Tax Structure and Public Spending – Or How the Electorate Is Deceived into Paying for Bigger Public Spending than It Really Wants

Ole P. Kristensen, University of Aarhus

It is a classical proposition that tax structure may influence public spending. Two such propositions concerning the visibility and the elasticity of the tax system are tested. Visibility is not important while highly elastic tax systems are correlated with big public spending in times of economic boom. In times of economic decline and recession, high spending countries turn to deficit financing. In both cases big spenders seem to rely more upon a dose of fiscal illusion than moderate spenders.

Introduction

The separation of public sector activities from their funding is a constitutional feature of the public sector. The funding of public activities is provided by taxes with no particular relations to the activities they are supposed to finance. This separation is an important part of the raison d'être of the public sector. It may be argued that the de facto separation of spending and taxing decisions makes the spending decisions asymmetrical in the sense that the benefits of a given activity is given a more careful consideration than the costs (Kristensen 1980, 1982, 1984). By implication, public spending exceeds the level that would be determined by popular preferences, if benefits and costs had been given equal consideration.

Albeit the asymmetry of spending decisions is a basic feature of the public sector, the degree of asymmetry may nevertheless vary according to the specific institutional settings of political and administrative decision-making. An important part of this institutional setting is the specific characteristics of the tax system. Public funding is general, unrelated to the activities to be funded. But the features of the taxes providing the funding may vary considerably from one political system to another. The question is whether different types of taxes make the asymmetrical consideration of benefits and costs more or less pronounced. Are some forms of taxes more or less suitable for hiding and/or ignoring the costs of public activities than others?

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upon the level of public spending (Buchanan 1967). The influence of the tax system may be due either to the objective distribution of the costs of public activities it implies and/or due to the perceptions of the costs and their distribution it imposes upon the minds of people. Concerning perceptions of costs, the central concept is "fiscal illusion" invented by the Italian economist A. Puviani around the turn of the century (Buchanan 1967, chapter 10, Wagner 1976). Fiscal illusion implies some kind of underrating of the costs of public activities. The possibility of such underrating is caused by the fundamental separation of public activities from their funding.

The exact scope of fiscal illusion is supposed to depend on the features of the tax system. So-called "invisible taxes" like indirect taxes and taxes paid by companies (not individuals or households) are supposed to promote fiscal illusion (Buchanan 1967, Baumol & Oates 1975, chapter 17, Wilensky 1976, Brennan & Buchanan 1978, Pommerehne & Schneider 1978, Hibbs & Madsen 1978, Alt 1983), and so tax systems with a big share of invisible taxes are supposed to promote public expenditures. The thesis is that tax systems relying heavily on invisible taxes are accompanied by large public expenditures.

The literature dealing with these subjects has been dominated by theoretical contributions (often made by economists), while there is a lack of empirical tests of the thesis. Cameron (1978), however, has presented an empirical result which, for a group of countries during a particular period, contradicts the thesis. He found that indirect taxes' share of overall tax revenue was *negatively* correlated with the growth rate of public expenditure. On face value the thesis also seems incompatible with the fact that the trend in industrialized countries has for a long time been increasing reliance on direct taxes, especially personal income taxes, and decreasing reliance on indirect taxes (Hanneman 1982, Alt 1983). While this trend has prevailed, public expenditures have simultaneously increased dramatically.

Even if the thesis of a positive correlation between heavy reliance on invisible taxes and the size of public expenditures seems to lack empirical evidence, some empirical studies do indicate a positive correlation between visibility of taxes and the likelihood of tax rebellion and other forms of popular protests against taxation (Wilensky 1976, Hibbs & Madsen 1981). So the visibility or lack of visibility of taxes may have some importance after all, even if it is not enough to influence the size of the public sector.

The importance of making taxes invisible and so hide the real costs of the public sector is also stressed by a study of American tax policy. Discussing popular influence upon tax policies the study concludes: "... elected officials have devised strategies to confuse the public, deflect their discontent, and render organized opposition costly and ineffective" (Hansen 1983, 212). Apart from the ability to "confuse the public", it is essential that the tax system is also able to provide revenues, and preferably big revenues, to fund the big public spending

that is a common feature of most industrialized countries. The twin considerations for invisibility and big revenues may easily be in contradiction with each other. The revenue capacity of invisible taxes is not without limits. Long before the achievement of the present-day high level of taxing and spending, Joseph A. Schumpeter (1918), among others, pointed to the existence of a limit in capacity of any tax. That is, a point exists above which increased tax rates do not yield higher but falling revenues. That kind of reasoning has recently gained new prominence in form of the so-called "Laffer-curve" (see, e.g., Wanniski 1978).

The limited capacity of any tax may have contributed to the increasing reliance on visible taxes like personal income taxes to finance public expenditures during this century. The traditional indirect taxes simply did not possess the capacity to provide funding for public expenditures of contemporary magnitude. It remains, however, an unanswered question why increased shares of visible taxes have apparently not contributed to slow down public expenditure growth. Perhaps visible taxes like personal income taxes possess other institutional features than invisibility, which may contribute to answer the question. Income taxes are visible, but they also automatically produce rapidly increasing revenue under conditions of economic growth and inflation in a way which may make the financing of a big public sector quite painless. Some taxes are very elastic, that is, they increase revenues more in relative terms than the relative rate of economic growth, while other taxes are less elastic. The overall elasticity of the tax system is an institutional feature which may be of importance for the ability of the tax system to finance big public spending without too much resistance. The key is *automatic* growth of revenue, that is, growth produced by an interaction between fixed tax rates and economic growth plus inflation, as opposed to revenue growth due to deliberate changes of tax rates. The former kind of revenue growth is often thought to create less resistance than the latter (Rose 1985), and so a proposition is often presented saying that elastic taxes with a built-in "fiscal drag" may independently contribute to the explanation of big public expenditures (Buchanan 1967, Oates 1975, Goetz 1977, Hansen 1983, chapter 3). "The fiscal drag" is supposed to provide more or less "free" funding of the public sector. A study has even shown that under conditions of real economic growth *and* inflation, a tax with elasticity larger than 1, when measured in nominal terms, will have even higher elasticity in real terms (Suyderhoud & Veseth 1976). Thus real economic growth and inflation combined can have substantial impact upon aggregate tax revenue without any overt political interference.

