0440

IMF WORKING PAPER

WP/91/9   INTERNATIONAL MONETARY FUND

European and Fiscal Affairs Departments

The Determinants and Efficiency of Local Authority Spending in England *

Prepared by Tamim Bayoumi and James Gordon

Authorized for Distribution by Desmond Lachman
and George Kopits

January 1991

Abstract

This paper analyzes the efficiency and determinants of local authority expenditure in England during 1989/90. The capitalization of local spending in house prices is used as a test of efficiency, and it is found that local services are in general excessive from this standpoint. The determinants of local government spending are then estimated and local incomes, the tax price faced by the electorate, and local party control are found to be significant. Application of the analysis to the recently introduced local government reforms suggest small effects on the overall level of spending.

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

Tables

Charts

Summary

This paper examines the efficiency and determinants of local authority expenditure in England in fiscal year 1989/90. The study is of particular interest because Conservative governments since 1979 have made the curbing of what they regarded as excessive local government spending a major plank of their economic policy platform and in April 1990 introduced a wide-ranging reform of local authority finance.

This study derives and implements a test for the efficiency of local government expenditures, based on the capitalization of fiscal variables in house prices. The results indicate that local government expenditures are negatively capitalized into house prices, implying a general over-provision of local services. This outcome holds both for all private houses and for smaller properties, such as flats and maisonettes, the latter being a particularly significant result since residents in these properties are likely to pay below average taxes. When the sample was divided between those councils controlled by the Labour party and those that were not, strong evidence of over-provision was found for the former, while efficiency could not be rejected for the latter.

The paper then proposes and estimates a model of the determination of local government expenditure. The results indicate that the level of services depends upon income, the tax price, and the party in political control at the local level. Estimates of the likely effects of the April 1990 reforms of local government finance on local spending suggest that on average spending would fall by around 1 1/2 percent of its previous level.

Overall, there is evidence that local authorities have considerable leeway to deviate from the efficient allocation of resources. This deviation can be sustained because the associated effect on housing costs make individuals indifferent between efficient and inefficient councils. Nevertheless, house prices are distorted countrywide, implying welfare costs for society as a whole. These results have a potential implication for the removal of fiscal barriers within the European community. To the extent that the finding of fiscal immobility applies to the EC as a whole, the main effect of member countries attempting to maintain differentials in fiscal redistribution after 1992, within the range observed in England, would be on property values, rather than on movements of people.

1. Introduction

This paper examines the efficiency and determinants of local authority expenditure in England in fiscal year 1989/90.   The study is of interest because the Thatcher government has made the curbing of what it regards as excessive local government spending a major plank of economic policy. It is also timely given the recent introduction (and likely demise) of the Community Charge. 1/ Testing the degree to which local authority expenditure could have been said to be efficient in the period immediately before the reform allows the necessity of the reform to be judged. Estimating the determinants of expenditure supplies useful evidence both for comparison with other studies of local government behavior and to facilitate prediction of the effect of the reform. The results also shed some light on the degree of fiscal mobility within a member state of the European Community, a topic of some importance given the EC-wide proposed changes in 1992.

A number of factors make a study of English local government behavior worthwhile, and distinctive in comparison to earlier work on the United States. England is a small densely populated land, with relatively small local authorities; as a result, electors can choose between different types of authority (as one of the authors brought up in a suburb 20 miles outside of London can attest), making it a good testing place for Tiebout type behavior, whereby fiscal mobility ensures an efficient level of local services (Tiebout (1956)). 2/ England is also particularly suited to a cross-sectional study of local government behavior. It has a unified local fiscal system with a single tax, and a level of expenditure is defined at which each authority can provide a standard set of government services (the Grant Related Expenditure assessment, or GRE).   By analyzing actual expenditure as a percentage of GRE, inter-authority differences in both needs and costs of spending are automatically taken into account.

The plan of this paper is as follows. Section 2 briefly describes the system of local finance which existed in England in 1989/90. Section 3 reviews the theory of the local public sector, concentrating on the Tiebout model and how "fiscal residuals" can be capitalized in house prices. The latter provides the analytical underpinnings for the empirical tests carried out in section 4, where evidence on capitalization is used to draw

---

1/ The Community Charge (a head tax) replaced the rates (a property tax) in April 1990 as part of the largest change in local authority finance in England in the postwar period. See King (1988b) or Bayoumi (1991).

2/ Hughes (1987) argues that the Tiebout hypothesis is most plausible in countries where local government enjoys considerable autonomy and this is not the case in England where local government is no more than an agent of central government. Nevertheless, although households need not move for fiscal reasons, they certainly move. Home owners move approximately once every seven years (Coles (1989)), while evidence from the Community Charge indicate that one in five people change address each year.

inferences about the efficiency of local government expenditure, and allows the necessity of the 1990 reform to be examined. To analyze the effect of the reform requires an empirical estimation of the determinants of local government spending. The results of this exercise are presented in section 5 and are used to calculate the implications for expenditure of the reform in Section 6. Section 7 presents the conclusions.

2. The System of Local Authority Finance in England in 1989.

This section briefly describes the system of local government finance operation in 1989/90 and highlights those aspects which are particularly important in the subsequent analysis. Local authorities represent an important sector of the U.K. economy. In 1988/89 (fiscal year April-March), local authority current and capital expenditures were almost £50 billion (10 percent of GDP and over a quarter of the total net of transfers for general government). Table 1 shows a breakdown of local authority revenues and expenditures in 1986. About three quarters of spending was on goods and services, within which education absorbs almost half.

In financing expenditure, approximately equal amounts were derived from local government's own resources and from central government grants. Receipts from local resources include two minor sources, namely gross trading profits of trading enterprises and interest receipts, and one major source, a local property tax, known as the rates. Rates were levied on all buildings, domestic (residential) and nondomestic (business). Each building had a rateable value, assessed by a central government agency, which represented the rent it could command if let. 1/ Local governments were broadly free to set whatever tax rates they wished on these values, although from 1985 to 1987 some high spending authorities were constrained by rate-capping. 2/

Central government grants to local authorities can be divided into two components: specific grants which relate to specific services, such as the police, and general grants. The general grant had two functions: it aimed to equate tax levels across different authorities for a given level of services (negating the effects of differences in the local tax base), and it attempted to influence the level of expenditure through variations in grant amount. To this end, the Grant Related Expenditure (GRE) was defined for each authority as the level of spending which Central Government calculated to be adequate to provide a uniform set of services for the local population. Since the GRE takes into account both differences in need and

---

1/ Revaluations were supposed to occur approximately every five years. However the last two scheduled revaluations in England were not carried out and up until the end of the system, rateable values reflected the 1973 revaluation. In Scotland, by contrast, there was a revaluation in 1985.

2/ Low income households receive transfers called rate rebates to help them pay these taxes. Altogether, about one third of all households received rebates, which cover up to 80 percent of their rate bills.

