, reflecting the success of SEFIS1.

According to the evaluation of the schemes undertaken by Research Associates (Stone) (DTI, 1987) the net benefits of the grant were £58mn on an actual expenditure of only £70mn as shown in the Table below. (Only £22mn was actually paid out under SEFIS1 and £48mn under SEFIS2.)

Quantifiable Effects of SEFIS(1 & 2)(*£mn*)

Outgoings		*Benefits*	
grants	70	users' profits from extra sales	7
publicity/manpower	1	users' profits knock on sales	2
		users' profits from cost savings	16
		customers' cost savings	25
		customers' extra profits	6
		m/c tool manufacturers' profits	3
		less publicity manpower	−1
		Net benefits due to grant	58
		Benefit of grant itself	70
71		Gross benefits	128

Note: displacement effects have been computed and deducted from the initial calculation of benefits.

The aim of SEFIS was to encourage competitiveness of the targetted firms and through their key role in the production process a wider range of UK industry. The grant appears to have been successful in its purpose and was well received. By having close targetting the large proportion of the expenditure went where intended and did increase the stock of advanced technology machinery. However, it is interesting to note that the main beneficiaries in terms of profits were those firms which were already more profitable and would have undertaken the investment even without the grant.

Some of the guidelines which emerged from the evaluation are worth noting:

1. the main financial beneficiary is the customer through cost savings that are passed on
2. more than investment is required in the package in order to improve business skills and the way the investment is used

The evaluation comes down against having a further scheme simply because much of this particular technology would (by then) have been acquired by eligible firms. Further schemes of this nature would therefore have to involve other specific aspects of advanced technology or further steps within same technological area if they are to be equally successful.

The consultants' conclusion about the need for a further scheme is rather surprising in the light of the tone of their assessment. The evidence they produce for the success of the scheme is sufficiently convincing to merit the investigation of a further scheme, aimed more widely at new high technology among small firms. Take up of new ideas still appears slow, even in the field of information technology. In part this is due to the lack of bodies like the Fraunhofer centres to encourage the diffusion of existing technology and help firms bring their ideas successfully to the market. Any further schemes should therefore go hand in hand with the promotion of the diffusion of technology, say, through institutions like the Faraday centres which have been widely discussed and the provision of packages which include an element for training in the use of the new technology so that the new equipment is exploited to the full.

The more recent Flexible Manufacturing Systems Scheme (in operation 1982–6) has also received a favourable evaluation (DTI, 1992). Not only were there direct reductions in costs particularly through reductions in stocks and work in progress, but the increased flexibility imparted by the systems

enabled firms to penetrate markets which would otherwise probably have remained closed. The requirements of additionality for the scheme helped increase its net benefit (each £ spent resulted in £1.26 of cost reduction and £25.50 in extra sales according to the consultants' analysis (DTI, 1992, P.6).) Limited well directed schemes do therefore appear to offer opportunities.

Section Eight: Wider Issues

We have been careful in this analysis to point out that we are dealing with only one area of investment and capital. In forming an assessment of policy priorities it is necessary to consider the whole picture, which runs from investment in infrastructure and buildings through investment in plant, machinery, equipment and vehicles to technology, innovation and human capital through education and training. We make no comment on which of these needs is the most pressing but the evidence we have presented here on the shortfall in investment, primarily in plant, machinery and equipment can be replicated in all sectors. Our colleagues at NIESR led by Professor S J Prais (Prais, 1990) have put the emphasis on human skills, particularly intermediate skills and have been able to demonstrate the causes of market failure in this regard. Work on regional development at the Institute (Begg, Lansbury and Mayes, 1993, for example) has emphasised the importance of the network of business services in attracting and retaining investment. The arguments in favour of greater R&D, particularly in the diffusion of technology and implementation of ideas for new products are also widely known. Mason (1993) has explained this clearly and repeated the need for intermediaries along the lines suggested for the Faraday centres to help firms of all sizes but particularly SMEs to implement new technology.