If the proposition concerning a correlation between tax elasticity and the size of public expenditure is, to some degree, correct, some kind of fiscal illusion must be involved. Only fiscal illusion can explain different reactions towards revenue growth caused by fiscal drag and revenue growth caused by deliberate decisions. However, empirical studies indicate the presence of exactly that kind of fiscal illusion. The proposition concerning a relationship between tax elasti-

city and the magnitude of public spending seems to be better empirically founded than the proposition concerning invisible taxes and public spending (see, e.g., Oates 1975, Craig & Heins 1980), though the empirical findings are not uniform (see, e.g., Hansen & Cooper 1980).

The propositions on the relationships between tax structure and public expenditures are more or less incompatible. Invisible taxes like taxes on goods and services are supposed to be rather inelastic, while visible taxes like personal income taxes are supposed to be highly elastic. Whether a tax is elastic or not is, of course, an empirical question, but if visible taxes tend to be highly elastic, and invisible taxes tend to be inelastic, then the implication from the twin propositions is that invisible tax systems promote public expenditure because taxes are invisible, and visible tax systems promote public expenditure because taxes are highly elastic.

So far, two important attributes of the tax system (ability to conceal the costs of the public sector and ability to provide revenue) have been considered. A third one is the distributional impact of the tax system (Peters 1979, 788). Political and ideological preferences favouring big public expenditures will typically also favour taxes with substantial redistributional effects. Progressive income taxes have traditionally been perceived as more social in their redistributional impact than, e.g., indirect taxes (Peters 1978, 788–89, Katz et al. 1987, 875–77). So if large public spending is caused by political preferences (which need not be the case), one might, from redistributional considerations, expect it to be financed by visible taxes. This possibility weakens the chances of finding empirical support for the proposition on the relationship between invisible taxes and public spending.

The purpose of the paper is first to study the tax structure of a number of countries to see whether sufficient variation of tax structures makes it feasible that they have an independent impact upon the size of public spending. Second, empirical measures of the elasticity of different types of taxes will be devised. Finally, tests of possible relationships between tax structure and public spending will be undertaken.

Tax Structure

Public sectors are financed by taxes, by some minor current and capital revenues which are not taxes, and by deficits. According to standard OECD tax definitions, three taxes – personal income taxes, social security contributions, and taxes on goods and services – provide more than 80 per cent of total tax revenue in the OECD countries. The remaining revenue is primarily provided by corporate income taxes and taxes on property.

Table 1 shows that from 1965 to 1982 the relative importance of personal income taxes and social security contributions has increased, and the relative

Table 1. Tax Structure and Tax Level in OECD-Countries 1965 and 1982*

	1965	1982
	Percentage of total tax revenue	
Personal income taxes	26.3	32.7
Social security contributions	18.2	24.5
– of which paid by employers	–9.9**	–14.9
Taxes on goods and services	37.1	29.0
Corporate income taxes	9.2	7.8
Property taxes	8.0	5.1
Other taxes	1.2	0.9
	100.0	100.0
Public deficit: percentage of GDP***	0.9	5.3
Total tax revenue: percentage of GDP	26.9	36.8

Source: OECD, 1984: tables 3, 11, 13, 15, 17, 19, 23, 25; and OECD, 1984a: tables R8 og R9.

Notes: * All figures are simple averages of the OECD member countries.

      ** Missing information in 1965 makes this figure not fully comparable with other figures.

     *** The deficit is the difference between "total outlays of government" and "current receipts of government".

importance of taxes on goods and services has decreased. Total tax revenue as a proportion of GDP has increased, so taxes on goods and services have retained their share of GDP, but they have not been able to catch up with the growth rate of personal income taxes and social security contributions.

The changes from 1965 to 1982 continue the long-term trends of this century. Direct taxes have increased their importance compared with indirect taxes (Hanneman 1982, 127–28; Alt 1983, 190). Direct taxes have increasingly become personal income taxes, while the importance of corporate income taxes has declined. The traditional indirect taxes like customs and taxes on specific goods and services have been replaced by general sales taxes, lately in the form of value added taxes (Hanneman 1982, 127). Not until after the Second World War did social security contributions establish their position as a major tax (Hanneman 1982, 126).

The implication of the changing tax structures has generally been more visible taxes (Hannemann 1982, 126). The changes have probably also meant more elastic taxes. The traditional sources of revenue may be said to have exhausted their capacity for raising revenue. So new sources of revenue have become inevitable to enhance the capacity for funding, and even more important to establish sources of revenue able to increase the capacity of funding at the same or at a higher rate than the rate of economic growth.

