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No. 49 August 1986

Long run implications of the increase in taxation and public debt for employment and economic growth in Europe*

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Giuseppe Tullio

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Internal Paper

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1. Introduction

Economic policy makers typically are interested in the effects of their actions over a relatively short time horizon stretching say from one quarter to one to two years. The effects of their actions over a long time period say 10 to 20 years is often beyond their interest. In a rather parallel fashion, there is a great deal of economic analysis of the short run effects of fiscal policy whereas analysis of the very long run effects of fiscal actions has attracted relatively little attention at least in the post world war II period. The few more recent contributions are cast within abstract and mathematical growth models generally of not easy understanding for a typical policy maker.

The role of the government sector in all economies of the European Community (EC) has grown substantially in the last two and a half decades. Although it is very difficult to measure the size of the government sector in relation to the overall economy, the ratio of general government expenditure to the national product can give a rough idea of the magnitudes involved. This ratio however, on the one hand, underestimates the degree to which the government sector intervenes in the private economy. This is because intervention through regulations and legislative means which do not give rise to direct disbursements from the general government budget do not affect the ratio. Similarly, the extent of the operations of state-owned enterprises are generally not reflected in the ratio. On the other hand, this ratio overstates the degree of government influence on the economy to the extent that governments increasingly have become "financial intermediaries" by transferring money collected from taxes and sales of bonds to households or firms. While such financial intermediation has an impact on the allocation of resources, this impact is much weaker than if the government bought goods and services itself. This is especially true if the funds are transferred in a non-discriminatory way. In this paper we shall nevertheless use the ratio of general government expenditure to national product as proxy for the size of government.

The increase in the size of government which occurred after 1960 in Europe is roughly comparable with the increase which occurred during and after the first world war. In Germany for instance total government expenditure as a ratio to net national product[1] was 10.5 per cent in 1881 and 18.5 per cent in 1913[2]. It almost doubled to 34.1 per cent by 1930. From 1960 to 1979 the ratio increased from 35.2 to 53.6 per cent[3]. It stood at about 54 in 1984.

This paper analyses the long run effects of the observed protracted growth in government expenditure and the accompanying growth in taxation and/or public debt in the EC on employment and economic growth from 1960 to 1984. The object is to indentify possible policy options for the EC governments' fiscal strategy in the long run. If for instance it can be established that the current high levels of unemployment and the very different employment performance of the EC with respect to say Japan and the US in the last decade or so have something to do with the different growth in the size of governments during the period, clear fiscal policy conclusion would follow for at least the remainder of this century. A similar conclusion holds if it can be shown that the large increase in the size of the government sector which has occurred in Europe from 1960 onwards has affected real economic growth adversely.

It is very difficult to reach firm conclusions about the long run effects of the size of government on employment and economic growth since the variables which play a crucial role are many and the problem does not lend itself to easy treatment within a formal model. It makes a difference in the long run whether it is public investment, current government expenditure on goods and services, or transfers which grow. The effects on capital accumulation and on the misallocation of resources may be very different. In addition the various categories of expenditure can be valued very differently by the recipients of the services and the transfers. How wage earners value the growth in public expenditure is very

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1 Long historical series for Germany are available only for net national product. See W. Hoffmann (1965).

2 Appendix 2 contains a table with the ratios of German government expenditure to NNP, excluding and including transfers, every 10 years from 1881 to 1979.

3 The source of the numerator is OECD (1983) and of the denominator Statistisches Bundesamt (1983).

important for wage behaviour, since if they value it highly, they should be willing to accept some reduction (or less growth) in net wage income, while if they value it little they will attempt to shift forward the higher taxation, thereby increasing the real product wage. In a highly integrated world in which European firms compete with firms located in areas where taxes on labour and labour costs in general grew much less, they may not be able to pass all the increase in costs on to the consumers; this will influence profits, capital accumulation and the international allocation of capital. Similarly the way in which a given size of government is financed matters. Does an increase in taxation, with the ratio of public debt to gross domestic product remaining constant, have the same effect as an increase in the public debt/GDP ratio with the ratio of tax revenues to GDP remaining constant? Also important is which type of taxes create less disincentives to employment and less microeconomic distortions. The difficulty of reaching firm conclusions about the long run macroeconomic effect of the size of government on employment and economic growth is also due to the fact that taxation, government expenditure and regulations have in the first place micro-economic effects. Even if it was possible to reach firm conclusions about the micro-economic effects of each type of tax, each expenditure program and each regulation, enormous problems of aggregation would remain.

Furthermore, even if one could establish firmly that the growth in government expenditure and taxation which has occurred in Europe in the last 25 years has had a very negative effect on employment creation and economic growth, it does not necessarily follow that the size of government would have to be rolled back. A social welfare function is needed to weight the costs of a larger government, in terms of lower employment and economic growth, against the benefits of more equality and larger welfare programmes.

Despite the difficulties involved in reaching firm macroeconomic conclusions, of which the above mentioned are only a sample, the paper tries to isolate a number of major channels through which the growth in the size of government could affect employment and economic growth, the most important being the effect of higher taxation on labour costs and on the demand for labour by the private sector. It concludes that, given the way the government sector has grown in European countries since about 1960,

there is a strong presumption that the effect has been on balance negative. By implication therefore, this paper suggests that the social costs of large government sectors are probably higher than generally believed.

The paper is structured as follows: Section 2 reviews briefly the development of two sets of variables for the aggregate of the EC, the US and Japan from 1960 to 1985. The first set of variables contains the ratios of general government expenditure, taxation and public debt to GDP in the EC, US and Japan (exogenous fiscal variables). It also contains the ratio of direct taxes on labour income and social security contributions to the net take-home wage. The second set of variables contains employment, unemployment, the capital-labour ratio and real GDP growth, the evolution of which may be determined in part by the fiscal variables. Hence they can be regarded as being at least partly endogenous. At the end of this section a cross-section regression analysis of 10 industrial countries identifies a significant negative correlation between real economic performance and the growth of government expenditure, taxation and the taxation wedge between gross and net wages. It is shown that in those countries where the exogenous fiscal variables grew more, economic growth and employment creation slowed down most during the sample period. However not too much importance should be attached to these regression results, because they may be flawed by a number of econometric problems and by the aggregation of all government expenditure and revenues. More weight should be put on the remainder of the paper which deals with some theoretical reasons for expecting the causality to run mostly from the growth of fiscal variables to higher unemployment and lower economic growth.

The first channel through which the size of government may affect employment and growth that is analyzed is how higher taxes are likely to influence labour costs and the demand for labour by the private sector. The starting point for the analysis of this channel is the model of Adam Smith and David Ricardo. They believed that all taxes on wages were more or less fully shifted forward onto higher labour costs, because real after tax wages were rigid downwards, being fixed at the level of subsistance.

In addition, in an open economy, even one as large as the United Kingdom during their time, industrial prices could not be increased to the point of fully reflecting the higher labour costs, due to foreign competition. Hence, they believed that taxes on the wages of labour, taxes on necessities and in part taxes on luxuries were leading to lower employment. They also believed that these taxes were taxes on profits and that they had a negative effect on capital accumulation in the long run. Two assumptions of Smith and Ricardo's theory are crucial for their conclusions. Firstly the notion that public expenditure was useless to the worker, being generally expenditure to finance wars, and secondly Malthus "subsistence theory of wages". The subsistence theory of wages is clearly inapplicable under post World War II circumstances. However, ironically, if labour unions have a monopoly power and fix net wage income to some extent exogenously, the Smith/Ricardo model can still be useful. In the US instead, where labour unions do not possess the same degree of monopoly power and the incidence of direct taxes on dependent labour income and social security contributions is likely to fall relatively more on wage earners, the effects of the growth of government are probably less negative than those predicted by Smith and Ricardo.

Section 3 deals with the implications of the functioning of labour markets in Europe for wage behaviour. The incidence of direct and indirect taxation on the distribution of income and the effects of tax induced wage increases on the demand for labour by firms and the supply of labour by workers are dealt with. The effect of higher taxes on the demand for labour depends not only on the behaviour of wages, but also on the price behaviour by firms, since the demand for labour depends on the product wage. Recent empirical work on the elasticity of demand for labour by firms with respect to the product wage is surveyed, showing that higher wage costs can considerably reduce the demand for labour by the private sector.