Table 1. United Kingdom: Current Account
of Local Authorities, 1986

(In billions of pounds sterling)

Expenditure		Revenue	
Goods and services	30.7	Own resources	20.9
Education	14.5	Profits	4.8
Social services	3.5	Interest	0.9
Police	3.2	Rates	15.1
Roads	1.5		
Refuse (garbage)	1.4	Government grants	21.8
Fire services	0.7	Specific grants	7.4
Other	4.5	General grants	14.4
Subsidies	1.0		
Housing	0.5		
Public transport	0.3		
Other	0.2		
Transfer payments	4.3		
Grants to students	1.1		
Rest and rate			
rebates	3.2		
Interest payments	4.2		
Current surplus	2.3		
Total	42.6	Total	42.6

Source: King (1988b).

costs across authorities, it provides a useful (and in comparison to U.S. studies of local government behavior, unique) benchmark against which to compare actual spending.

The way in which the grant system operated is illustrated in Chart 1, taken from King (1988a). In order to simplify the analysis, it is assumed that the only revenues available are from (domestic and nondomestic) rates and general grants. The vertical axis shows the level of services, while the horizontal axis represents the property tax rate (called the rate poundage). The lines T and D show the revenue from total and domestic rates respectively, with line D being below T due to the existence of nondomestic rate payers. The line I shows income after the general grants, and the difference between line T (total local tax revenue) and line I (total income) represents the level of government grants plus the tax revenue. At a given level of tax $(\tau*)$, which is the same for each authority, the line I passes through the GRE. This is the part of the operation of the grant which equalizes the tax rate which each authority has to levy to provide the level of services defined by the GRE.

The two lines T and I are not parallel to each other. Instead the income line I is less steep than the tax line T. This is because the Government sought to equate the marginal effect on the tax rate of increases in expenditure across authorities; the system was designed so that for each authority an extra pound of expenditure per capita would necessitate a rise of 1.1 pence in the rate poundage. Since a rise of 1.1 pence generally brings in revenue per capita of over one pound from domestic and nondomestic rates, this reduces the grant that the authority receives. 1/ Hence, at higher poundages, the tax and income lines move closer together as the grant from Central Government is reduced. The income line I, also has a kink in it at a level which is ten percent of the national average GRE above the GRE for that particular authority. At this point, the marginal tax rate faced by authorities rises from 1.1 pence per pound of extra expenditure per capita to 1.5 pence per pound. The rate at which the central government grant is withdrawn rises at this point, and the income line I becomes flatter. 2/ Hence local authorities faced a kinked budget constraint.

The way in which the government manipulated the grant meant that for each authority,

$$\tau = \tau* + \alpha(g\text{-gre}), \tag{2.1}$$

where g and gre are per capita expenditure and GRE respectively and α = 0.011 (0.015) for g to the left (right) of the kink in Chart 1. From (2.1),

---

1/ On average, however, it brought in less than one pound in domestic rates, which made the average domestic tax price less than one. See the discussion below.

2/ If the calculated grant became negative, the authority received nothing from the Government.

CHART 1

The System of Local Finance
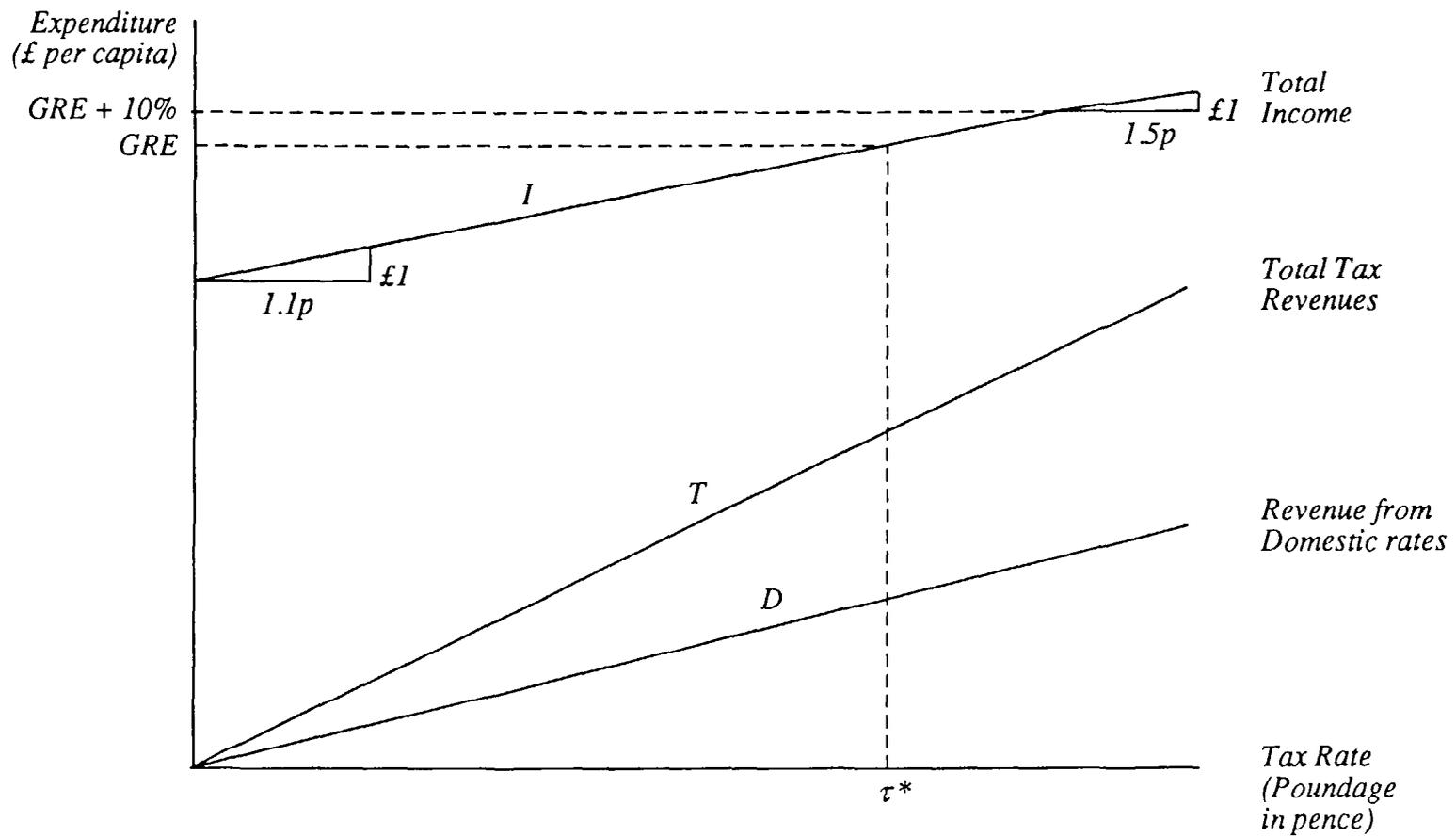
the tax price faced by the local electorate is $d(\tau D)/dg = \alpha D$, where D is the __domestic__ rate base. Domestic tax prices were thus proportional to local domestic rateable values and varied across authorities; a 1.1 pence rise in the poundage produced more domestic rates in an area with high domestic rateable values than in one with low values (domestic tax prices for different areas are shown in Table 6 below).