The tax structures of individual countries vary substantially around the OECD average. The deviations from the average are shown in Table 2. Denmark, New Zealand, Finland, Australia, and partly Sweden rely heavily on personal income taxes to finance their public sectors. In terms of share of GDP, Denmark is the most deviant case: personal income taxes constituted 23.4 per cent of GDP

Table 2. Structure of Public Sector Funding in Selected OECD-Countries 1982. Figures Indicate Deviations from the OECD Average in Percentage Points

	Personal Income Taxes	Social Security Contributions*	Taxes on Goods and Services	Corporate Income Taxes	Property Taxes	Tax Revenue in % of GDP	Deficit in % of GDP**
	Deviation in Percentage Points						
Denmark	21	−23	8	−5	−1	44	10
Sweden	8	4	−5	−5	−4	50	8
Finland	12	−18	11	−3	−3	37	2
Australia	13	−21	3	2	3	31	0***
New Zealand	28	−26	−5	0	2	34	−
France	−20	19	1	−3	−1	44	4
Germany	−4	10	−3	−3	−2	37	4
Italy	−8	21	−14	0	−2	40	12
Holland	−9	16	−5	−1	−2	46	8
Austria	−9	12	2	−5	−3	41	4
Ireland	−3	−10	17	−3	−1	40	9***
Belgium	4	3	−3	−2	−3	47	11
Norway	−8	−5	6	9	−3	48	−4
Japan	−6	4	−14	12	5	27	4
England	−4	−6	0	2	8	40	4
USA	5	2	−12	−1	5	31	6
OECD average	33	26	29	8	5	37	5
	percentage of total tax revenue						

Source: OECD, 1984: tables 1, 11, 13, 15, 21, 23, 25; and OECD, 1984a: tables R8 and R9.
  * Payroll taxes have been included here.
  ** Deficit defined as in Table 1. Negative sign indicates a surplus.
  *** This figure is from 1981.

in 1982 compared with Sweden's 20.5 per cent, New Zealand's 20.4 per cent (the countries ranking second and third), and the OECD average of 12.0 per cent (OECD 1984, table 10).

Most Continental European countries rely especially on social security contributions to raise revenue for their public programmes. Social security contributions and personal income taxes are strongly negatively correlated (Rose 1984, 107). That is, countries rating high on income taxes are low on social security contributions and vice versa. Some countries rely deliberately on social security contributions instead of income taxes. Sweden, for example, has from 1965 to 1982 deliberately increased the role of social security contributions, mostly paid by employers, to relieve the pressure of personal income taxes. In some other countries, the reliance on social security contributions may be due to lacking ability, for political and administrative reasons, to establish an effective system of income taxes (Alt 1983, 188).

The visibility of social security contributions depends on whether (in the formal sense) they are paid by employers or employees. Contributions paid by the employees are in many respects similar to personal income taxes. They normally differ from income taxes, though, in terms of progressivity and the possibilities of tax-avoidance.

Ireland falls into its own category by relying very heavily on taxes on goods and services to raise its government revenue. Almost half of the tax revenue in Ireland stems from this source.

The remaining OECD countries rely to a lesser degree on one single tax to raise their revenue than the countries relying on income taxes and social security contributions. Fund-raising is based on more relatively minor sources. Norway deviates by getting a big share from corporate income taxes. So does Japan, but having a far smaller public sector, the corporate income tax share of GDP is smaller here than in Norway. The big Norwegian contribution from corporate income taxes is due to the oil fields in the North Sea. Taxes on Norwegian oil production (many of them corporate income taxes) provided 16.9 per cent of aggregate Norwegian tax revenue in 1982 (Statistisk Sentralbyrå 1984: tables 298 and 299). England and the USA get relatively big revenues from property taxes. Property taxes are somewhat oldfashioned, as their role in general has been declining. Their presence indicates a decentralized tax structure, as property taxes have traditionally been the revenue source of local government (Alt 1983, 183). Property taxes are considered very visible when they are paid by households, and annoying to the tax payers because they are not related to a monetary income enabling the tax payers to pay the tax. The American tax rebellion of the late seventies was not least directed towards property taxes (Danziger 1980, 602–603).

According to Table 2, deficit financing, the most cost-hiding way of funding one can think of, played an important role in 1982 in a number of OECD countries. The only member country running a healthy surplus was Norway, a country with quite substantial and "free" revenues from its oilfields. Only recently has deficit financing achieved the prominent position of 1982. In 1974 deficits in the OECD countries were generally insignificant.

Generally, the structure of taxing exhibits substantial variation among the members of the OECD. This lack of uniformity with respect to funding of the public sectors constitutes a first precondition for an independent impact on the magnitude of public spending from the tax structure.

Tax Elasticities

Changes of economic activity and of income will influence the revenue of any tax. Theoretically, it is not possible to calculate the effect upon the revenue of a tax from a certain change in, e.g., GDP. The effect depends just as much on tax

rates and tax rules as on how people react to changing incomes. So the estimation of the elasticity of a given tax has to be based on empirical evidence.

When estimating tax elasticities, only "automatic" changes of revenue, not influenced by, e.g., politically decided changes of tax rates, are of relevance. So the elasticity cannot be calculated simply from the actual annual change rates of tax revenue and GDP, as actual changes of tax revenue mirror GDP growth as well as political decisions concerning the tax scheme. Denmark provides a dramatic illustration of this point. Due to so-called tax reforms, revenues from personal income taxes increased by 47 per cent from 1969 to 1970. If this increase was related to GDP growth without any corrections, a serious bias would be introduced into the estimation of tax elasticity. When studying a large number of countries during several decades, it is in practice impossible to "correct" tax figures for political interference. Other methods to estimate tax elasticities must be invented.