Smith and Ricardo's assumption that public expenditure is useless is an excessive simplification. Section 4 analyses the implications for macroeconomic equilibrium of a positive value placed by workers and tax payers on growing public expenditure. The problem is dealt with first at a theoretical level, then a highly conjectural attempt is made to assess

qualitatively the value attributed by European workers to the growth in government expenditure which has occurred in the last two decades or so.

Section 5 tries to assess the effects of the growth of government expenditure and taxation on capital accumulation in Europe, by analysing the effects on household savings of the expansion of social security systems, of the changes in after tax interest rates and of the reduction (or smaller growth) of disposable income. The effects on private savings are different depending on the type of government expenditure; three types of government expenditure are distinguished: public investment, direct purchases of goods and services and transfers. This section also deals briefly with the effects on private capital accumulation of a debt financed growth in government expenditure. It is concluded that of all forms of financing government expenditure, debt financed government expenditure has the most negative effect on private capital accumulation.

Finally Section 6 draws policy implications for European fiscal policy in the long run and the short run.

2. The growth of government expenditure and taxation in the EC, US and Japan from 1960 to 1985

This section summarises in Tables 1 to 3 the growth of government expenditure, taxation and public debt in EC countries from 1960 to 1985 and compares it with experience in the US and Japan. Tables 4 to 7 contain comparisons of the variables which government expenditure, taxation and public debt can influence: the wedge between labour costs and wages net of social security contributions and direct taxes (Table 4), the growth rates of employment, the levels of unemployment (Table 5), the growth rates of real GDP per capita (Table 6) and of capital labour ratios (Table 7). Since several studies of the development of these variables already exist, this section will be kept very short.[1]

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1 See Todd (1983), Committee of Governors of the Central Banks of the Member States of the European Community, (1983), Wegner (1983) and European Economy (1984).

Table 1 shows that general government expenditure[1] as a ratio of GDP increased by about 20 percentage points in the European Community from 1960 to 1985, the ratio increased by about 9 percentage points in the US and by about 17 percentage points in Japan. Since Europe had already the highest government expenditure to GDP ratio in 1960, in 1985 the ratio exceeded in Europe that of the US by about 16 percentage points. Total tax receipts, including social security contributions show a similar pattern (Table 2). They increased from 1960 to 1985 by about 14 percentage points in the European Community, by 4.5 percentage points in the US and from 1960 to 1983 by about 10 in Japan. The growth of government expenditure was much more pronounced than the growth of taxation especially in the European Community and in the US. By 1985 taxation and social security contributions were 46.5 per cent of GDP in the European Community and 31.9 per cent in the US. In 1983 they were 30.8 per cent in Japan. The gross public debt rose sharply in all three blocks from 1980 to 1985 (Table 3). In Japan it had risen sharply also from the mid-1970s to 1980 while in the US it had fallen sharply from 1960 to 1973. By 1985 the ratio of gross public debt to GDP was the highest in the Community where it had reached about 61 per cent. In several of the Community countries the ratio was significantly above 100 per cent[2].

The growth in taxation and social security contributions had a considerable impact on the wedge between gross wages and wages net of social security contributions and direct and indirect taxes falling upon dependent labourers. Table 4A contains the narrower wedge, which includes social security contributions paid by employers and employees and an estimate of direct taxes paid by dependent labourers, as a fraction of the wage net of social security contributions and direct taxes. Table 4B contains the extended wedge which includes an estimate of indirect taxes paid by dependent labourers, as a fraction of the wage net of contributions and direct and indirect taxes. Unless the workers suffer from fiscal

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[1] General government expenditure includes expenditures by local governments and expenditure on social security.

[2] In 1985 the ratio was 116.9 per cent in Belgium, 117.1 per capita in Ireland and 103.8 per cent in Italy.

Table 1: General Government expenditure as a fraction of GDP in the EC, the US and Japan.(1), 1960-1985

	1960	1973	1980	1983	1984	1985
EC(2)	32,1	39,8	47,4	51,8	52,1	51,5
USA	26,8	30,7	33,1	35,5	34,3	35,5
Japan	18,2	22,1	32,4	34,9	n.a.	n.a.

(1)In per cent.
(2)EUR-9

Source: Commission of the European Communities, European Economy, various issues, and Economic Report of the President, February 1986.

Table 2: Government Receipts as a fraction of GDP in the EC, the US and Japan(1),1960-1985.

	1960	1973	1980	1983	1984	1985
EC(2)	32,7	39,1	43,7	46,4	46,8	46,5
USA	27,4	31,2	31,9	31,6	31,4	31,9
Japan	20,7	22,4	28,0	30,8	n.a.	n.a.

(1)In per cent, including social security contributions.
(2) UR-9

Source: See Table 1

Table 3: Gross public debt as a fraction of GDP in the EC, the US and Japan(1), 1960-1983.

	1960	1973	1980	1983	1984	1985
EC(2)	-	40,7	44,5	55,0	58,2	61,1
US	45,9	25,3	27,5	35,1	36,9	n.a.
Japan	-	22,5(3)	52,9	68,2	69,3	69,4

(1)In per cent.
(2)EUR-8, weighted arithmetic mean excluding Greece and Ireland
(3)1975

Source: Commission of the European Communities, International Monetary Fund, IFS, various issues and OECD, Economic Outlook, December 1985. For the USA central government debt.

illusion, the extended wedge is the most relevant one, since the real buying power of the worker is to a large extent independent of whether he pays more direct taxes and less sales or value added taxes or vice versa. However his labour-leisure and consumption-saving choices and the composition of his consumption depend on marginal tax rates. In Germany, France, the Netherlands and Sweden the extended wedge was in 1983 well over 100 per cent of the net wage and more than double than in the US and Japan. In Italy the wedge was 72.3 per cent in 1983, but the figures might be distorted by forms of taxation not included in the wedge. Such forms are the inflation tax, the direct payment for public services (e.g. highway tolls for example) and the fact that the social security system which is unfunded presents a huge deficit which is covered by the Italian Treasury. Finally, the Italian government has for many years paid a part of social security contributions (fiscalizzazione degli oneri sociali). Also in the UK the figure appearing in the table for the extended wedge was much smaller than in other European countries, probably because of the larger role played in the UK by private pension schemes. The extended wedge increased moderately from 1960 to 1983 in the US (about 7 percentage points) and in Italy (about 14 percentage points). It increased by about 23 percentage points in Japan, while in all other European countries it increased considerably by 35-36 percentage points in Germany, France and the UK and by 80 and 97 percentage points in the Netherlands and Sweden.

Table 5 compares the growth in employment in the Community with the growth in the US and Japan. From 1960 to 1985 employment increased by about 1.8 per cent per year in the US and 1.1 per cent in Japan while it did not increase in the Community. The difference in employment performance was particularly large in the period 1980-1985 when in the Community employment fell by about 0.5 per cent per year, while it increased by about 1.2 per cent in the US and 1.1 in Japan. The rates of unemployment reported in the bottom part of the table reflect the more unsatisfactory employment growth in the Community with respect to the growth of the labour force.

Table 6 shows that, comparing the pre and post 1973 periods, the growth rates of real GDP per capita slowed down the most in Japan and the

Table 4A: Estimate of the wedge between gross wages and wages net of direct taxes and social security contributions in selected European countries, the US and Japan,(1) 1960-1983.

	1960	1973	1980	1983
Germany	42,5	59,3	66,1	69,9
France	39,8	51,2	69,5	74,5
UK	23,1	32,0	34,9	39,4
Italy	32,9	37,5	49,0	47,1
Netherlands	43,4	74,1	81,8	103,2
Sweden	32,0	55,3	79,7	78,1
USA	29,2	35,7	39,1	36,9
Japan	18,3	26,3	33,6	37,8

(1)In per cent of the net wage. Total direct taxes have been split between dependent labourers and self-employed according to the share of compensation of employees (net of taxes) in disposable income.

Source: OECD, national accounts.

Table 4B: Estimate of the wedge between gross wages and wages net of direct and indirect taxes and social security contributions in selected European countries, the US and Japan,(1) 1960-1983.