3. The Theory of Local Government Expenditure

The operations of local government are efficient when the marginal social cost of providing an extra unit of services equals the marginal benefit derived by the community. If the goods being provided are rival and excludable in consumption, user fees will ensure both efficiency and that the benefit principle is satisfied. Where the goods provided are non-rival, efficiency requires the Samuelson condition that the sum of individual marginal benefits equals marginal cost. User fees must now be personalized (using Lindahl prices) if the benefit principle is to be satisfied, but even this may not be sufficient for efficiency (Rubinfeld, (1989)). There are also well-known problems with preference revelation.

Given the practical problems associated with user fees, and in particular the public good nature of many of the services provided, most local government expenditure is typically tax financed. Efficiency then only arises under special circumstances. If the level of expenditure is median-voter determined, the condition for efficiency is that the median voter is made to pay the same proportion of marginal social costs as he or she shares in total marginal benefits. For example, efficiency would prevail under a poll or head tax if individuals have identical preferences. It could also prevail under a poll tax with non-identical preferences, providing that the median voter receives the mean marginal benefit. However, the benefit principle would be violated, with those receiving above (below) average marginal benefits from public goods having positive (negative) fiscal residuals. Tiebout (1956) made the point that in departing from benefit taxation, local government risked individuals voting with their feet; those receiving negative fiscal residuals would migrate to lower tax communities. In this way a set of homogeneous communities would be formed, differentiated according to the common preferences of its members. Within each community, individuals would face equal tax prices and receive equal shares in marginal benefits, so both efficiency and the benefit principle would be satisfied.

The Tiebout model requires some strong assumptions. To begin with, it requires a higher degree of local government autonomy than Hughes (1987) argues is the case in the U.K.. It assumes there are no costs to living in one jurisdiction over another and that revenues are raised by a head tax. It also disregards houses and land. In practice, however, there are a number of costs to movement, which may provide some leeway for local councils to deviate from the benefit principle. The more costly is Tiebout-

migration, the less local governments are likely to be constrained in their attempts to choose independent levels of provision or taxation. 1/

In addition, with the notable exception of the U.K. since April 1990, the head taxes assumed in the Tiebout model are not used in practice and the most common local tax is on houses and land. Such property taxation will in general imply tax prices which vary across individuals. The discussion of efficiency must now be qualified, since the property tax itself will be distortionary and the associated deadweight loss should be included in the marginal cost of increasing local government expenditure. It is also extremely unlikely that property tax financed local expenditure will be (second best) efficient; this would require a rather unlikely coincidence between the median voter's share in total marginal benefit net of deadweight loss and his or her share in total property value.

Nevertheless, the fact that tax prices differ does not mean that local taxation cannot follow the benefit principle, even where preferences for local government services are identical. This is because housing supply is relatively inelastic and fiscal residuals can be capitalized into property values. For example, in the hypothetical case of a community where everyone derives the same benefit from local spending and there is a proportional property tax, high tax properties will sell at a discount and low tax properties will sell at a premium. The poor (rich) will face increased (decreased) housing costs, thus undoing the redistribution implicit in the property tax. Hence capitalization acts as an alternative to exit as a means of blocking redistribution at the local level (Hamilton (1979)).

Capitalization can be used to test for (second best) efficiency. 2/ In a homogeneous community, for example, the efficient provision of public goods means that each resident faces a zero fiscal residual. If provision is efficient in all communities, then no relationship between property values and local fiscal variables would be expected, and a regression of the former on the latter across homogeneous communities should yield no correlation. By contrast, the finding that house-prices were affected by local government behavior would create a presumption of non-optimal

---

1/ More recently, Buchanan and Faith (1987) have suggested that exit might be internal; those receiving negative net marginal benefits from local government might secede. This could involve refusing to pay local taxes. It could also involve petitioning the national government to unseat the local council or to change the rules of local government finance. The latter possibility is explored in Gordon (1989).

2/ Capitalization does not increase the likelihood of efficiency, since any tax-expenditure combination can be capitalized, not only the efficient one. Once capitalization occurs, households have no fiscal incentive to exit and this makes the mechanism (violation of the benefit principle) ensuring efficiency in the Tiebout model inoperative. Inefficiency can therefore persist even with perfect mobility.

provision. 1/   To fix ideas, consider a consumer with a utility function which includes housing services (H), per capita local government expenditure (g), and consumption of a numeraire commodity (C). 2/   There are a number of different communities, each of which has autonomy over its own expenditure and tax decisions.   All communities finance expenditure using a local property tax.   A property owner's tax liability is τHR; the product of the rate (τ), the level of housing services (H) and some historical value of housing services (R). 3/   In choosing where to live, the consumer chooses H, g and C, so the problem can be written,

$$\max_{H,C,g} U(H,g,C) \quad \text{s.t.} \quad y \geq P(g,\tau)H + \tau RH + C, \tag{3.1}$$

where y is income and P is the bid-price function relating the price of housing to the expenditure-tax package offered by a community. Capitalization thus occurs by assumption.

Solving the maximization problem defined by (3.1) gives the following first order conditions,

$$U_H = \lambda(P + \tau R) \tag{3.2a}$$
$$U_g = \lambda P_g \tag{3.2b}$$
$$U_C = \lambda \tag{3.2c}$$
$$P_\tau + R = 0 \tag{3.2d}$$

From equation (3.2d) and the consumer's budget constraint, it follows that $P(g,\tau)$ must be of the form,

$$P(g,\tau) = K(g) - \tau R \tag{3.3}$$

where $K'(g) = U_g/\lambda$.   The derivative of $P(g,\tau)$ with respect to g, recognizing the dependence of τ on g from the local government budget constraint, is:

$$dP(g,\tau)/dg = U_g/\lambda - d(\tau R)/dg \tag{3.4}$$

where the term on the right hand side is the consumer's fiscal residual (marginal benefit from local government services less tax price).   If, for the type of individual in question, government services are being provided at the desired level, then the right hand side of (3.4) will equal zero.

1/   There is an extensive US literature using capitalization tests, initiated by Oates (1969) and refined by Brueckner (1979 and 1982).   For a survey see Rubinfeld (1987) or Miezkowski and Zodrow (1989).   We are not aware of any previous attempts to use these tests on UK data.

2/   The model is based on Yinger (1982).   Differences in tastes and social factors are ignored in our exposition; adding such factors complicates the analysis, but does not alter the basic conclusions.

3/   This simplifies the analysis and, as noted on page 3, is consistent with the recently abolished system of rates in England, where revaluations were infrequent.

For those who would prefer more (less) government expenditure given their tax prices, it will be positive (negative) under reasonable assumptions about preferences. The prices of large houses should therefore be more negatively related to the level of local spending than small houses.

To test for efficiency, multiply equation (3.3) by H and sum over the number of property owners:

$$\sum_{i=1}^{N} P_i H_i = \sum_{i=1}^{N} [K(g) - rR_i]H_i \qquad (3.5)$$

Since the term under the summation sign on the left hand side represents the price of housing services, the price of the house is the discounted sum of equation (3.5). Assuming that all variables are in long run steady state this yields,

$$\sum_{i=1}^{N} \frac{P_i H_i}{r} = \sum_{i=1}^{N} \frac{[K_i(g) - rR_i]H_i}{r} \qquad (3.5')$$

where r is the discount rate. Dividing through by N yields the average house price, which can be differentiated with respect to g:

$$\frac{d(\overline{PH}/r)}{dg} = \frac{1}{rN} \sum_{i=1}^{N} \frac{U_g^i H_i}{\lambda} - \frac{1}{rN} \sum_{i=1}^{N} \frac{dTAX_i}{dg} \qquad (3.6)$$

Since efficiency implies that the right hand side of (3.6) should be zero, a test for efficiency is that average house prices do not depend on fiscal variables.