The concept of elasticity is based on the assumption that the "automatic" changes of tax revenue are related to changes of national income in the following way:

$$\frac{\Delta T}{T} = \kappa \cdot \frac{\Delta Y}{Y}$$

T being tax revenue, Y GDP, k the tax elasticity and Δ indicating changes. So if the relationship corresponds to the assumption, the elasticity may be estimated by linear regression. Disturbances in the form of political interference with the tax system will most probably weaken the linear relationship, except in the unlikely event that political interference is heavily positively correlated with economic growth rates. Using linear regression to estimate the elasticity, it is possible to detect political and other disturbances. Low explanatory power of the regression model indicates disturbances, while high explanatory power of the model suggests a purely "automatic" relationship between the relative growth rates of the economy and relative growth rates of tax revenue.

When estimating tax elasticities, one has to consider whether the economic growth rate, the independent variable of the estimation, has to be lagged. Often, for example, some time lapses from income is earned until the tax is paid. If that is the case, the independent variable should be time-lagged. An OECD study, however, has shown that the time lag for income taxes in general is small (OECD 1983). As the time lag is probably even smaller for other kinds of taxes, the economic growth rates will not be lagged.

The estimation of tax elasticities will be based upon data from 20 OECD member countries covering the years from 1965 to 1982. For each country a regression analysis has been performed for each of the three major taxes, using annual relative growth rate of GDP as independent variable and relative annual growth rate of tax revenue as dependent variable. The findings are shown in Table 3.

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Inspection of scatterplots and the size of r^2 have been used to determine the explanatory power of the regression model. The inspection of scatterplots showed that small r^2 values in all cases were due to lack of association, not due to curvelinear relationships. Small r^2 values suggest, as argued above, that the relationship is disturbed, e.g., by political interference. In those cases it is not possible to estimate the elasticity. I have chosen to exclude cases where r^2 is smaller than 0.25. That is, only those cases are considered where at least 25 per cent of the variation of the growth rate of tax revenue may be explained, in a linear model, by the variation of economic growth rates. The choice of 25 per cent is arbitrary in the same sense as the choice of level of significance in a test of statistical significance is arbitrary, but minor changes of the cutting point do not have any impact on the results.

Another indication of disturbances, making this way of estimating tax elasticities unfeasible, would occur if the regression analysis provided constant terms different from zero. It so happens, however, that in all cases where $r^2 \geq 0.25$, the constant does not differ significantly from 0 (5 per cent level). So even if the constant is not literally 0, the deviations from zero may be considered random and so ignored. The interesting point is that if the regression model has a certain explanatory power, then the constant does not differ systematically from zero. So it is more demanding to ask for good explanatory power of the regression model than to ask for a non-significant constant. In cases of bad explanatory power ($r^2 < 0.25$) several cases of significant constant terms occur, indicating that disturbances caused e.g. by political interferences may imply bad explanatory power as well as non-zero constants.

If the deviations of the constants term from zero were of a systematic nature, problems of interpretation would arise. If the relationship between relative changes of tax revenue and GDP could be adequately described by a linear model with a constant term different from zero,
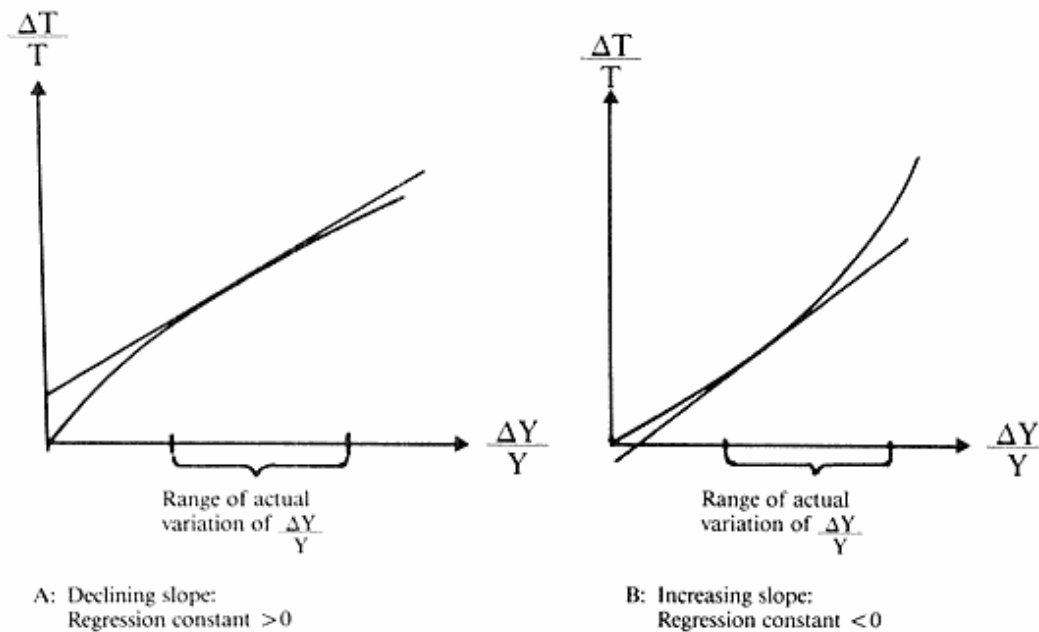
$$\frac{\Delta T}{T} = K \cdot \frac{\Delta Y}{Y} + a$$

the implication would be that the concept of elasticity would be without meaning. This point may be formulated in substantial as well as mathematical terms. Substantially the implication would be that tax revenue would increase automatically even if GDP did not change at all, which of course is meaningless. Mathematically the implication would be that

$$\lim_{\Delta Y \to 0} \left(\frac{Y}{T} \frac{\Delta T}{\Delta Y} \right) = \lim_{\Delta Y \to 0} \left(k + a \cdot \frac{Y}{\Delta Y} \right)$$

does not exist, and so the elasticity is not defined.