	1960	1973	1980	1983
Germany	77,9	102,3	109,2	112,5
France	82,5	92,1	113,8	118,9
UK	51,6	64,8	76,4	87,4
Italy	58,8	56,9	71,5	72,3
Netherlands	68,8	111,7	124,0	148,0
Sweden	55,9	110,4	139,5	153,1
USA	48,8	56,7	57,9	56,0
Japan	31,7	41,0	49,2	54,8

(1)In per cent of the net wage. Indirect taxes have been split between dependent labourers and self-employed using the same criteria as for direct taxes in Table 4A.

Source: OECD, national accounts.

Table 5: Growth in total employment and unemployment in the EC, US and Japan, 1960-1985

Employment(1)

	1960-1973	1973-1980	1980-1985	1960-1985
EC(2)	0,23	0,19	-0,50	0,05
USA	1,87	1,94	1,19	1,75
Japan	1,26	0,73	1,12	1,09

Unemployment(3)

	1960	1973	1980	1983	1984	1985(5)
EC(4)	2,5	2,5	5,8	10,4	10,9	11,1
USA	5,5	4,9	7,1	9,6	7,5	7,1
Japan	1,7	1,3	2,0	2,7	2,7	2,7

(1)Average geometric growth rates.
(2)EC-10.
(3)In per cent of labour force.
(4)EC-9.
(5)September 1985

Source: OECD (1984); and the Commission of the European Communities, European Economy, Supplement A, No. 12, December 1984 and No.12, December 1985.

Table 6: Real GDP growth per capita in the EC, the US and Japan(1), 1960-1985.

	1960-1973	1973-1980	1980-1985(3)	1960-1985(3)
EC(2)	3,81	1,95	1,05	2,73
USA	2,76	1,14	1,53	2,07
Japan	8,59	2,77	3,22	5,84

(1)Average geometric growth rates.
(2)EC-10.
(3)The figure for 1985 is preliminary

Source: European Commission.

least in the US. But from 1980 onwards, Europe's growth performance was the most disappointing. Table 7 compares the growth in the capital labour ratio in the Community with those in the US and Japan. In the 1960s the growth in the capital labour ratio was much higher in the Community than in Japan and in the US and it slowed down only marginally for the average of the Community in the 1970s and the early 1980s. In some countries like France and the UK the growth of the capital labour ratio accelerated in the 1970s. As has been shown by Todd (1983, 1984) and Mortensen (1984), these developments can be associated with the larger increase in the wage-rental ratio in Europe and they can therefore ultimately also be related to the growth in taxation of labour and with the development of general labour costs.

The last part of this section contains simple cross country regressions between the fiscal variables of Tables 1, 2 and 4 and the "endogenous" variables of Tables 5 and 6, showing that in the countries where government expenditure, taxation and the wedge grew most, the performance of employment and economic growth was less satisfactory. The regressions are of the type:

$$(1) \qquad \dot{Y}_i = a + b\bar{X}_i + c\bar{Z}_i + dP_i$$

where Y is real GDP per capita or employment. A dot above the variable Y stands for the geometric average annual growth rate during the periods 1960-68, 1969-75 and 1976-83 and i indicates the country. The countries in the sample are the big four European countries plus Belgium, Denmark, the Netherlands, Sweden, the US and Japan. The independent variables X are respectively the average ratio of government expenditure to GDP, of government receipts to GDP and the two measures of the wedge between gross wages and net wages reported in Table 4. A bar above the variable X stands for the arithmetic average for the periods 1961-68, 1969-75 and 1976-83. The variable Z stands for the arithmetic average of the ratio of exports to GDP during the same three periods. It is intended to test the relevance of the theory of "export led growth". Finally, P is a dummy variable which is equal to the average ratio of oil imports to GDP in the years immediately

Table 7: Growth in the capital labour ratio in some EC countries, US and Japan(1), 1960-1981.

	1960-1970	1970-1981	1980-1984	1960-1981
Germany(2)	4,6	4,3	-	4,6
France(2)	3,9	4,9	-	4,5
UK(2)	4,4	5,2	-	4,8
Italy(2)	4,3	3,6	-	4,1
EC-10(3)	3,8	3,2	3,0	3,5
US(3)	1,1	0,3	0,8	0,7
Japan(3)	1,6	3,7	2,5	2,7

1 Average geometric growth rates.
2 Total industry; Source: Todd (1984).
3 Economy wide ratios. Source: Commission of the European Communities, European Economy, No.20, July 1984.

following the first oil shock (1975-1978) for the period 1976-83 and zero for the two previous periods. This variable is intended to capture the effect of the oil price shocks on each country's economic growth. The number of observations used to estimate equation (1) is 30,3 observations for a total of 10 countries, except for the regressions which have the tax wedge as the independent fiscal variable, where the observations are 24, since the OECD does not publish the data needed to calculate the wedge for Belgium and Denmark. The hypothesis embedded in equation (1) is that the slowdown in the growth rates of real GDP per capita and of employment is significantly correlated with the growth in the size of the government and in the wedge.

One problem with estimating regression (1) is reverse causation: a recession and an increase in unemployment lead to higher spending on unemployment benefits and to increases in the share of spending on other programs in GDP, if the government wants to maintain the growth rate of programs unaltered. However by taking 7 or 8 year averages the effect of short cycles on the fiscal variables should be small. As to the effect of long cycles it can be assumed that within a long period such as 7 or 8 years, governments have the time to change, at least to some extent, the legislation and adapt expenditure programs and taxes to the new lower rate of economic growth. Thus government actions may reduce the reverse causation. Furthermore the problem of reverse causation is likely to be less when government tax receipts or the tax wedge rather than government expenditure are used as the exogenous variable, because tax revenues fall during a recession at unchanged tax rates and because governments are more likely to reduce tax rates during a prolonged recession than to reduce government spending. Be that as it may, the regression results reported below have to be taken with great caution. Further work is required in attempting to eliminate the effect of long cyclical swings on government expenditures, receipts and the wedge and in disaggregating total expenditure and revenues into major categories.

The regression results reported in Table 8 suggest that the growth rates of real GDP per capita were negatively and significantly correlated with the growth in government expenditure, in taxation and in the wedge over the sample period. Particularly the coefficient of the average ratio of tax receipts to GDP is significantly different from zero: an increase

(3)

Table 8 : Effect of Government Expenditure and Taxation on economic growth and employment: cross country

$$\dot{Y}_i = a + b\,\bar{X}_i$$

Dependent variable	Regr. No.	Constant term	Independent variables: Govn. Exp.(1)	Taxation(1)	Wedge(2)	Ext. Wedge(2)	R^2	D.W.	ϱ	F
Growth of real output per capita	1	5,86 (7,07)	-0,11 (3,97)	-	-	-	0,35	1,88	0,29 (1,58)	7,13(3)
	2	8,61 (6,95)	-	-0,17 (4,83)	-	-	0,44	1,92	0,34 (1,88)	10,35(3)
	3	5,84 (5,74)	-	-	-0,06 (3,41)	-	0,33	2,02	0,39 (0,88)	5,00(4)
	4	5,78 (5,44)	-	-	-	-0,04 (3,01)	0,31	1,97	0,28 (1,34)	4,38(4)
Growth of total Employment	5	2,19 (4,02)	-	-	-0,03 (2,29)	-	0,19	1,76	-	5,25(5)
	6	2,40 (4,37)	-	-	-	-0,02 (2,66)	0,24	1,86	-	7,10(5)

Where i in the equation is the country index, a dot above a variable stands for a geometric average growth rate and a bar for an arithmetic mean.
The dependent variables are average geometric growth rates for the following periods: 1960-68, 1968-75, 1975-83. The independent variables are arithmetic averages for the periods: 1961-1968, 1969-1975, 1976-1983. Numbers in parenthesis are t-statistics. ϱ is the coefficient of autocorrelation of residuals. The autocorrelation has been corrected by Cochrane-Orcutt.

(1) Cross section of 10 countries: the big 4 in the EC, plus Belgium, Denmark, the Netherlands, Sweden, the US and Japan.
(2) 8 countries: Belgium and Denmark were excluded for lack of data.

(3) F(1/26)
(4) F(1/20)
(5) F(1/22)

in the average ratio of tax receipts to GDP of one percentage point was associated with a lower average annual rate of growth of real GDP per capita of 0.17 points. An increase in the average ratio of government expenditure to GDP of one percentage point was associated with a lower average rate of growth of real GDP per capita of 0.11 points per annum. Also the two tax wedges are significantly and negatively correlated with the rate of growth of both GDP per capita and total employment.