4.   Testing for the Efficiency of Local Expenditures

Data on average house prices for local authorities in England were obtained from the Halifax Building Society. They were not available for metropolitan districts; hence the sample covered London boroughs and nonmetropolitan counties. In addition to overall prices, the data included five subcategories: detached houses, semi-detached houses, terraced houses, bungalows, and flats and maisonettes. The data cover the period July 1989 to June 1990, which is close to the April 1989 to March 1990 local authority fiscal year (covered by the expenditure data).

It is worth noting that these data refer to market prices and therefore do not cover publicly provided (council) housing in which many of the less well off in England live. In 1988, 23 percent of the English housing stock was council housing, 67 percent owner occupied, and 10 percent private

rentals. Hence the test only covers the 77 percent of the housing stock for which market data exist. [1] However, the existence of data on different categories of housing, in particular relatively basic housing such as flats and maisonettes, makes this omission less of a problem.

To derive an estimating equation for England, substitute (2.1) with $\alpha =$ 0.011 into (3.5'), divide through by the discount rate r to convert the flow of benefits into the stock value, and rearrange to give,

$$\frac{PH}{r} - \frac{RH(.011gre - r*)}{r} = \frac{H(K(g) - .011gR)}{r} \qquad (4.1)$$

The implication of (4.1) is that house prices must be adjusted by a term representing the intercept of the tax function (2.1), which differs across authorities. This term can be interpreted as the value per household of an implicit lump sum grant and was calculated from the data. A discount rate of 3 percent and a depreciation rate of 2 percent was assumed; this implies a capitalization factor of 1/0.05, or 20. In order to test the sensitivity of the results to this capitalization assumption, factors of zero and 40 were also used; these did not alter the nature of the results.

Of course, other factors affect the value of housing. Three such variables were included in the regressions: income, population density and the percentage of dwellings without inside toilets. The last variable is clearly relevant as a measure of the quality of the housing stock, while the first two proxy the marginal utility of consumption and the services associated with urban areas.

Assuming a log-linear specification, the estimating equation becomes,

$$\log(HP_i - 20(.011gre - r*)RH_i) = \beta_0 + \beta_1 \log(income_i) + \beta_2 \log(G_i/GRE_i)$$

$$+ \beta_3 Pop\ Density_i + \beta_4\ W/o\ inside\ toilet_i \qquad (4.2)$$

where subscript i represents different local authorities.

---

[1] This creates a potential sample selection problem since some councils will have relatively more council houses than others. If high spending councils are argued to have a higher percentage of council housing, then controlling for quality differences, there should be a positive correlation between house prices and real expenditure. Since we find a negative correlation, this bias is unlikely to explain our results.

The results from estimating this equation are shown in Table 2. 1/
The first column shows the results of running (4.2) using average
transaction prices of all houses. The estimated standard errors, reported
in parentheses, are adjusted by the procedure suggested in White (1980) to
make them robust to hetroskedasicity. The income elasticity is estimated to
be close to 1, and the proxies for housing quality are both significant and
have the expected signs. The coefficient on local expenditure is negative,
and significant at the 1 percent level. Given the absence of council-
housing in the sample used to calculate average prices, this is not
necessarily an indicator of over-provision. More convincing evidence of
over-provision comes from the next two columns, which show the results of
running the same regression for detached houses, and flats and maisonettes.
The negative effect of government expenditure is larger for detached houses
than for overall house prices (as would be expected since taxes are higher
for such houses), while the effect on flats and maisonettes is lower than on
detached houses, and both coefficients are significant at the 1 percent
level. 2/ That there appears to be negative capitalization for flats and
maisonettes strengthens the view that local government services were over-
provided in 1989/90; owners of these particular dwellings are likely to pay
below average rates.

Since local political party control was found to be an important
determinant of the level of local expenditure by Foster et al (1980), a
result which is confirmed in the next section, the model was re-estimated
allowing the coefficient on the expenditure variable to vary depending on
party control. The results from this exercise are shown in Table 3. For
Labour controlled councils the coefficient on the expenditure ratio is
negative and significant at the 1 percent level in all the regressions,
indicating a considerable degree of over-provision of services for all types
of housing. By contrast, for those councils not under Labour control the
coefficient on the expenditure ratio is much smaller. It is significant at
conventional levels only in the regression using data on detached houses,
which are those households who pay the most tax. The coefficient is small
and insignificant in the regressions using data on all households and the
one using data on flats and maisonettes; in the latter case the coefficient
is particularly small, with an absolute value of less than 0.2. 3/ This
provides evidence that the provision of services by these councils may be

---

1/ Since this section looks at the impact of overall levels of service,
rather than attempting to explain individual local authority behavior, the
levels of expenditure and GRE for individual authorities were adjusted to
include services provided to London boroughs or metropolitan districts on an
area wide basis, such as the Inner London Education Authority.

2/ Regressions including dummies for both inner and outer London boroughs
(not reported) did not alter our results, suggesting they are not simply
capturing the effect of higher London house prices.

3/ This is exactly the pattern that would be expected under a property
tax.

Table 2. England: Tests of the Capitalization
of Local Government Expenditure, 1989.

	All Households	Detached Houses	Flats and Maisonettes
Income	0.81**	1.67**	0.97**
	(.25)	(0.43)	(0.25)
G/GRE	-0.87**	-1.67**	-0.85**
	(.27)	(0.48)	(0.31)
Population density	0.034**	0.056*	0.055**
	(0.010)	(0.026)	(0.010)
No inside WC	-0.047**	-0.079**	-0.041**
	(0.010)	(0.013)	(0.009)
R^2	0.68	0.78	0.74
se	0.14	0.17	0.15
No. of obs	63	49	63

Notes: The dependent variable is the average local house price adjusted
for government grants. Constant terms are not reported. Standard errors
are adjusted to be robust to hetroskedasticity. One or two asterisks
indicate the coefficient is significantly different from zero at the
5 percent or 1 percent level, respectively.

Table 3. England: Effect of Party Control on Capitalization, 1989

	All Households	Detached Houses	Flats and Maisonettes
Income	0.82**	1.69**	1.00**
	(0.25)	(0.44)	(0.25)
G/GRE			
Labour controlled	-0.96**	-2.25**	-1.00**
	(0.32)	(0.77)	(0.38)
Not Labour			
controlled	-0.45	-0.90*	-0.17
	(0.31)	(0.41)	(0.26)
Population density	0.034**	0.065**	0.055**
	(0.009)	(0.028)	(0.009)
No inside WC	-0.046**	-0.074	-0.037**
	(0.009)	(0.011)	(0.009)
R^2	0.69	0.80	0.76
se	0.13	0.17	0.15
No. of obs	63	49	63

Notes: The dependent variable is the average local house price adjusted for government grants. Constant terms are not reported. Standard errors are adjusted to be robust to hetroskedasticity. One or two asterisks indicate the coefficient is significantly different from zero at the 5 percent or 1 percent, respectively.

considerably closer to the efficient level. Since the average ratio of expenditure to the GRE for non-Labour controled councils is close to unity, this implies that the GRE may be a reasonably good estimate of the level of efficient service provision.