Fig. 1. Curvelinear Relationships between Relative Changes of GDP and Tax Revenue

A: Declining slope:
   Regression constant >0

B: Increasing slope:
   Regression constant <0

Alternatively, a non-zero constant might be caused by a curvelinear relationship between relative changes of tax revenue and GDP (see Fig. 1). The estimated regression coefficient then corresponds to the slope of the curve within the range of growth rates of GDP actually experienced. If that is the case, one could argue that this slope, albeit not exactly elasticity as defined traditionally, is an indicator of the ability of the tax system to automatically increase revenue when the economy grows. This is so because the slope corresponds to the effect upon tax revenue from one more percentage point of GDP growth within the range of annual GDP growth that actually occurs. So the estimated regression coefficients are in any case relevant indicators of the ability of the tax system to automatically increase tax revenue.

Average tax elasticities (calculated solely from cases where $r^2 \geq 0.25$) for the three major taxes are shown in Table 3. The results correspond roughly to the prevailing notions of the elasticity of various taxes. Personal income taxes are highly elastic. A ten per cent increase in GDP is on average accompanied by an increase of income tax revenue of 13.4 per cent.

As expected, elasticity of taxes on goods and services is rather low. Growth of revenue of taxes on goods and services is on average just able to keep pace with nominal economic growth. The elasticity of social security contributions is pretty high, higher than one could expect from the literature. Many studies on tax elasticity have dealt with local government, which rarely rely on social security contributions. Perhaps that is the reason why little has been written about the elasticity of social security contributions.

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Table 3. Elasticity of Personal Income Tax, Social Security Contributions and Taxes on Goods and Services in the Period from 1965 to 1982. Elasticity has been Estimated as the Coefficient of Regression in a Simple Regression with Annual Relative Growth rate of GDP as Independent Variable and Annual Relative Growth Rate of Tax Revenue as the Dependent Variable.

	Personal Income Taxes		Social Security Contributions*		Taxes on Goods and Services	
	b	r^2	b	r^2	b	r^2
Austria	1.64	0.39	1.18	0.45	1.01	0.57
Belgium	1.36	0.45	1.21	0.67	0.62	0.21
Canada	0.32	0.04	1.31	0.39	1.53	0.59
Denmark	1.00	0.04	-2.98	0.09	1.08	0.20
Finland	1.19	0.35	0.83	0.09	0.29	0.17
France	1.33	0.25	1.51	0.63	1.77	0.48
Germany	1.56	0.47	1.43	0.85	0.94	0.42
Greece	0.87	0.10	0.79	0.38	1.16	0.48
Ireland	0.99	0.25	0.61	0.14	0.99	0.36
Italy	-1.05	0.05	-2.64	0.24	1.52	0.16
Japan	0.90	0.29	1.00	0.56	0.55	0.26
Holland	1.34	0.52	1.04	0.54	1.08	0.38
New Zealand	0.64	0.18	–	–	0.74	0.46
Norway	0.04	0.00	-0.23	0.00	0.97	0.30
Portugal	–	–	–	–	0.99	0.36
Spain	1.95	0.46	2.34	0.52	0.46	0.08
Switzerland	0.89	0.32	1.22	0.24	0.71	0.51
England	1.19	0.35	1.04	0.46	0.84	0.29
USA	0.97	0.19	-0.06	0.00	0.77	0.25
Sweden	1.70	0.29	1.13	0.07	0.25	0.02
Average b in countries with $r^2 \geq 0.25$	1.34		1.29		1.00	

The calculations are based upon data from several editions of OECD, *Revenue Statistics of OECD-Member Countries* and *National Accounts*.

* In the case of Austria, the elasticity estimated is one of payroll taxes.

The high elasticity of social security contributions is noteworthy, as these contributions then combine invisibility (when they are paid by the employers) with elasticity. Maybe that is why this source of revenue has become so popular recently.

Social security contributions and personal income taxes are elastic and they have also increased their share of total tax revenue from 1965 to 1982. The elasticity of those taxes is, of course, part of the explanation of their increased share of total tax revenue. It is not the other way round. The estimated elasticities are not spuriously high, as the case would be if in reality they were caused by politically decided increases of the tax rates. As noted above, political interference would most certainly weaken the correlation between economic growth rates and growth rates of tax revenue, and so in extreme cases (if $r^2 < 0.25$) be excluded from the analysis. Weaker relationships in a simple regression analysis would

most likely imply numerically smaller regression coefficients. That is, political interference will tend to reduce the elasticities as they have been estimated here, whether the political interference implies increased or decreased reliance on the tax in question. This expectation is actually given empirical support by the findings of Table 3. Small r^2 values are accompanied by small or even negative b values.

Tax Structure and Public Spending

Very few studies of the relationship between tax structure and public spending have been performed at the national level. Most studies relate to a subnational level (see, e.g., Craig & Heins 1980, Oates 1975, Hansen & Cooper 1980). The findings are neither very distinctive nor uniform. In the remaining part of this paper the relationship will be examined at the national level. The spectrum of analysis has been restricted to OECD member countries, which mostly are economically developed and democratic.

The relationship between tax structure and public spending has been examined in two ways in the literature. The dependent variable may be either the level of public spending or public spending growth rates. The latter may seem natural taking into consideration in particular the character of the proposition on tax elasticity and public spending. This proposition emphasizes the dynamics of economy, tax revenue and public spending, so the growth rate of public spending might appear to be the correct choice as dependent variable. In contrast, Craig & Heins (1980, 268–69) have argued in a convincing way that a tax structure promoting public spending cannot cause bigger growth rates all the time. A tax structure promoting spending can for some time cause an increased growth rate, but once the higher level of spending corresponding to that particular tax structure is reached, the growth rate will not exceed those of other tax structures. The implication from this argument is to use the level of public expenditure as dependent variable instead of the growth rate.