The coefficients of the other two independent variables, the average ratio of exports to GDP and of oil imports to GDP were never significantly different from zero. However especially the variable used here to measure the oil dependence is very crude. Furthermore if countries with a greater dependence on oil imports have tended to increase the size of government relatively more the coefficients of the previous regressions could be biased.

Similar cross-country regressions of the rate of growth of GDP per capita on the changes in the public debt to GDP ratio could not be performed because of the difficulties of gathering homogeneous data on public debt going back to 1960 for a sufficient number of countries. The effect of the public debt to GDP ratio on the growth of real output per capita has, however, been analysed for Germany by Sommariva and Tullio (1986a, 1986b), by taking 5 year averages over the period 1880 to 1979. During this period the ratio of public debt to GDP had a very significant and negative effect on the growth rate of GDP per capita.

A significant negative correlation between the tax/GDP ratio and the growth rate of real GDP has also been found for a sample of 20 developed and developing countries by Marsden (1984) using average data for the 1970s. When the rate of growth of the capital stock and of the labour force are added to the tax/GDP ratio as additional independent variables in his 20-country sample the size of the coefficient of the tax/GDP ratio is halved and it looses significance, while the coefficient of the rate of growth of the capital stock turns out to be very high and significant. This implies that in his sample of countries tax increases seem to have had above all a strong negative effect on capital accumulation. However by disaggregating tax receipts he also shows that there was a very significant and negative correlation between the growth rate of the labour force and social security payments and payroll taxes.

The regressions presented in this section and those performed by Marsden are reduced from equations and do not by themselves establish a causal relationship from fiscal variables to economic growth. A structural model of the economy comprising a wage equation, a price equation, an investment function and a demand for labour equation has been estimated for Germany, the Netherlands, the US and the United Kingdom by Knoester (1983). His empirical work suggests a high degree of forward tax shifting in the wage equation, a significant crowding out of private investment when public debts and interest rates increase and a high negative elasticity of the demand for labour with respect to the product wage. Simulations of each country model show that an increase in government expenditure and taxation leads in the long run to a fall in employment and real output in all 4 countries. Knoester's simulations and the theoretical arguments presented in the next sections suggest a significant causality running from the growth of government, the way it has occurred in Europe, to lower employment and economic growth.

3. The determination of wages and prices, taxation and the demand and the supply of labour

A useful starting point to analyse the effect of higher taxes on wages, prices, the real product wage and employment is Adam Smith and David Ricardo's model. Briefly their theory on the consequences of the growth of government expenditure and taxation is composed of three major points. a) Taxes upon the wages of labour, taxes upon necessities and, in part also, taxes on luxuries[1] are shifted forward more or less fully into higher real labour costs. Therefore these taxes are taxes on profits. b) The higher real cost of labour leads to a reduction in the demand for labour by the private sector, for a given capital stock. But since in the long run the capital stock falls, (see point c below), the reduction in the demand for labour will be even larger. c) In an open economy taxes on profits cause an outflow of capital until the after tax profit rate is again equalized across countries; in a closed economy the adjustment occurs via a reduction in capital accumulation. Hence the reduction in employment in the private sector and the reduction in capital accumulation cause deindustrialisation.

(1) According to Adam Smith labourers also consumed luxuries. But since they consumed little of them the effect of an indirect tax on luxuries on the cost of labour to firms was assumed to be small.

Smith and Ricardo's model is generally quickly dismissed today on the basis of the argument that two of their key assumptions are no longer valid. These assumptions are the subsistance theory of wages and the belief that government expenditure had no value for the average citizen, since it was wasted on wars or to maintain kings' and princes' lavish standards of living. Yet, their thorough analysis contains a number of elements which deserve very close scrutiny because they are still relevant to understand the consequence of the growth of government in Europe.

How the conclusions derived from Smith and Ricardo's model can be changed by the possibility that the government spends its receipts on productive investment or on goods, services and transfers that are valued highly by the citizen-voter-taxpayer rather than on wasteful wars, is analysed in the next sections. In this section the likely effect of higher taxation in Europe on wages, prices, the product wage and the demand for labour is analysed, drawing upon existing empirical evidence on the functioning of labour markets in Europe.

The subsistance theory of wages is clearly outdated as a theory of real wage behaviour in modern industrial countries. But if real after tax wages are rigid downwards because labour unions possess some degree of monopoly power and/or because workers resist real wage reductions because they do not value the additional government expenditure highly enough, the conclusions of Smith and Ricardo's model still maintain historical relevance to understand today's European macroeconomic problems. The determination of nominal wages has to be analysed jointly with the determination of prices by firms. The workers or labour unions who attempt to shift the higher taxes forward may be frustrated if firms can pass the higher labour costs onto higher product prices. But the firms freedom in setting prices has been limited in Europe by the high and increasing openess of the European economies and, at least since the mid-seventies, by the anti-inflationary policies of the governments of the major industrial countries. However the high and increasing openess has probably been the more important factor, as the real cost of labour and taxation were developing quite differently or starting from very different levels in other major areas of the world, such as the newly industrialised countries, Japan and the United States.

Where the monopoly power of unions is greater, or where government expenditure has gone beyond the optimum level, the adjustment to the growth of government expenditure will be borne more by reduced employment than by reduced net wages and the political pressure on the government to roll back the growth in expenditure will be less since the employed worker's net wage is prevented from falling. Vice versa, where the degree of monopoly power of unions is less and the size of government below the optimum, net wages tend to fall and the political pressure to roll back the growth in government builds up more rapidly. This could explain why in the US there seems to be a much broader political consensus than in Europe to reduce the size of government, despite the fact that growth of government in the US has been much more moderate in the period under study. This analysis implies therefore that in Europe there may be or have been dangerous elements of instability: the more government expenditure grows beyond the optimum, the more labour unions resist reductions in net wages, the more employment falls, without sufficient political pressure building up to reduce the size of government. It might therefore be necessary that enlightened governments, who can perceive the links outlined above, pursue the objective of rolling back the size of government in Europe even without a clear mandate from the worker-voter to that effect. On the other hand the greater antagonism toward government spending in the US may come largely from defence spending, where many people in the US feel that Europe and Japan receive most of the benefits rather than the American taxpayers. In contrast, in Europe domestic citizens directly receive the benefits of most government spending(1).

The degree of forward shifting of taxation onto higher product wages and the negative impact of higher product wages on employment in Europe in the period under analysis, two crucial links in the transmission from higher taxation to lower employment, have so far been assumed on the basis of circumstantial evidence.

On the issue of the degree of forward shifting of taxation, Knoester (1983) and Knoester and Van der Windt (1985) suggest that it has been significant and substantial in OECD countries in the period under

(1) This point was suggested by Robert Gordon.

analysis.(1) They tested for the forward shifting of the sum of direct taxation of labour and social security contributions, leaving aside the inflation tax on monetary and financial assets which for some years and for some countries has been quite substantial(2). As to the degree of forward shifting of indirect taxes they include the difference between consumer price changes and GDP price changes among the independent variables. To what extent this difference is determined by the behaviour of the terms of trade in addition to changes in indirect taxation is however not clear. For several countries they found full forward shifting of the sum of direct taxation and social security contributions. It would be interesting to split the sample period and see whether, say after 1973, the degree of shifting forward in Europe has been higher than before, as one would expect, and if in the US and Japan it has been significantly lower than in Europe. Preliminary work by Tullio (1986) shows that the degree of forward shifting in the US has been significantly lower for direct taxation and for total social security contributions than in European countries. In this study nominal labour costs are regressed on a deflator of GDP at market prices as well as productivity and tax variables. Since the coefficient of the price index turns out not to be significantly different from one in all eight industrial countries in the sample, the regressions measure the average effect of productivity growth and tax factors on the real product wage. Hence the actual behaviour of prices during the sample period is implicitly taken into account although a better way to proceed would be to estimate simultaneously a wage and a price equation for each country. For the US Gordon (1971) finds a very high and significant coefficient of the rate of change of the employers' social security tax rate in wage equations. His estimates of the coefficients range from about 0.70 to 1.10 for the period from the first quarter of 1954 to the last quarter of 1970. He estimates also the coefficients of the changes in the employees' tax rate and finds that they are much smaller, ranging from about 0.14 to about

(1) Knoester's sample period is 1958-1980 and Knoester and Van der Windt's 1960-1982.