Our discussion thus far forms part of this wider framework. The need for a higher rate of return has an impact on R&D expenditure in just the same way that it does on investment in plant, machinery and equipment. Our arguments are in general for neutrality of treatment. Expenditure on R&D and training is 100% allowable against tax in the year it is undertaken. The reintroduction of first year allowances on a temporary basis has already been made as a step towards this return to neutrality as part of the encouragement of investment as a means of accelerating the recovery from recession. We argue for its permanent reinstatement.

However, any changes suggested must bear due regard to the whole pattern of public finance. Reinstating 100% allowances has no impact on taxation in the long run as the writing down allowances will eventually sum to 100%. It is the interest cost of postponing the allowance which increases the burden on firms and decreases that on the government. When the new system stabilises, this represents a once and for all not a continuing loss for the government, except insofar as investment is actually increased and hence the total claim for allowances rises. Against that must be offset the tax consequences of the faster rate of growth and higher levels of employment and real incomes. Our simulations with the National Institute macroeconomic model show that although the impact on the economy, employment and inflation are all favourable there

is a detrimental effect on the public sector borrowing requirement of perhaps £2bn a year from the return to 100% allowances. The more that the increase in investment leads to an increase in productivity then the less the pressure on the public sector deficit.

We further show that even if the whole extra need to borrow is offset by a cut in public sector spending that the effect will be positive in the long run, raising output and employment and lowering the rate of inflation. The drawback is that the effect is negative in the short run. Offsetting this would require a package of measures which will protect neutrality as well as avoid an unfortunate profile for the impact. For example one could restrict tax relief on interest payments to the tax rate paid by SMEs. This has the added advantage of removing the discrimination against small firms in the current system. The benefit to the long run public sector borrowing requirement far exceeds the cost of restoring the allowances (over £10bn) and hence provides an opportunity for other stimuli to the economy, whether these come from increased infrastructure investment or a reduction in taxation. As the total budget is composed of many influences in addition to the three we have mentioned we do not explore any more specific combinations although they can be approximated from our tables and simulated with the model.

We lastly turn to market failures within business investment rather than for the sector as a whole and suggest that there are some measures that could be considered to improve diffusion of new technology to smaller firms. Past experience suggests that small schemes can have a noticeable impact and in the light of the time which has elapsed and the limited coverage of previous schemes such a stimulus would again be appropriate. However, on this occasion the range of new technology could be widened so that it includes IT in order to benefit small firms in all sectors not just those closely related to mechanical engineering. The costs of such a scheme could be borne by the reduction in interest allowances.

One concern which has been widely expressed is over the behaviour of investment over the business cycle. To be able to benefit when the recovery comes investment needs to be one of the first aspects of the economy to pick up. However, given the extent that it is financed from retained earnings and the lack of incentive because of greater tax exhaustion the system does not provide this impulse. This has led some other OECD countries to allow firms, in effect, to save up tax allowances in a more extensive manner than is currently permitted here and release them to aid recovery from recession. We have argued that the impact of such moves are likely to be small on total investment and limited on the recovery itself. In any case the time for doing this in the current cycle is largely past.

However, there are three further facets to this form of incentive which could warrant its reconsideration. The first is that the externalities from one firm's investment on the actions of others could be particularly important in the early phases of a recovery (Romer, 1987). Secondly, there are considerable problems for suppliers from the sheer amplitude of the fluctuations in demand in the industry. Investment goods industries face demand which fluctuates more than the demand for investment and investment itself fluctuates considerably more than the economy as a whole. Thus investment goods producers have faced 30% reductions in demand when overall demand in the economy has only fallen slightly. Some smoothing of the cycle would reduce the costs of these fluctuations. Lastly, the macroeconomic literature (Blanchard and Kiyotaki, 1989, for example) suggests that there extra costs, labelled menu costs from fluctuations in the economy which could be reduced by a greater measure of stabilisation.

Now is a good time to consider these arguments, discussed in Bollard, Harper and Mayes (1993) as provision for stabilisation can best be made when the economy is in its upswing so that greater resources can be put aside for the future, rather than the current problem where increased borrowing against the future is required. A simple step that could be introduced is the payment of interest on defered tax allowances so that their real value is maintained.

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