The partly competing propositions concerning elastic and invisible tax structures will be tested. Two indices measuring overall elasticity and visibility of the tax systems have been calculated. The findings are presented in Tables 4 and 5. The associations are measured by linear regression, while the outcome is presented in the form of regression coefficients and squared correlations.

All scatterplots corresponding to the regressions have been inspected. Small r^2 values are in all cases due to lack of relationship, not due to inadequacy of the linear model. Thus the r^2 values may in all cases be used as indicators of the strength of the relationship between tax structure and public expenditure. Simple regression, only, has been used, because the purpose of the analysis is not to give a full explanation of the level of public spending but just to see if tax structure has an independent effect upon public spending, and because the very small

Table 4. The Association between the Elasticity of the Tax System and the Magnitude of Public Spending in OECD Countries 1965–1982

	b	r^2
1965	0.29	0.23
1966	0.35	0.32
1967	0.32	0.23
1968	0.35	0.25
1969	0.35	0.23
1970	0.36	0.24
1971	0.35	0.16
1972	0.42	0.24
1973	0.43	0.24
1974	0.35	0.17
1975	0.29	0.11
1976	0.25	0.09
1977	0.20	0.04
1978	0.22	0.04
1979	0.21	0.04
1980	0.12	0.01
1981	0.23	0.04
1982	0.30	0.06

The index of elasticity is computed as

$$\left(\frac{\text{Personal income taxes} + 0.96 \times \text{social security contributions}}{\text{total tax revenue}} \right) \times 100$$

Data source as in Table 3.
The units of analysis are the 20 OECD countries of Table 3. Due to missing information the number of units of analysis is reduced for some years.

number of units of analysis makes multifactor studies infeasible, whatever technique of analysis is utilized.

Table 4 renders some support to the proposition that elastic taxes promote public spending. From 1965 to 1973 around 25 per cent of the variation of public spending in the OECD countries is explained by the variation of tax elasticity. The direction of the relationship is in agreement with the proposition: Reliance on elastic taxes is associated with big public expenditures. An increase in the share of elastic taxes by one percentage point is accompanied by increased public spending of around 0.3–0.4 per cent of GDP.

In 1974 and the following years, the correlation between tax elasticity and public spending is weakened to vanish in 1980. So the validity of the proposition concerning elasticity and spending is not universal. The timing of the results, however, forms the basis for a sharpening of the formulation of the elasticity thesis. The core of this thesis is that real economic growth and inflation via an elastic tax system, more or less painless, without the requirement of tough political decisions, provide funding for a big public sector. The trick obviously works best in times of rapid economic growth. In times of economic hardship and

perhaps even economic decline the elasticity may backfire, because an elastic tax system will reinforce any kind of economic development. This kind of fiscal illusion, which is the actual reason why elastic taxes may imply bigger public spending, works best during times of rapid real economic growth, which enables real take-home pay and public spending to grow simultaneously. Thus the association between tax elasticity and public spending can be expected to be stronger during economic growth than during economic stagnation and decline.

Rapid economic growth was the typical pattern in OECD member countries from 1965 to 1973. From 1974 onwards the pattern was one of economic crisis and decline, so the pattern of economic development corresponds nicely to the pattern revealed in Table 4 concerning the association between tax elasticity and public spending. A proposition stating that such a correlation exists during times of economic growth, while it is weakened or even vanishes during periods of economic crisis, is supported by the empirical findings.

The demonstration of an empirical association does not constitute the final proof of a substantial association between the tax structure and public spending. It might be argued that political preferences favouring big public spending deliberately also want an elastic tax system to finance the spending (Oates 1975, 156). If that is the case, no substantial association is behind the empirical association. The features of taxing and spending then both just mirror political preferences, and so the empirical correlation is spurious, caused by political preferences. A reasoning like that is not necessarily convincing. If public spending is determined by political preferences (which certainly need not be the case, as, e.g., institutional factors and their companions like fiscal illusion may play a role), there should of course be political willingness to raise sufficient revenue. So an association should exist between tax revenue and spending (albeit that is not always the case), but why should political preferences cause the tax *structure* to be systematically related to the level of spending? Especially when high spending is associated with a tax structure which automatically provides funding without political interference, it might seem odd that political preferences should be the cause. It *is* strange that political willingness to finance a big public sector should imply a tax structure systematically relying more heavily on taxes raising revenue without political interference than political preferences less inclined towards big public spending. When big public expenditures are systematically associated with elastic tax systems, it looks more like fiscal illusion than like political preferences. This is supported by an American study on the politics of taxation (Hansen 1983). A major conclusion of the study is that tax policies are far less determined by popular preferences than by other kinds of policies.

A final blow to the proposition of the association between tax elasticity and public spending being a spurious one caused by politics is given by the lack of association between politics and tax structure in the OECD area. Using the

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Table 5. Association between "Invisible" Taxes' Share of Total Tax revenue and the Magnitude of Public Spending 1971–1982 in OECD Member Countries

	b	r^2
1971	−0.17	0.05
1972	−0.24	0.10
1973	−0.22	0.08
1974	−0.26	0.12
1975	−0.18	0.06
1976	−0.09	0.02
1977	0.06	0.00
1978	0.15	0.02
1979	0.18	0.02
1980	0.16	0.02
1981	0.19	0.04
1982	0.33	0.08

Data source: See Table 4.
Invisible taxes include corporate income taxes, social security contributions paid by employers, payroll taxes and taxes on goods and services. Property taxes paid by companies should have been included, but it is not possible to make a distinction between property taxes pay by companies and households. Independent variable: invisible taxes as percentage of total tax revenue. Dependent variable: total government outlay as percentage of GDP.
Units of analysis: See Table 4.