(2) See Masera (1979) for an estimate of the inflation tax in Italy in the 1970s. He shows that in 1976 the inflation tax was higher than the direct taxation of all wage income.

0.24, but still very significantly different from zero (Gordon, 1971, 1972). Hamermesh (1981) shows that the shifting forward of direct taxation and social security contributions has significantly raised the natural rate of unemployment in the US.

Empirical evidence on the second crucial link in the transmission from higher taxation to lower employment, the elasticity of the demand for labour with respect to the product wage, is instead relatively abundant. A negative long run partial elasticity of the demand for labour with respect to the real product wage by profit maximizing firms follows from any production function with a non zero elasticity substitution between labour and capital. The Cobb-Douglas production function for example assumes a long run elasticity of -1. In empirical work the long run elasticity of labour demand has been shown not to be significantly different from -1 for Germany by Sommariva and Tullio (1985) for Australia by the Federal Reserve Bank of Australia econometric model (1977), for Italy by Tullio (1981), and for Sweden by Hörngreen, Myhrman et al. (1982).(1) Artus (1984) using a CES production function, shows that for the post World War II German manufacturing sector the CES production function reduces to a Cobb-Douglas and implicitly that the partial elasticity is -1. The COMPACT model estimated by the Commission of the European Communities for the aggregate of the Community also implies an elasticity of about -1. With a CES production function the absolute value of the elasticity can be larger or smaller than one depending on the value of the elasticity of substitution between labour and capital. Using Wymer's (1972, 1976) maximum likelihood estimation procedures to estimate small macromodels, Bergerstrom and Wymer (1976) and Knight and Wymer (1978) obtained an elasticity of -0.5 for the UK, and Sommariva (1981) obtained an elasticity of -0.44 for Sweden. All the studies mentioned above are done on postwar data except Sommariva and Tullio (1986) which covers 100 years from 1880 to 1979. A high and significantly negative elasticity is also found by Knoester (1983) for the Netherlands, Germany, the US and the UK.

(1) These elasticities are obtained within small macroeconomic models estimated by full information maximum likelihood using Wymer's (1972, 1976) programs. They are more reliable and accurate than the ones obtained from single equation estimates because they are free from the simultaneous equation bias. They are obtained by imposing across equations restrictions on the price, wage, employment and investment functions.

Drèze and Modigliani (1980) obtain a short run partial elasticity of Belgian employment with respect to real wages of -0.2. They also show that if capacity is allowed to adjust, the elasticity becomes a sizeable -2.0 for Belgium. Their conclusions are based on the model of the Belgian Planning Office estimated by d'Alcantara (1979). Drèze (1984) reviews developments of the capital labour ratio and of factor shares in Europe in the 1970s and concludes that the evidence is not inconsistent with the hypothesis that the underlying production function is Cobb-Douglas. A recent study by the UK Treasury reviews empirical estimates of the elasticity for the United Kingdom and concludes that most studies find an elasticity varying between -1 and -1/2 with output allowed to vary (UK Treasury, 1985). The study points out that these estimates could be biased towards zero if in some years of the sample period there were labour supply constraints. In a study focusing on factors determining income shares in the European Community, Steinherr (1983) finds that in most countries firms resisted the reduction in profit margins arising from higher input and labour costs by shedding labour. The elasticities obtained by the various authors are not always strictly comparable because in some studies output is fixed while in others it is variable, and because some estimates are model based while others result from single equations.

Government employment policies in the face of increases in wage costs and the possible reductions in private employment are crucial in the determination of the final outcome. If the government directly employs the labourers laid off by the private sector and increases further taxation to keep the budget in balance the danger of a vicious circle arises in which government employment grows and, as a result of higher taxation, employment in the private sector is reduced further.(1) This has happened to a large extent in Sweden where the government has a very pronounced full employment objective.

The interaction between the reduction in the demand for labour in the private sector and increases in government employment and the size of

(1) See in particular Söderstrom and Viotti (1978) and Steinherr (1983).

government and taxation have been studied with reference to the Swedish case at the University of Stockholm (Calmfors and Horn, 1983, Söderstrom and Viotti, 1978, and Gylfason and Lindbeck, 1982). In particular Gylfason and Lindbeck study the problem in a game theoretic framework and show that if the government reacts to the fall in private employment the size of government will be higher and private employment smaller than otherwise. The Stockholm school seems to suggest that the processes described above were set in motion by exogenous increases in real wages. However it seems more reasonable to assume that the process was set in motion in Sweden by an exogenous expansion of government expenditure in the 1960s.(1) Bacon and Eltis (1976) follow a partially classical approach and introduce profit and capital accumulation in the analysis of the effects on economic growth of the reduction in the share of output which is "marketed" resulting from increased government employment. They consider the possibility of unemployment developing if workers have minimum targets of consumption of marketed output and/or labour unions possess monopoly power.

What is the role played by the elasticity of supply of labour with respect to the after tax wage in causing a fall in employment? With full shifting forward of taxation on the part of the labour unions and workers, the previous analysis suggests that firms reduce employment as labour costs increase. The elasticity of supply of labour plays no role. If the incidence of labour taxes is borne instead by wage earners, the adjustment in employment occurs on the supply of labour side (Break, 1974). The elasticity of demand for labour would appear to play a relatively larger role in European economies with respect to the US economy possibly because labour unions have more monopoly power and because the size of government exceeds by far the US levels.

Empirical evidence on the elasticity of supply of labour is becoming more plentiful for the UK and the US economies. The elasticity of supply of labour services by principal family income recipients is generally believed to be negligible. For married women the elasticity is generally believed to be substantially higher. One factor which has most likely had a more important effect on the supply of labour in Europe than

(1) The growth of government expenditure in Sweden exceeded by far that in other major European industrial countries in the 1960s.

in the US is the level of unemployment compensation (Balassa, 1984, OECD, 1985). However, even in the US the secular growth of unemployment benefits has significantly affected the natural rate of unemployment (Collyns, 1984). As in many European countries unemployment benefits are barely below the level of net wages for a prolonged period of time after layoff, there is no incentive to find new employment. If the workers can supply their services in the hidden economy, as they do in many countries, they can end up being better off financially by remaining registered as unemployed. Similarly, the improvement and extension of old age pension schemes seems to have reduced the participation rate of older people and sickness benefits seem to have increased absenteeism, especially in Sweden and Ireland (OECD, 1985).(1)

With shifting forward of taxes on labour, profits are squeezed in the short run especially in open economies which face strong foreign competition. Only as firms manage to reduce the size of their labour force can profits partly recover. For the average of the 1970's the gross operating surplus in manufacturing as a ratio of gross value added, a proxy of profit margins, was below the level of the 1960s in the four large EEC countries (Mortensen, 1984 and OECD 1986). However, the oil shock also contributed to this development. Since 1981 the gross operating surplus has increased steadily, despite sluggish demand, as firms were reducing their labour force in absolute terms and in relation to their capital stock. Table 9 contains the gross operating surplus as a percentage of value added in the four large European countries, Sweden, the US and Japan. Despite the reduction of employment, in 1983 the simple average of the gross operating surplus as a percent of value added was still 18.4 per cent below the average of the 1960s in the four largest European countries, while in the United States it was only 7 per cent lower.

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1 pp. 140-142, pp. 147-152 and pp. 152-153.