5. The Determinants of Local Government Expenditure

Having tested for the efficiency of provision, the analysis turns to the determinants of local authority spending in England. It is assumed that local government behavior reflects the solution to a problem of voter utility maximization, similar to (3.1). The decision maker may be the median voter or the majority party. In either case, the level of government spending chosen will be a function of local incomes and domestic tax prices in the standard way. Area-specific factors such as the cost of providing services and the needs of the local population might also be important. An additional influence might be the political mechanism underlying the decision making process. An obvious variable to consider if this is to be captured is party allegiance, which following Foster et al (1980), is measured using the proportion of Labour council members; at least part of the variation in local government spending is likely to be explained by different electorates having different preferences as to the size of local government.

The possibility that local government behaves as Leviathan and expands the scale of its operations up to the limits of its power (see Mueller (1989)) is also explored. Such behavior is modelled by assuming that the members of the majority party maximize their own utility subject not only to individual household budget constraints and the local government budget constraint, but also to a constraint of the form:

$$U^m(g^m, H^m, C^m) \geq U_{min}(X),$$
(5.1)

where the m superscripts refer to the members of a minority group who will exit or secede should they get less than some minimum level of welfare, (Buchanan and Faith (1987)). In (5.1), U_{min} represents how well off the minority would be if it were to secede. In the regressions below variables intended to test whether such surplus extraction occurs include a dummy equal to one if the Labour party had a majority on the local council; this variable performing better than the proportion of Labour council members would support the argument that local councils were more concerned with surplus extraction than satisfying local preferences. Regional dummies representing proximity to metropolitan areas and hence employment are also included; the rationale being that if a local authority is in an area with many jobs, the council can exploit the rents implied by the costs of travelling to and from work. In terms of (5.1), the closer is a metropolitan area, the lower is U_{min} and hence the larger the potential for surplus extraction.

Taken together the arguments above imply a demand function of the form,

$$g = g*(Y, P_G, X, Z, S), \qquad\qquad (5.2)$$

where Y is a measure of local income, P_G is the tax price faced by the decision-maker, Z is a vector of the community's social and economic characteristics, X is the proportion of Labour council members (representing preferences for local government services) and S is a vector of variables attempting to capture surplus extraction. As noted earlier, the analysis is considerably simplified by the existence of the GRE system. Since the GRE is defined for any authority as the level of expenditure required in order to provide a uniform level of local services, it will depend on social and economic factors such as costs and needs. Hence,

$$gre = gre(Z), \qquad\qquad (5.3)$$

and (5.2) can be rewritten as,

$$g/gre = g(Y, P_G, X, S). \qquad\qquad (5.4)$$

Data on the factors in equation (5.4) were collected for London boroughs, metropolitan districts, and non-metropolitan counties in England. The data for the planned level of expenditure, the GRE, and the tax prices are for the fiscal year 1989/90, from CIPFA (1989). Incomes were measured as male full time earnings in that locality in April 1988, from _Regional Trends_ (CSO (1990)). Preferences and surplus extraction variables were measured as explained above; X is the percentage of Labour council members in 1989/90; LabCon is a dummy equal to one if Labour council members are in a majority; and various regional dummies were defined representing inner London boroughs (InnLon), outer London boroughs (OutLon), and other metropolitan districts (MetDist). The expected coefficients are positive, with inner London boroughs being expected to show the largest effects, since they are associated with the largest concentration of jobs. Assuming a log-linear form the estimating equation was,

$$\log(g_i/gre_i) = \beta_0 + \beta_1\log(Y_i) + \beta_2\log(TP_i) + \beta_3 PerLab_i +$$

$$\beta_4 InnLon_i + \beta_5 OutLon_i + \beta_6 MetDist_i + \beta_7 LabCon_i + \epsilon_i \qquad (5.5)$$

where subscript i refers to different local authorities. 1/

The estimates of equation (5.5) using standard techniques will be biased. This is because, as described in section 2 above, local councils face a kinked budget constraint. As a result, the tax price faced by the local council depends upon the chosen level of expenditure, and hence the observed tax price is correlated with the error term. Several methods have been proposed for dealing with this problem, of which the most satisfactory

---

1/ Incorporating the GRE in the equation as a ratio is equivalent to putting the logarithm of the GRE on the right hand side but constraining its coefficient to be unity. This assumption is tested below.

is the one originally used in Burtless and Hausman (1979). 1/ This divides the error in equation (5.5) into two components, an unobserved shock to preferences, ϵ_1, and an optimization error, ϵ_2.

Let g* represent the desired level of expenditure, and $\beta'X_j$ the value of the right hand side of equation (5.5) in situation j, where j=1 is when the tax price is low, and j=2 indicates the situation after the kink in the budget set when the tax price is high. In expression (5.5) two variables change between the two states, namely the tax price faced by the local authority and the level of virtual income of the electorate. Letting g_kink represent the level of expenditure at which the tax price changes, the desired level of expenditure is

$$
\begin{array}{llll}
(1) & g^* = \beta'X_1 + \epsilon_1 & \text{for } \beta'X_1 + \epsilon_1 < g\_kink, & \\
(2) & g^* = g\_kink & \text{for } \beta'X_2 + \epsilon_1 < g\_kink < \beta'X_1 + \epsilon_1, & \\
(3) & g^* = \beta'X_2 + \epsilon_1 & \text{for } \beta'X_2 + \epsilon_1 > g\_kink. & (5.6)
\end{array}
$$

There are three states, which are illustrated in Chart 2. If the desired level of expenditure is below g_kink even with the low tax price, then this value will be chosen; if the desired level of expenditure is above g_kink for the low tax price, but below it for the high tax price then the level g_kink will be chosen; if the desired level of expenditure given the high tax price is above g_kink, then this level will be chosen.

Given the level of $g^*(\epsilon_1,\beta)$, actual expenditure, g, is

$$
g = g^* + \epsilon_2, \tag{5.7}
$$

where ϵ_2 is an optimization error. Assuming that both ϵ_1 and ϵ_2 are normally distributed, the probability of observing any given value of g can be computed by integrating over all possible values of ϵ_1. Writing the standard normal distribution and its cumulative density as $\phi(.)$ and $\Phi(.)$ respectively, and the levels of ϵ_1 at which g* moves from state 1 to state 2 and from state 2 to state 3 as $\underline{\epsilon}_1$ and $\overline{\epsilon}_1$ respectively, the probability of observing expenditure level g is

$$
P(g) = \int_{-\infty}^{\underline{\epsilon}_1} \phi\left[\frac{(X_1'\beta+\epsilon_1) - g}{\sigma_2}\right]\phi\left[\frac{\epsilon_1}{\sigma_1}\right]d\epsilon \quad + \quad \phi\left[\frac{g\_kink - g}{\sigma_2}\right]\Phi\left[\frac{\overline{\epsilon}_1 - \underline{\epsilon}_1}{\sigma_1}\right]
$$
$$
+ \int_{\overline{\epsilon}_1}^{\infty} \phi\left[\frac{(X_2'\beta+\epsilon_1) - g}{\sigma_2}\right]\phi\left[\frac{\epsilon_1}{\sigma_1}\right]d\epsilon. \tag{5.8}
$$

The three parts of the expression correspond to the three possibilities for desired government expenditure; within each expression the first density (normalized by σ_2) corresponds to the optimization error, while the second

---

1/ For a discussion of the econometrics of kinked budget sets, see Moffitt (1990).

part of the expression (normalized by σ_1) represents the unobserved preference shock. Since the product of two normal densities is also normal, the integrals can be evaluated and written as a function of the cumulative normal distribution. As a result, expression (5.8) can be written in a form which is easy to program.