Cameron index of left-wing dominance of government 1965–1982 (Cameron 1984) as an indicator of politics, no relationship exists between politics and the elasticity of the tax system in 17 OECD countries in 1982 (r^2 equals 0.03), and this weak association is even in the "wrong" direction. Left dominance of government goes with lower elasticity. Even stronger evidence of the lack of association between politics and tax structure is the lacking association between left dominance and income taxes' share of total tax revenue ($r^2 = 0.02$ in 1982). This evidence is stronger because income taxes are considered especially egalitarian, and so a strong argument could be made that the relative size of this tax should be heavily influenced by politics. The lack of influence from politics upon tax *structure* fits well into the finding by Richard Rose that national tax structures are characterized by substantial inertia (Rose 1985).

The relationship between invisibility of taxes and public spending is shown in Table 5. Missing information inhibits comparable analysis before 1971. The associations are generally weak. During the early years ending in 1975, though, the associations are stronger than the associations found by David R. Cameron between indirect taxes' share of total tax revenue and the growth rate of public spending (Cameron 1978). Furthermore, during the beginning of the period, the associations are negative as is the association found by Cameron. That is, reliance on invisible taxes is associated with small public sectors. Thus the proposition concerning invisible taxes and spending is contradicted by the empirical facts. However, at the end of the period the association becomes slightly positive.

Table 6. The Association between Deficit Financing, General Invisiblity of Financing and the Magnitude of Public Spending 1965–82 in OECD Member Countries.

	Deficit		General invisibility	
	b	r^2	b	r^2
1965	0.21	0.00	–	–
1966	-0.12	0.00	–	–
1967	0.38	0.01	–	–
1968	0.64	0.03	–	–
1969	0.41	0.01	–	–
1970	0.71	0.04	–	–
1971	-0.05	0.00	-0.17	0.05
1972	-0.01	0.00	-0.24	0.09
1973	0.06	0.00	-0.25	0.12
1974	0.14	0.00	-0.20	0.09
1975	0.31	0.02	-0.15	0.04
1976	-0.02	0.00	-0.10	0.02
1977	-0.13	0.00	0.00	0.00
1978	0.09	0.00	0.06	0.00
1979	0.80	0.07	0.18	0.03
1980	0.76	0.09	0.23	0.03
1981	0.96	0.17	0.75	0.32
1982	1.28	0.29	0.64	0.23

Deficit as independent variable is deficit as percentage of GDP. General invisibility of financing:

$$\frac{\text{Invisible taxes} + \text{deficit}}{\text{total tax revenue} + \text{deficit}} \times 100$$

Before making a final judgement concerning this proposition, it is necessary to include deficit financing. Deficit financing is the most invisible way of funding one can think of, in the sense that it is even more likely to promote fiscal illusion than invisible taxes because the payment of the costs is postponed. The associations between public deficits and public spending are shown in Table 6. The associations are very weak or even non-existent before 1979. The direction of the association is also shifting. Starting in 1979, a dramatic strengthening of the association takes place. The direction of the association corresponds to the proposition of invisibility: Big public spending goes with big public deficits.

Jointly, the findings concerning invisible taxes and deficits form a rather clear pattern. Before the economic setback beginning in 1974 and a couple of years after, no or even a negative association is found between the invisibility of funding and public spending. After some years of economic problems a positive association, and even quite a strong one, emerges. Around 25 per cent of the variation of public spending in OECD countries in 1981 and 1982 is explained by variation in the invisibility of the means of funding (see Table 6, 3rd and 4th columns).

Deficit financing is the most important means to make the costs of public spending invisible in 1981 and 1982. The increased reliance on deficit funding could be due to a Keynes-inspired type of economic policy, so that increased

Fig. 2. Association between Growth of Public Spending and Growth of Public Deficits 1974–1981 in 18 OECD Member Countries
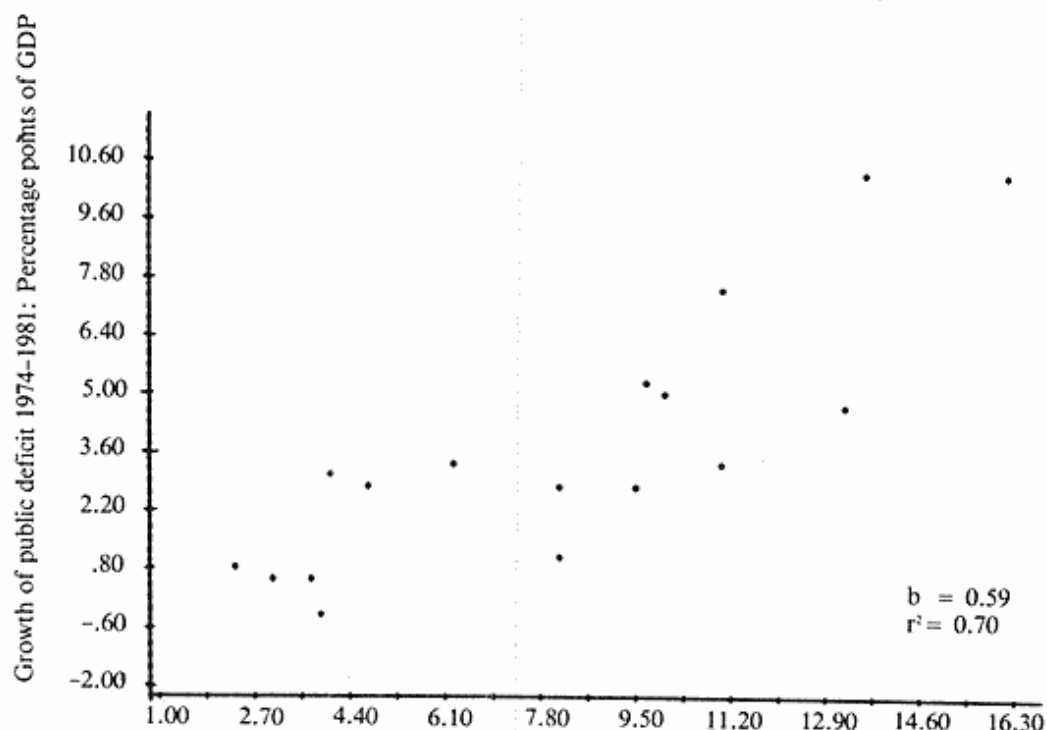
Growth of public spending 1974–1981: percentage points of GDP
Data source: OECD, 1984a.