Table 9: Gross operating surplus in manufacturing, 1960-1983
(as a ratio of value added)

	1960s average	1970s average	1982	1983(1)
Germany	36,3	30,7	26,6	29,5
France	33,3	32,3	25,1	27,0
UK	32,2	23,6	21,5	24,5
Italy	39,4	32,7	35,3	34,2
Sweden	29,6	22,7	23,7	29,9
USA	27,1	24,9	21,1	25,2
Japan	55,9	47,6	44,3	44,0

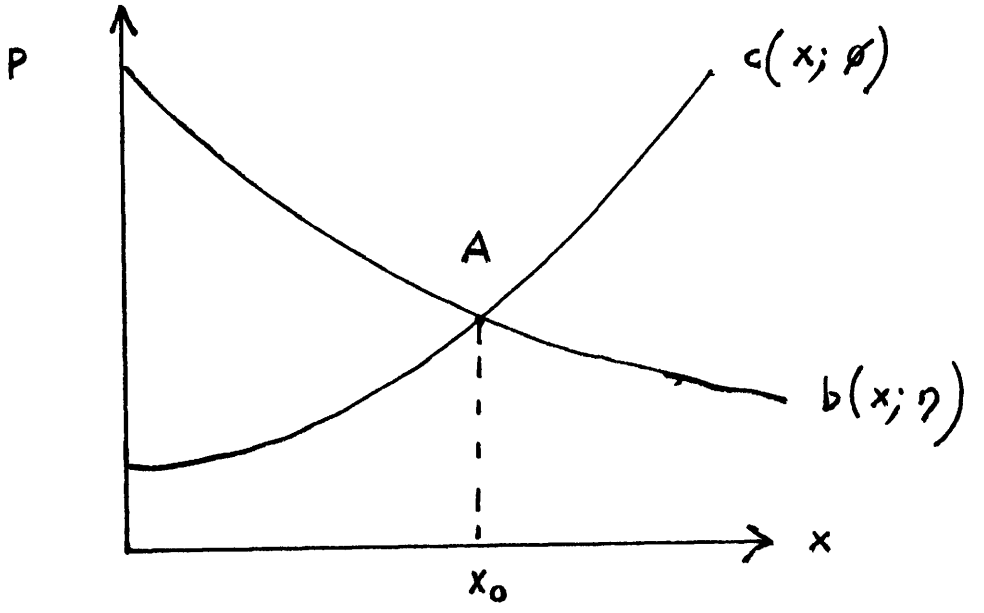
(1) Estimate

Source: OECD(1986)

4. The importance of how workers value government expenditure for the degree of tax shifting.

Stripping the problem to its bare bones, the importance of how public expenditure is valued by the worker-voter-taxpayer for wage behaviour can be illustrated with the help of Figure 1[1]

Figure 1 - Costs and Benefits of government expenditure and the optimal size of government



On the horizontal axis x indicates the quantity of public output (a proxy could be real government expenditure) per capita. On the vertical axis p indicates the number of units of domestic currency. National product and the general price level are assumed to be constant. The $c(x;\phi)$ curve is a supply curve of output on the part of the government. It indicates the social costs which the government incurs to supply a given quantity of x. These costs include the direct costs the government incurs to supply the public goods plus the indirect costs connected with the misallocation of resources which government expenditure and taxation cause. These costs are

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1 See Inman (1982).

measured in units of domestic currency and they increase as the supply of public output increase, partly for the same reasons as the supply curve of the output of any industry is generally upward sloping and partly for reasons that are peculiar to it. The government specific "factors" which causes the supply curve $c(x,\phi)$ to be upward sloping are connected with the costs of collecting taxes and with the increasing misallocation of resources caused by higher average and marginal taxation and higher government expenditure(1). ϕ stands for all factors other than the quantity of public output that influence costs. They include the structure of government taxation and expenditure which influences the extent of resource misallocations as well as the disincentive effects of existing marginal tax rates. In principle the curve $c(x,\phi)$ could also be u-shaped due to economies of scale before diseconomies set in.

The downward sloping curve labelled $b(x;\eta)$ is the marginal benefit curve (demand curve) for government output of the worker-voter-taxpayer. it indicates how much they are willing to pay for any given quantity of government output. The symbol η stands for all factors other than x which influence the value which the worker attributes to government output. They include the structure of government expenditure and their quality. Given the position of the cost and benefit curves of figure 1, the optimum size of government is reached at point A, where x is equal to x_0. if x exceeds x_0 the marginal cost of production of public output exceeds the marginal benefit and vice versa when x is below x_0.

Smith and Ricardo's model implies a steeply declining $b(x;\eta)$ curve which intersects the horizontal axis at quite a low level of x after which the benefit of additional government output to the citizens of the country would be zero or negative. It follows that the optimal size of government is reached at a low level of x.

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(1) They are mainly distortions of the labour-leisure and consumption-saving choice, distortions caused by differential taxation on commodities and tariffs on imports, misallocation effects due to subsidies, unemployment compensations and other government expenditure.

Assuming the size of government is initially below the optimum and that net of tax wages are initially above the subsistence level, there is likely to be no wage resistance on the part of workers as government grows until point A is reached. If the size of government grows beyond point A one would expect workers to start resisting further taxation increases by refusing to accept a cut in real net of tax wages. The reason being that beyond point A they feel that they pay more than what they get in exchange for the higher taxation.

It is impossible to know the shape of the curves $c(x;\phi)$ and $b(x;\gamma)$ and therefore to determine a priori the optimum size of government, or whether a country's government expenditure per capita is above or below the optimal level (given the structure of taxation and the composition of government expenditure). However, there is a presumption that Europe's total government outlays have surpassed sometime between 1960 and today the optimum level. The presumption arises from the actual behaviour of wages, employment and unemployment in Europe analysed in Section 2. European governments were unable to convince the worker-taxpayer not to shift forward the increased taxation and social security contributions and to accept the necessary cuts or lower growth of net wages. In many industrial countries government expenditure grew considerably as a ratio to national product also during the gold standard. The relevant ratios for Germany are reported in Table 1 of Appendix 1. An historical analysis of the behaviour of the key macroeconomic variables in Germany from 1880 to 1979 seems to suggest that the growth of government and taxation which occurred before World War I was absorbed by the private sector without strains.(1)

Even assuming that for a given country it could be clearly established that the levels of the main macroeconomic variables are incompatible with each other because the government has grown too much, it does not necessarily follow that the only way to return to macroeconomic equilibrium is to reduce the size of the public sector in relation to national product. The government could enact policies that shift the $c(x;\phi)$ curve down and/or the $b(x;\gamma)$ curve up. The $c(x;\phi)$ curve can be

(1) See Sommariva and Tullio (1986), Chapter I.

shifted downwards by changing the structure of taxation and government expenditure in the direction of a less distortive mix and by reducing marginal tax rates for a given tax intake, by increasing the level of efficiency in the government in supplying public output and by reducing corruption. The $b(x; \eta)$ curve can be shifted upwards by supplying goods which are more highly valued by the worker. Alternatively governments could attempt to reduce the degree of monopoly power of labour unions in order to reduce the after tax product wage.

Labour unions in Europe are generally believed to be supportive of the idea of having more government and more public employment programmes, especially when unemployment is high. They also want high real wages for their members. It follows from the analysis of this section that labour unions in Europe have failed to see that more government requires less growth of real after tax wages or even declining real after tax wages, if macroeconomic equilibrium is to be maintained in the long run.

5. Effects of the growth of government expenditure and taxation on savings and capital accumulation.

So far the paper has focused on the effect of the growth of government expenditure and taxation which has occurred in Europe since 1960 on wages, prices, the function of the labour market and employment. This section will briefly analyse the effects of government expenditure and taxation on savings and capital accumulation. A survey on the effects of the growth of the US government on capital formation by Von Furstenberg and Malkeil (1977) concludes that overall the net effect was most likely negative; the authors distinguish three types of financing of government expenditure: taxation, inflation and bond financing. Even though the inflation tax has been a relevant source of government finance for some countries(1) the latter has been the least important of the three sources ofgovernment revenues for Europe as a whole. For most countries by far the most important source of revenue was taxation followed by bond financing.

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(1) Particularly Italy in 1974, 1976 and 1980 and the UK in 1974 and 1976.

On the expenditure side they distinguish between direct purchases of goods and services, transfers and expenditure on capital account. Transfers have been by far the most dynamic item on the expenditure side in all industrial countries within and outside the EC. Expenditure on capital account has increased substantially as a ratio to GDP from 1960 to 1983 in Japan and Italy and has remained stable or has declined in the other major industrial countries, particularly since 1975, since it was easier to cut than transfers. Even in Japan and Italy the expenditure on capital account has fallen in relation to overall government expenditure. Table 10 contains the ratios of expenditure on capital account to GDP/GNP in five year intervals from 1960 to 1980 and in 1982 in the big four EC countries, in Japan and in the US. The lower part of the table contains the ratio of expenditure on capital account to total government expenditure. Government expenditure on capital account in Table 10 contain investment subsidies to the private sector and subscription of capital of public enterprises which in many European countries have often covered operating losses. Thus the figure indicated in the table most likely overestimates at least for European countries the contribution of the government to the country's capital stock.