The parameters in the model, namely β, σ_1, and σ_2, were estimated using maximum likelihood techniques; in other words, by maximizing the sum of the logarithm of (5.8) over all observations. Table 4 shows the results from regressing the logarithm of the ratio of expenditure to the GRE on income, the tax price and variables representing preferences, location, and political control. The rows show the coefficient estimates for each regression, with their standard errors, and the logarithm of the likelihood function. Four regressions are shown; in the first three the influence of preferences, location, and political control are investigated separately, while in the last all variables are included.

The first three regressions indicate that each of the explanations, that local expenditures depend upon voter preferences, on surplus extraction associated with the location of job opportunities, and on local political control, are broadly consistent with the data. The first column shows the results when expenditure is regressed upon income, the tax price, and the percentage of local council members who represent the Labour party (X). The income and tax price elasticities are estimated to be 0.46 and -0.27, and are significantly different from zero at conventional levels. The coefficient on X indicates that each percentage point of Labour party representation raises local spending by 0.15 percent, and the coefficient is significantly different from zero. In the second column variables representing proximity to jobs are substituted for X variable. The income and tax price terms are again significant (as they are in all the regressions); the location variables indicate that inner London boroughs spend 13 percent more than nonmetropolitan counties, outer London boroughs 8 percent more, and other metropolitan districts 4 percent more, with the first two results being statistically significant. In the third column the Labour control variable (LabCon) is substituted for the location terms. It indicates that Labour councils spend 8 1/2 percent more than other councils.

While these explanations are all broadly consistent, it is also clear that the model using the LabCon variable is a superior description of the data. The log of the likelihood function is significantly larger in this regression, while the estimated standard error for preferences (σ_1) is only about half that of the other two regressions.

This impression is confirmed by the regression reported in the fourth column, which includes all the independent variables used in the first three columns. Income, the tax price, and Labour control are all highly significant, while the X variable (representing local preferences) is totally insignificant. Two of the locational variables are also insignificant, although there is still a significant effect associated with

CHART 2

**The Effects of A Kinked Budget Constraint**
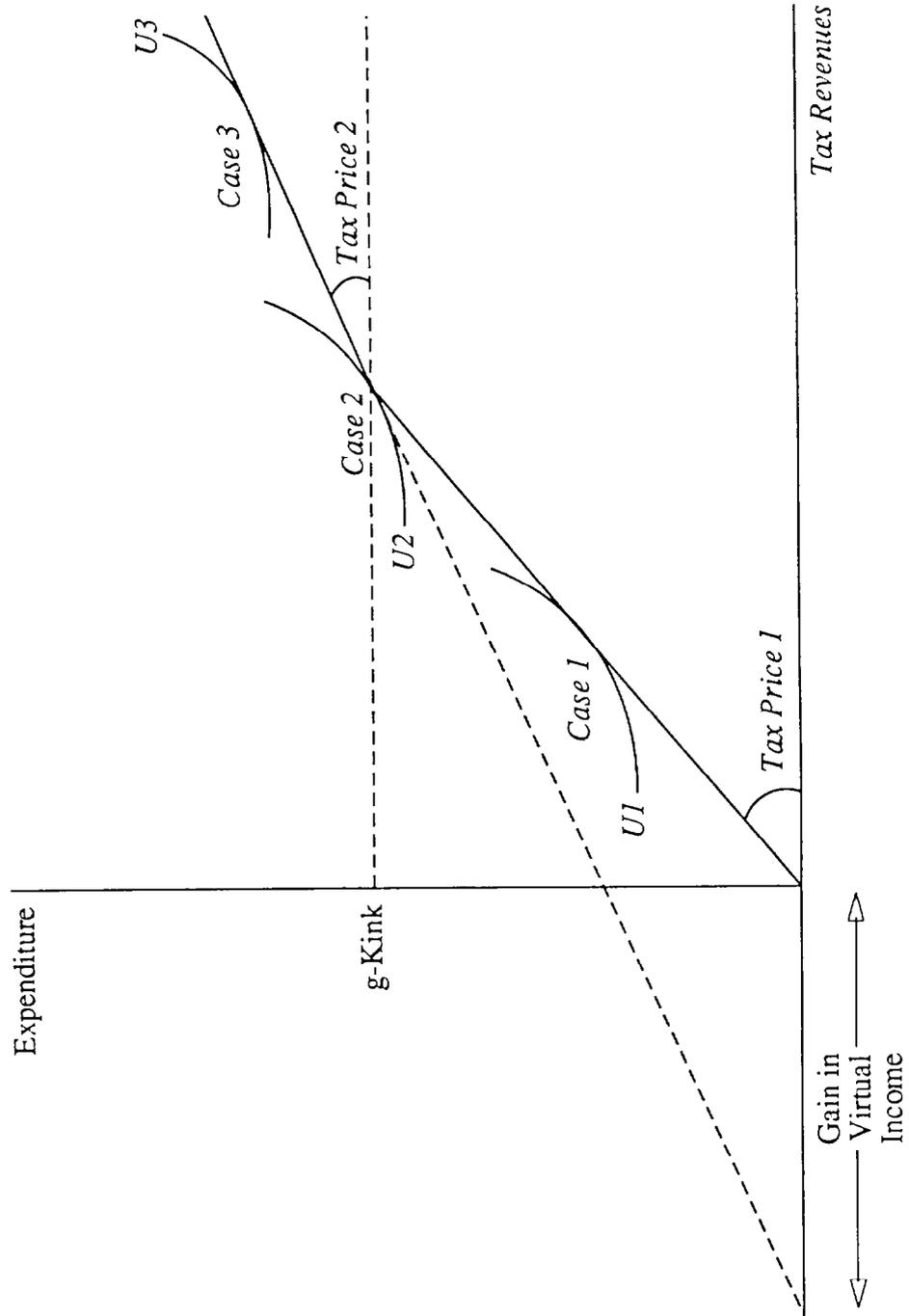
Table 4. England: Estimated Equations of
the Provision of Local Government Expenditure