deficits are chosen to fight economic recession and are not due to difficulties in providing visible funding of big public spending. If anti-cyclical policies were the major cause of deficits, no relationship, however, should be expected between the size of public spending and the size of the deficits. From an anti-cyclical point of view only the balance between public spending and public revenue (and the composition of this balance) is of relevance. The level of spending is irrelevant in the context of anti-cyclical policies, and so no systematic association between the level of spending and anti-cyclical deficits should be expected. As such an association *does* exist (even a rather strong one), it is hard to escape the conclusion that the deficits to a substantial degree are caused by political difficulties in raising sufficient revenue to meet the costs of the public sector, and not just by anti-cyclical considerations.

This conclusion is strongly supported by the association between the dynamics of spending and deficits. Fig. 2 shows an extremely strong correlation between the growth rates of spending and deficits from 1974 to 1981. No less than 70 per cent of the growth of public deficit from 1974 to 1981 is explained by the growth of public spending. Sceptics, including economists of the Keynesian

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Table 7. Public Deficit Growth 1974–81: Economic Recession and Public Spending Growth as Explanatory Factors.

Explanatory variable	Regression coefficient	Standardized regression coefficient	t-value
Public Spending Growth 1973–81	0.56	0.79	5.91
Unemployment growth 1971–73 to 1974–81	0.58	0.22	1.63
$R^2 = 0.75$ ($R^{-2} = 0.72$). N = 18			

The analysis is based upon the 18 OECD members where the relevant data are available.
Data source: OECD, 1984a.

creed, might still argue that the increase of public spending as well as deficits could be caused by economic recession. Table 7 shows the outcome from a multiple regression analysis with deficit growth from 1974 to 1981 as the dependent variable and public spending growth and the strength of the recession as explanatory variables. The strength of the recession is operationalized as average unemployment increase from the 1971–73 period to the 1974–81 period. Table 7 shows that the recession in the OECD-countries contributes very modestly to the explanation of deficit growth. Growth of public spending is a far stronger explanatory variable. The strength of the recession does not explain public spending growth either, as one should have expected from a Keynesian point of view. The simple correlation between growth in unemployment and spending increase is as low as 0.24. This emphasizes that increased deficits are more due to the difficulties of collecting sufficient taxes to fund big public spending than to anti-cyclical efforts. Tension between spending and tax collection, caused by the separation of decisions concerning public activities from decisions concerning the funding of these activities, is reinforced during times of economic hardship and then the easy (and short-sighted) solution of deficit financing is apparently chosen.

Data do not in general support the proposition that big public spending is always financed in a more invisible way than more modest public spending. For a long time no positive association existed. This contradiction in the proposition of invisibility relates to years of steady economic growth. After some years of economic hardship the pattern changed, and a positive association emerged.

Concluding Remarks

The study has shown associations between the magnitude of public spending and its financing. The timing of the findings is interesting and gives rise to a more detailed specification of the nature of the relationship between spending and funding. In times of economic growth big public spending is associated with tax systems more elastic than those of nations with more modest spending programmes. In times of economic troubles this association disappears, and after a

transition period big spending becomes associated with more invisible funding than does the funding of small spending.

This pattern suggests that high spending nations rely more a dose of fiscal illusion than do other nations. The means to promote fiscal illusion then depends on the state of the economy. During times of economic boom, elastic taxes and their ability to provide automatically big and increasing revenue do the job. This magic stops working when the economy slows down or declines. Instead, invisible funding is introduced.

Whether the times are good or bad, reliance upon invisible taxes is not important to promote fiscal illusion. The hiding of the costs during economically hard times was primarily done by increasing the deficit, the explanation possibly being that the capacity of invisible taxes is limited, and so they cannot play a major role in the funding of very big public sectors. So the widespread notion of indirect and other invisible taxes promoting public spending is out of line with the realities of contemporary giant public spending habits.

Nations with big public spending relying on elastic taxes to solve their problems of funding get into trouble during times of economic hardship. The tension between the pressure for spending and the need for funding becomes acute, partly because economic stagnation and decline affect public revenue more severely when the tax system is elastic. That is the "seamy" side of elastic taxes. Any economic development is amplified by elastic taxes. The squeeze in the high spending nations with elastic tax system is solved by taking to deficit financing. So this study has rendered support to notions of association between levels of spending and the means of funding besides illustrating the basic tension between decisions concerning spending and taxing, which, under certain circumstances, compels substantial public deficits.

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