The distinction between three types of financing methods and three types of expenditure gives rise to 9 possible combinations. The effects on capital accumulation are likely to be quite different in each case. Economic theory does not generally permit firm conclusions to be reached. Particularly difficult is the assessment of the effect on household savings of specific welfare programmes, like the expansion of unemployment compensations, of medical care and pension systems. Another controversial issue relating to the effects of bond financing, is the extent to which government bonds are net wealth. If government bonds are not considered net wealth and people discount future tax liabilities, the effect of bond financing on capital accumulation will be less negative. Martin Feldstein (1982) has analysed the effects of government policy on consumer expenditure for the United States and shown that the marginal propensity to consume out of transfers is significantly higher than 1. He also shows that a constructed measure of social security wealth has a significant and

Table 10: Government expenditure on capital account and average public propensity to invest in the four big EEC countries, the US and Japan 1960-1982[1]

Expenditure on capital account as a ratio of GDP

	Germany	France	UK	Italy	US	Japan
1960	4,3	3,7	2,7	3,9	2,5	4,6
1965	5,9	4,7	5,5	3,7	2,6	5,8
1970	6,1	4,2	6,2	4,0	2,2	5,3
1975	5,6	4,3	5,8	4,9	2,0	6,4
1980	5,5	3,3	3,4	4,3	1,5	7,0
1981	5,0	3,3	3,9	5,0	1,3	8,0
1982	4,6	3,2	2,8	5,6	1,3	7,2

Expenditure on capital account as a ratio of total government expenditure

1960	13,2	10,7	8,3	12,9	9,1	25,3
1965	16,1	12,2	15,1	10,8	9,3	29,0
1970	15,8	10,8	15,8	11,7	6,8	27,5
1975	11,5	9,9	12,4	11,3	5,6	23,4
1980	11,4	7,1	7,5	9,4	4,3	21,6
1981	10,1	6,7	8,1	9,7	3,7	23,9
1982	9,3	6,3	5,9	10,2	3,5	20,8

[1] Source: OECD, National Accounts, (1984), Table 9. The numerator is the sum of lines 28,29 and 30, minus line 26.

positive effect on consumer expenditure (1974, 1982) with a coefficient which is not significantly different from that of overall wealth which includes the value of the public debt. Both findings suggest that, at least for the United States, the effect of the growth of social security payments, of social security wealth and of public debt have had negative effects on capital accumulation. Furthermore they strongly contradict the hypothesis rediscovered by Bailey (1962) and Barro (1974) that government bonds are not net wealth. If the conclusions reached by Feldstein for the US are applicable to European countries, the large increase in transfers observed in Europe is likely to have exerted a considerably negative effect on capital accumulation.

In the remainder of this section two of the nine combinations of growth in expenditure-financing will be considered in greater detail and the channels through which they may affect capital accumulation will be analysed. The two combinations are those which have been quantitatively the most important in Europe during the sample period; they are the tax and the bond financed increases in transfers.

Taking up the tax financed increase in transfers first, four channels can be distinguished. The first channel operates via changes in disposable income of households. Taxes reduce disposable income, while transfers increase it. The net effect on disposable income is negative because of the administration costs of transfer programs, because the cash equivalent income of transfers in kind to recipients is generally smaller than the reduction in income of tax payers and because of disincentive effects of taxes and transfers. Furthermore aggregate household savings is likely to go down also because taxpayers have a higher marginal propensity to save than transfer recipients. The reduction in aggregate household saving via changes in disposable income is probably much higher in the case of a tax financed increase in government purchases of goods and services than in the case considered here.

The second channel operates via the reduction in after tax interest rates and the effect of changes in after tax interest rates on saving. It is still debated in the literature whether saving depends positively and significantly on the real after tax interest rate. Recently the conclusion that the real after tax interest rate has uncertain effects on private savings has been challenged on theoretical grounds by Summers (1982, 1984) in a model of the life cycle theory of savings. He argues that there is a very strong presumption in favour of a positive elasticity. His empirical estimates confirm his a-priori. Most existing empirical estimates of the interest elasticity of saving have been obtained without correcting for inflation or for taxation. Further the sample periods do not generally include the years from 1980 to 1985 when real interest rates underwent major fluctuations and rose to historically high levels.(1) Nevertheless several studies suggest that the elasticity might be quite high. Boskin (1978), for example, using US time series finds a negative real after tax interest rate elasticity of consumption of about -0.4. Boskin's estimates of the elasticity could be somewhat on the high side, and they are very sensitive to the inclusion of 1934 in the sample period, as shown by Howry and Hymans (1978). However, even smaller elasticities would imply non negligible negative effects of increased taxation on the stock of capital in the long run. Tullio (1983) for Germany finds a positive and significant real interest rate elasticity of saving of 0.07. These results for Germany are confirmed by recent estimates of the consumption function covering the period from 1970 to 1983 by Tullio and Contesso (1985) which yield an after tax nominal interest

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(1) If real after tax interest rates influence savings but they change very little it is more difficult to obtain a significant elasticity. This point is also made by Summers (1984).

elasticity of consumption of - 0.056.(1) The same study yields high and very significant after tax interest elasticities for all other major industrial countries in the sample. A pooled cross-country time series estimate (for 8 industrial countries and from 1970 to 1983) yields an estimate of -0.034. It is also shown that for most countries the elasticity became larger and more significant in the latter part of the sample period when after tax interest rate variability was higher.

Tullio and Contesso also split the after tax interest rate into the before tax rate and the tax correction factor and find that the latter is also very significant. Rough simulations with the calculated elasticity show that the increase in the level of taxation which occurred after 1970 led, via the interest rate effect, to a higher level of 1983 consumption per capita of 4.8 per cent in Italy, 3.3 in Belgium and 2.0 in Sweden. This is equivalent to a lower level of 1983 household saving per capita of 32.7 per cent in Italy, 22.6 in Belgium and 13.9 in Sweden.

Gylfason (1981) also finds high and significant elasticities of consumption for the US both with respect to the nominal interest rate and with respect to expected inflation by trying with various interest rates and various measures of expected inflation.

The third channel operates via changes in the demand for capital or labour intensive goods. Von Fürstenberg and Malkiel (1977) maintain that a growth in transfers changes the composition of aggregate demand towards more capital intensive goods. This raises the rental cost of capital services and reduces the capital-labour ratio in all sectors of the economy.

Fourth, welfare programmes and especially government retirement programmes may have specific negative effects on household saving. Precautionary saving of households may go down as a result of the introduction and extension of unemployment benefits, free medical care, and

(1) An elasticity of -0.06 implies that a fall in the after tax interest rate from say 4 per cent to 2 per cent which corresponds to a 50 per cent decline, raises consumption by a substantial amount, 2.8 per cent.

support programmes of the poor, because households with high probabilities to experience unemployment, disabilities, illnesses may feel more protected and save less. As regards government pension schemes, if the actuarial present value of social security benefits is greater than the present value of social security contributions net household wealth increases and consumption may go up and savings down. As mentioned above Feldstein (1974, 1982) estimated for the US that the marginal propensity to consume social security wealth does not differ greatly from that of ordinary wealth. Two additional factors would tend to depress national savings. First, the progressive redistribution built into the pension systems contributes to depress saving. Second, in many European countries where social security systems are not actuarially funded, yearly social security benefits have for many years exceeded yearly social security contributions and this further depresses national saving via the government budget. Other factors, however, may have tended to raise household saving, namely the incentive that pension systems have created for earlier retirement and the less than full indexation of pensions, especially for people in the higher income brackets. The less than full indexation and the fact that social security benefits are not transferable to future generations should make social security wealth a less than perfect substitute of private wealth. Nevertheless, especially in countries where the unfunded social security systems are in deficit, the effect on national saving is likely to be highly negative. Von Fürstenberg and Malkiel maintain that for the United States, by far the greatest potential effect of government policy on household saving arises from government retirement programmes (Von Fürstenberg and Malkiel, 1977, p. 844).

The channels isolated above suggest an overall negative net impact of the growth of tax-transfer programmes on capital accumulation.

On the second most important combination of growth in expenditure-financing, the case of bond financed increases in transfers, the crucial issue is whether people are perfectly rational or not. If people were perfectly rational and took fully into account future tax liabilities arising from higher interest payments on a larger public debt, debt finance would be equivalent to taxation and the previous analysis would apply.