	Local Preferences	Employment Opportunities	Political Control	Full Model
Income	0.457** (0.096)	0.387** (0.133)	0.421** (0.083)	0.297** (0.100)
Tax price	-0.268** (0.003)	-0.263** (0.044)	-0.146** (0.032)	-0.182** (0.048)
Percent Labour	0.148** (0.003)			0.001 (0.053)
Inner London		0.132** (0.038)		0.068* (0.030)
Outer London		0.083** (0.027)		0.032 (0.024)
Metropolitan District		0.036 (0.040)		-0.011 (0.020)
Labour controlled			0.084** (0.012)	0.078** (0.023)
σ_1	0.033 (0.022)	0.031 (0.026)	0.015 (0.016)	0.007 (0.016)
σ_2	0.060** (0.011)	0.059** (0.010)	0.061** (0.010)	0.059** (0.009)
Logarithm of likelihood	87.9	88.5	92.3	95.4

Notes: The dependent variable is the ratio of local government spending to the GRE. Constant terms are not reported. One or two asterisks indicate the coefficient is significantly different from zero at the 5 percent or 1 percent level, respectively.

inner London boroughs. 1/ Using a likelihood ratio test, the models
based on local preferences and on location can be rejected as a restriction
on the full model, while the regression based on political control cannot be
rejected. 2/ Further regressions, not reported for the sake of brevity,
indicate that the inner-London effect becomes insignificant when the other
independent variables are removed. Hence, the preferred model of local
government expenditure is that in column three, where local spending depends
upon income, the tax price, and political control. 3/

The preferred regression indicates that local expenditure has an income
elasticity of 0.42 4/, a tax price elasticity of -0.15, and that councils
controlled by the Labour party spend 8 1/2 percent more than those which are
not so controlled. One possible problem with this model is that the LabCon
variable is too crude, and in particular that the degree of overspending
could be correlated with the tax price faced by the local electorate. To
test this the model was re-estimated with the term in political control
amended to $LabCon*(\beta_7+\beta_8\log(P_{Gi}))$, where β_8 represents the degree to which
Labour controlled councils react to the local tax price. When this version
of the model was estimated, however, the coefficient β_8 was small and
insignificantly different from zero, implying that the crude assumption that
all Labour controlled councils overspend by the same percentage cannot be
rejected by the data.

Thus far, it has been assumed that the GRE is an accurate measure of
the cost of providing a standard level of service. This assumption was
tested by investigating whether either the GRE itself or social variables
matter above and beyond the simple ratio used on the right hand side of
equation (5.5). Table 5 reports the results of adding both the logarithm of
the GRE and five social indicators to the basic regression; if the GRE is an
unbiased estimate of spending requirements due to social needs, then all of
these variables should be insignificant in the regression. At conventional
levels, none of the new regressors are significant and the log likelihood
test indicates that the restriction that the coefficients are jointly zero
cannot be rejected. Moreover the coefficient on the variable representing
political control is actually larger in this regression than in the

---

1/ In inner London education, the single largest local service, is
provided by the Inner London Education Authority, making measured
expenditures less comparable to other areas.

2/ The likelihood ratio statistic is equal to twice the difference in the
value of the log likelihoods. It is asymptotically distributed as chi-
squared with n degrees of freedom, where n is the number of coefficient
restrictions.

3/ This is in contrast to Foster et al (1980) who find that the
percentage of Labour council members performs better than a dummy variable
representing political control. Bennett (1982) also finds political control
to be important.

4/ This is similar to the value of one half quoted by Rubinfeld (1987) as
being typical of the findings of the U.S. empirical work.

Table 5. England: The Influence
of Social Factors on Local Government Expenditure

	Ratio of Expenditure to GRE
Income	0.274 (0.145)
Tax Price	-0.084 (0.064)
Labour controlled	0.142** (0.030)
GRE	-0.059 (0.044)
Population under 5 years of age	0.005 (0.027)
Population over 75 years of age	0.002 (0.011)
Ratio of single parents	-0.101 (0.771)
Average house size	0.038 (0.138)
No inside WC	-0.004 (0.010)
σ_1	0.015 (0.037)
σ_2	0.063** (0.010)
Logarithm of likelihood	99.8

Notes: The dependent variable is
the ratio of local government
expenditure to GRE. The constant
term is not reported. One or two
asterisks indicate the coefficient
is significantly different from
zero at the 5 percent or 1 percent
level, respectively.

preferred model. These results indicate that social factors do not help explain the difference in spending between councils under different political control. Further regressions on more restricted data sets produced similar results.

To summarize, local government provision of services has been found to depend upon local incomes, the tax price faced by the local electorate, and the political orientation of the majority on the local council. Other factors, such as proximity to jobs, or more general measures of local preferences were found to be unimportant. In addition, no evidence could be found that social factors impinged on spending over and above the effects implicit in the assessment of the GRE by Central Government.

6.   The Effect of the 1990 Reforms of Local Government Finance

In April 1990, the United Kingdom government enacted the most far reaching reform of local government finance in England and Wales in the postwar period, involving the substitution of a head tax (called the Community Charge) for the rates levied on domestic residents, the centralization of the rates levied on local businesses, and an overhaul of the administration of Central Government grants. 1/ This section uses the empirical results developed above to look at the effects of this change on local government expenditure.

The 1990 reforms, by making the government grant independent of local expenditures and centralizing business property taxes, unify the domestic tax price faced by local authorities at unity. The impact of this change on expenditure can be calculated using the elasticity of spending with respect to the local domestic tax price estimated above. The reforms also involve the substitution of a head tax for the domestic property tax. Assuming a median voter model, the effect of this aspect of the reforms depends upon the change in the tax price of the median voter. Evidence in Bramley, LeGrand and Low (1989, Table 4) and HMSO (1986, Annex F) both indicate that the effect of the reforms on the median voter is small. Hence no allowance was made for this effect. In any case, the United Kingdom government has just started a review of the Community Charge, which will almost certainly lead to major changes in its method of operation. The results presented here would remain valid under any reform in which government grants continue to be independent of local spending (and hence the domestic tax price is still unity across different authorities) and the tax price of the median voter is largely unaffected.

1/   See Bayoumi (1990) or King (1988b) for more details on these reforms.

Given the estimated model, the expected value of expenditure is,

$$E(g/gre) = \Phi(\underline{\epsilon}/\sigma_1)(X_1'\beta - \sigma_1 \frac{\phi(\underline{\epsilon}/\sigma_1)}{\Phi(\underline{\epsilon}/\sigma_1)}) + (\Phi(\overline{\epsilon}) - \Phi(\underline{\epsilon}))g\_kink$$

$$+ \Phi(-\overline{\epsilon}/\sigma_1)(X_2'\beta + \sigma_1 \frac{\phi(-\overline{\epsilon}/\sigma_1)}{\Phi(-\overline{\epsilon}/\sigma_1)})$$

(6.1)

where the three parts correspond to the three cases illustrated in Chart 2, and the adjustments to the $X'\beta$ terms reflect the truncation of the error terms. For the new system, which has no kink in the budget constraint, the expected value is simply given by $X'\beta$ with a tax price of one.

The results from these calculations are shown in Table 6. The first column shows the actual spending in 1989/90, the second the estimated spending given a tax price of one, while the third and fourth columns show the predicted percentage change in spending and the average tax price faced by the authorities, respectively. The overall effect is to reduce local authority expenditure 1/ in England by 1.5 percentage point in the long run; the reason that the figure is so small being that the average tax price faced by local authorities, at 0.93, is quite close to 1. There are, however, larger changes in spending between regions. London and neighboring nonmetropolitan counties have a rise of around 3 percent in their spending, since they faced a domestic tax price of above one, while the rest of England, with a tax price of 0.8, reduce spending by 3 percentage points. In terms of political control, Labour councils reduce spending by slightly more than non-Labour controlled councils, however the differences are relatively small compared to the regional effects discussed above.