Martin Feldstein (1982) calls this hypothesis the pre-Ricardian hypothesis and points out that it had been, by some, wrongly attributed to Ricardo. Indeed Ricardo stated clearly that there is no tax equivalence and no perfect rationality.

Modern supporters of the pre-Ricardian hypothesis are Bailey (1962) and Barro (1974). Even if the more sophisticated class of bond holders correctly foresees the implication of debt financing for future interest payments and tax liabilities, the classes which are more likely to bear the burden of future tax payments might not be aware of it. It is reasonable to conclude, in line with the thinking of Ricardo and Feldstein, that there is no full discounting of future tax liabilities in Europe and that government bonds are at least to a large extent net wealth. Under these circumstances the effect of debt financing on saving and capital formation will be worse than in the case of taxation financing.

By spending the proceeds of bond sales on productive investment the government can outweigh the negative effects of the bond issues on the country's capital stock. For this reason it was a solidly established rule in the pre-keynesian public finance literature that governments should issue debt only to finance public investment.

Adam Smith devoted the last chapter of his book to public debt. He thought that debt issue would reduce the stock of private capital by the same amount as the increase in debt. However this one-to-one substitution of government debt for private capital is based on the assumption that the proceeds of the sale of bonds are not used to finance investment and that the additional current government expenditure have no value for the worker-voter.

A one-to-one long run substitution of public debt for private capital follows also, under certain conditions, from neoclassical growth models. Phelps and Shell (1969) have shown that if public debt is increased when the economy is in the golden rule position, which guarantees the highest consumption per capita, the substitution is one-to-one. If the capital stock per capita is below the golden rule level, private capital falls by more than the increase in public debt and vice versa if the stock of capital is initially above the golden rule level.(1)

Consideration of the value workers-voters place on current government expenditure may somewhat reduce the degree of crowding out of private capital in the long run. This is likely to occur particularly if the proceeds from the sale of bonds are used to finance transfer payments. In this case, households' disposable income increases, since transfers are part of it and saving is likely to increase somewhat, thus reducing the fall in the private stock of capital.

Since most of the growth of public expenditure in Europe during the period under analysis has been on transfers, the transfer-debt increase has probably caused a less than one-to-one crowding out in Europe. However, the fact that the full employment stock of capital per capita in Europe is most likely still below the level implied by the golden rule would suggest a more than one-to-one crowding out. Whether the first or the second factor prevails, the conclusion cannot be escaped that debt financing has very negative effects on the country's capital accumulation, except when it is used to finance productive investment.

7. Policy implications for the long run and the short run

In the previous sections it was argued that the tax-financed growth in government expenditure which has occurred in Europe in the last 20-25 years has caused unemployment and slowed down the rate of economic growth during the period. It was further argued that particularly the debt financed part of the growth in government expenditure has had negative

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(1) For a proof see also Von Fürstenberg and Malkiel (1977).

effects on capital accumulation and economic growth. Productive public investment, expenditure on education and on research and development have not been among the most dynamic components of government expenditure and it seems safe to say that they have not been able to outweigh the negative effects of the growth of current government expenditure, taxation and debt discussed in this paper. If the arguments advanced are correct, the long run cost of the growth of government, the way it has occurred in Europe, would have to be reassessed. Since we do not know the social welfare function, it is difficult to reach firm conclusions. However, if the costs of a large government sector of the type we now have in Europe are substantially higher than originally thought, overall government expenditure, taxation and public debts have to be reduced substantially, or the structure of government expenditure changed drastically, i.e. productive public investment and expenditure on research and development and education should be increased substantially.

Unfortunately economic science does not tell us how to estimate the optimal size of government in each country. However, the fact that towards the end of the sixties a major wage push occurred in several European countries, particularly in the United Kingdom, France and Italy may suggest that pressures for the shifting forward of the increased taxation into higher real wages had been building up already in the sixties.(1)

One important element which has been neglected in the previous sections are the spillover effects of more unemployment, less capital accumulation and lower economic growth from one country to its trade partners. The same question could be put differently by asking how much would a country benefit if it embarked in isolation upon a policy of substantially reducing the size of government with respect to the case in which concerted action with the major trade partners is taken. First

(1) The narrow wedge, as measured in Table 4A increased by 40.6 per cent in the United Kingdom from 1960 to 1968, 23.5 per cent in France and 21.5 per cent in Italy. In Sweden and the Netherlands it increased by 64.4 per cent and 39.6 per cent respectively. Germany and the US experienced the lowest growth rates of the wedge: 10.4 per cent in Germany and 16.5 per cent in the US. In Japan the increase was substantial (28.5 per cent), but both in 1960 and 1968 the wedge was still by far the lowest than in any other country in the sample.

higher economic growth in neighbouring countries stimulates exports and employment at home. Second, the reductions in real domestic interest rates arising from lower public debts in a small country, without corresponding reductions in other countries can be expected under integrated financial markets to be quite small. All EC countries acting together could instead exert a significant impact on the level of world interest rates. These two factors would argue in favour of concerted action. Third, if one country acted in isolation the lower real wage costs and higher profit margins during the adjustment process would attract direct investment from abroad and/or lure domestic capital back at the expense of trading partners. Thus, on balance, small countries could be as well off by acting in isolation than in cooperation. However, such isolated actions would not solve the current problems of high unemployment and low economic growth at the EC-wide level. But lacking the consensus for an EC-wide strategy to substantially reduce the size of government in the long run, there certainly are enough economic incentives for one or a subset of EC countries to act alone.

This paper has dealt exclusively with the very long run effects of the growth of the size of government. The policy prescriptions that follow from the analysis completely disregard the conditions of the business cycle. At present after several years of restrictive fiscal policy in Europe and very low economic growth, some of the existing high unemployment might very well be due to insufficient aggregate demand. This has led some economists(1) and policy makers to suggest that European governments should expand fiscal policy. There is not necessarily a contradiction between the use of fiscal policy for cyclical stabilisation and the long run objectives formulated in this paper. For instance a more expansionary fiscal policy pursued by reducing the level of taxation is consistent with the long run objective while increasing government expenditure indiscriminately is not. Therefore a temporary increase in the public debt/GDP ratio above previously planned levels can be accepted if the business cycle is weak and some of the existing unemployment is keynesian. Furthermore, higher economic growth in the short run would keep the

(1) See Basevi, Blanchard, Buiter, Dornbusch and Layard (1983) and Blanchard and Dornbusch (1985).

increase in the debt/GDP ratio within manageable proportions or even help reduce it below planned levels. A more expansionary fiscal policy pursued by reducing the level of taxation would have to be accompanied, with a lag, by cuts in non-productive government expenditure in order not to raise the level of the debt too much. Announcements of these expenditure cuts could be made at the time the tax cuts are implemented to stabilise expectations. In order to maximise the short run effect of a given tax cut on unemployment and output some cuts could be initially announced to be temporary.

APPENDIX 1. The growth of government expenditure and of public debt in Germany 1881-1979.

Table 1.1: Ratio of government expenditure to NNP in Germany (in per cent)

	Total government expenditure[1]	Government expenditure, national accounts definition[2]
1881	10.5	7.3
1891	13.6	7.6
1901	15.3	8.4
1907	16.6	8.7
1913	18.5	9.8
1925	23.4	12.4
1930	34.1	13.5
1938	37.9	27.9
1950	37.5	17.4
1960	35.2[3]	15.5
1970	43.0[3]	14.7
1979	53.6[3]	16.3

1) Central, state and local government, including transfers; ratio calculated on figures in current prices.

2) Ratio calculated on figures in 1913 prices.

3) Source: OECD, Historical Statistics, 1960-1981 (1983).

Sources: Andic and Veverka (1964), Statistisches Bundesamt, Statistisches Jahrbuch für die Bundesrepublik Deutschland, various issues and OECD, Historical Statistics, 1960-1981 (1983).

Table 1.2: Government debt as percent of NNP in selected years.[1]

	Total government debt	Debt of central government
1881	36.5	1.8
1891	53.0	5.8
1901	51.9	7.9
1908	54.1	10.3
1928	17.4	8.5
1930	29.7	13.4
1938	30.9	19.5
1950	22.9	7.9
1960	18.9	8.3
1970	20.6	8.1
1979	33.4	16.3

1) From 1881 to 1938 the debt refers to the end of March, afterwards to the end of December.

Source: Deutsche Bundesbank (1976).

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