The conclusion that there will be relatively small effects on aggregate local government spending because the average domestic tax price is close to one, comes as somewhat of a surprise, since most commentators quote average domestic tax prices of around 0.7 (see King (1988a) p. 142). The main reasons for this discrepancy are that the lower figures refer to the tax price for councils outside London and only councils to the left of the kink in Chart 1 are included in the calculation. Remedying these omissions raises the average domestic tax price to the figure of 0.93 quoted above, and leads to the conclusion that aggregate spending will only change by 1.5 percentage points.

1/ These calculations exclude spending by the City of London, the Inner London Education Authority, London and other Metropolitan police, Fire and Civil Defence, Metropolitan Joint Passenger Transport, and County Councils for which wage data was not available. These other expenditures make up about one fifth of all local authority expenditure in England.

Table 6. England: Effects of the 1990 Reforms

	Current Expenditure (£ billion)	Predicted Expenditure (£ billion)	Percentage Change	Domestic Tax Price Under the Rates
Total	24.1	23.7	-1.5	0.93
Regions				
Inner London	1.2	1.3	7.8	1.80
Outer London	2.5	2.6	3.3	1.30
Metropolitan District	6.5	6.3	-2.9	0.81
Counties	13.8	13.5	-2.5	0.87
Neighboring London	2.9	2.9	0.4	1.06
Other	10.9	10.6	-3.2	0.82
Party Control				
Labour controlled	12.1	11.8	-1.9	0.88
Not Labour controlled	12.0	11.9	-1.0	0.98

7. <u>Conclusions</u>

This paper has looked at the efficiency and determinants of local government expenditure in England. A test for the efficiency of local government expenditures, based on the capitalization of fiscal variables in house prices, was derived and implemented. The results indicate that local government expenditures are *negatively capitalized into house prices*, implying a general over-provision of local services; this result holds both for all private houses and for smaller properties such as flats and maisonettes, the latter being a particularly significant result since residents in these properties are likely to pay below average rates. When the sample was divided between those councils controlled by the Labour party and those that were not, strong evidence of over-provision was found for the former, while efficiency could not be rejected for the latter.

Next a model of the determination of local government expenditure, which included variables which might capture surplus extraction by the party in power, was proposed and estimated. The results indicate that the level of services depends upon income, the tax price, and the party with local political control, with authorities controlled by the Labour party spending about 8 percent more than those under the control of other parties. This model was used to estimate the likely effects of the recent reforms of local government finance on local spending; *it was estimated that on average* spending will fall by around 1 1/2 percent of its current level. The efficiency gains from the Community Charge therefore appear to be rather modest and do not appear sufficient to justify the regressive nature of such a tax. It should be noted, however, that the recent announcement of a review of the Community Charge puts its future in question.

The results in this paper have several important implications. There is evidence that local authorities have considerable leeway to deviate from the efficient allocation. This can be sustained because the associated effect on housing costs make individuals indifferent between the inefficient council and a more efficient one. Nevertheless house prices are distorted country-wide, implying welfare costs for society as a whole. Another important implication has to do with the 1992 EC removal of fiscal barriers. To the extent that the finding of fiscal immobility applies to the EC as a whole, the main effect of member countries attempting to maintain differentials in fiscal redistribution after 1992, within the range observed in England, would be on property values, rather than on movements of people. A wave of fiscally-induced migration seems rather unlikely.

Bibliography

Bayoumi, T. "The 1990 Reform of United Kingdom Local Authority Finance", IMF Staff Papers (1990) Forthcoming.

Bennett, R.J. Central Grants to Local Government: The Political and Economic Impact of the Rate Support Grant in England and Wales, Cambridge University Press, Cambridge, 1982.

Bramley G., J. LeGrand and W. Low, "How Far is the Poll Tax a 'Community Charge'? The Implications of Service Usage Evidence", Discussion Paper WSP/42, The Welfare State Programme, London School of Economics, April 1989.

Brueckner, J. "Property Values, Local Public Expenditure and Economic Efficiency", Journal of Public Economics, 1979, 11.

_____, "A Test for Allocative Efficiency in the Local Public Sector", Journal of Public Economics, 1982, 14.

Buchanan, J.M. and R.L. Faith, "Secession and the Limits to Taxation: Towards a Theory of Internal Exit", American Economic Review, 1987, 77.

Burtless, G. and J. Hausman, "The Effect of Taxation on Labor Supply: Evaluating the Gary Negative Income Tax Experiment", Journal of the Political Economy, December 1978, 86.

Central Statistical Office Regional Trends 1990, HMSO, 1990.

Chartered Institute of Public Finance and Accountancy (CIPFA), Finance and General Statistics 1989-90, CIPFA, London, 1989.

Coles, A. "How Often Do People Move House?", Housing Finance, October 1989.

Foster, C., R. Jackman, and M. Perlman, Local Government Finance in a Unitary State, George Allen and Unwin, 1980.

Gordon, J. "The Poll Tax as a Ratepayers' Revolt", ESRC TIDI Discussion Paper No. 133, London School of Economics, 1989.

Hamilton, B. "Capitalization of Intrajurisdictional Differences in Local Tax Prices", American Economic Review, 1976, 66:5.

HMSO Paying for Local Government, Cmnd. 9714, London:HMSO 1986.

Hughes, G.A. "Fiscal Federalsim in the U.K.", Oxford Review of Economic Policy, September 1987, 3:2.

King, D. "The Future Role of Grants in Local Government Finance", in <u>The Reform of Local Government Finance in Britain</u>, ed. S. Bailey and R. Paddison, Routledge, 1988a.

_____ "Accountability and Equity in British Local Authority Finance", University of Sterling Discussion Paper in Economics, Finance and Investment (March 1988b).

Miezkowski, P and G.R. Zodrow,. "Taxation and the Tiebout Model", <u>Journal of Economic Literature</u>, September 1989, XXVII:3.

Moffitt, R. "The Econometrics of Kinked Budget Constraints", <u>The Journal of Economic Perspectives</u>, Spring 1990, 4:2.

Mueller, D.C., <u>Public Choice II</u>, Cambridge University Press, 1989.

Oates, W. "The Effect of Property Taxes and Local Spending on Property Values: An Empirical Study of Tax Capitalization and the Tiebout Hypothesis", <u>Journal of Political Economy</u>, 1969.

Rubinfeld, D. "The Economics of the Public Sector", in <u>Handbook of Public Economics</u>, Eds. A. Auerbach and M. Feldstein, North-Holland, 1987.

Tiebout, C. "A Pure Theory of Local Expenditures", <u>Journal of Political Economy</u>, 1956, 64.

White, H. "A Heteroskedasticity-Consistent Covariance Matrix and a Direst Test for Hetroskedasticity", <u>Econometrica</u>, 1980, 48.

Yinger, J. "Capitalization and the Theory of Local Public Finance", <u>Journal of Political Economy</u>, 1982, 90:5.