

FISCAL POLICY AND THE EFFECTS
OF GOVERNMENT PURCHASES
'THE CASE OF THE UNITED KINGDOM'

By A.W. ROTE

INTRODUCTION

Seemingly little work has been done since Peacock and Stewart's¹ article to distinguish between the two impacts of the Government on the economy through its purchasing function. By using statistics of inter-industry relations in the United Kingdom, they were able to show that public expenditure distributed among industrial sectors had both 'primary' and 'secondary' effects. More recently it has been shown that a knowledge of these indirect impacts may be helpful, viewed together with the circumstances of the time, in achieving accepted fiscal objectives.²

In the following analysis all figures are confined to the United Kingdom Government expenditure on goods and services in 1963, transfer payments being ignored. A refinement on the Peacock + Stewart exposition is that we include both gross domestic capital formation and current expenditure.

THE SIZE OF GOVERNMENT SPENDING

In a recent article, Professor Peston³ demonstrated the extent to which the public sector lays claim to output in the U.K. economy. At this level public expenditure exerts a major influence upon the functioning of the whole economy, absorbing a great deal of production and directly affecting important economic variables. The legitimacy of this rise is not questioned here, we merely set out the increase as it appears in the National Income and Expenditure Accounts for 1968.

¹Peacock A.T. and Stewart I.G. 'Fiscal Policy and the Composition of Government Purchases' Public Finance Vol. 13 1958 pp. 135-144.

²Roskamp K. 'Fiscal Policy and Effects of Government Purchases' Public Finance Vol. I 1969 pp. 33-43 and Roskamp K. 'Fiscal Policy Objectives and Government Purchases by Industries: Towards an Input-Output Decision Model' Zeitschrift Fur Die Gesante Staatswissenschaft 125. Band 1 Heft Jan. 1969 pp. 82-88.

³Peston M. 'Public Expenditure' The Bankers Magazine pp. 295-301 May 1969.

Public expenditure on goods and services, from 1957 to 1967 grew faster than Gross National Product, rising from 22.9% of G.N.P. in 1957 to 27.4% in 1967. Whilst expenditure on current account grew as quickly as total public expenditure on goods and services, gross capital formation grew at a much higher rate. However, the higher figures in later years are partly attributable to larger quantities of goods and services being used by the public sector and partly attributable to rising prices. Expressed in real terms these figures would be more relevant, however 'conceptual difficulties of expressing statistics of public expenditures for past years at constant prices are such that (I) do not feel able to publish... figures revalued at constant prices'.⁴

Table I

	PUBLIC EXPENDITURE		CURRENT PRICES			
	MILLION £'S		% G.N.P.		% INCREASE	% ANNUAL INCREASE
	1957	1967	1957	1967	1957/67	1957/67
Current expenditure on goods and services	3,584	7,063	16	18	97	7.2
Gross domestic capital formation	1,474	3,640	6.7	9.2	147	9.4
Total goods and services	5,058	10,703	22.9	27.1	112	7.7
Total public expenditure	7,937	17,544	40	51	121	8.2
Gross National Product (Market Price)	22,092	39,503			79	5.9

Table I does not enable us to assess the public sectors importance in producing sectors output. By expressing public sector purchases, from each industry, as a proportion of all final expenditures on that industry's output this task becomes relatively simple. In this first step we are able to see how dependant various industrial groups are upon the public sector for their livelihood. It is this dependency which we wish to examine further.

It is common practise, in any analysis of Government expenditure, to

⁴House of Commons Debate 30 January 1968 c 268 Chancellor of the Exchequer.

Purchases by Sales by	Final Buyers											Total Intermediate Output (7)	Other Industry Trades and Water (6)	Gas Electricity and Water (5)	Building and Contracting (4)	Manufacturing (3)	Mining and Quarrying (2)	Agriculture and Forestry (1)	Total Final Demand (8-11)	Total Final 7+12
	Personal (8)	Government Goods and Services (Current)† (9)	Gross Domestic Capital Formation (10)	Exports (11)																
griculture, Fishing and Forestry	1,083	14	33	43	494	5	-	-	-	-	-	503	4	-	-	-	1,173	1,676		
ining and Quarrying	208	26	-2	51	374	1	1	52	374	1	198	810	39	345	-	-	283	1,095		
anufacturing	4,995	1,274	2,006	3,962	4,363	496	496	946	4,363	198	198	7,646	1,466	177	-	-	12,177	19,823		
uilding and ontraction	386	303	2,191	10	85	30	30	-	85	18	18	260	112	15	-	-	2,890	3,150		
as, Electricity and ater	653	81	158	4	418	16	16	9	418	28	28	716	236	9	-	-	896	1,612		
ther Industry and rades*	8,581	3,102	356	1,542	2,288	281	281	170	2,288	85	85	4,410	1,436	150	-	-	13,581	17,991		
ports	1,641	189	264	262	2,593	151	151	146	2,593	8	8	3,594	677	19	-	-	2,356	5,950		
ages	-	-	-	-	6,168	353	353	1,364	6,168	582	582	18,160	9,319	374	-	-	-	-		
rofits, etc.	-	-	-	-	2,706	600	600	408	2,706	151	151	8,609	4,290	454	-	-	-	-		
axes on Expenditure	2,648	91	112	-	334	19	55	69	334	19	19	637	412	69	-	-	-	-		
ess Subsidies	20,195	5,080	5,118	5,814	19,823	1,676	1,676	3,150	19,823	1,095	1,095	45,347	17,991	1,612	-	-	2,851	81,554		
otal Input	20,195	5,080	5,118	5,814	19,823	1,676	1,676	3,150	19,823	1,095	1,095	45,347	17,991	1,612	-	-	2,851	81,554		

Source: Input-Output transactions Matrix National Income and Expenditure 1968 (giving 1963 output)

* Transport, Communications, Distributive Trades, Financial and other Services, Public Administration and defence, Public Health and Education services and Ownership of Dwellings.

† Definition does not include current expenditure on goods and services of Public Corporations and other public enterprises.

confine itself to direct outlay,⁵ yet 'when the effects of public expenditure are analysed solely in terms of their 'primary impact' many questions have no answer.'⁶ For example, what is the effect of a given final demand upon intermediate production, and subsequently the requirements in terms of resources to satisfy this intermediate production?

APPLICATION OF THE LEONTIEFF MODEL TO THE UNITED KINGDOM IN 1963

The choice of 1963 stems from the availability of a composite input-output matrix as given in the National Income and Expenditure 1968; this, for our purposes, has been consolidated into a six sector matrix to be shown below. We consider the model to be short run, no substitution and no productivity changes, together with the assumption that average input coefficients are equal to marginal ones.

Table II shows the position of the public sector in the (consolidated) input-output table. The first impact of any change in Government expenditure on one of these sectors will be to cause some associated rise in incomes of those directly employed within this sector. There would, however, be secondary effects as these sectors step up their purchases of supplies. These two effects may be shown by converting table II into an input-output proportion matrix (i.e. by expressing each element in the six columns as a ratio of its own column total).

The structure of the economy can now be described by a technological matrix:

$$A = (a_{ij}) \quad \text{where } a_{ij} = \frac{X_{ij}}{X_i}$$

Where X_i ($i = 1, 2, \dots, 6$) is the total output of each sector.

Thus the inter industry must produce

$$a_{11}x_1 + a_{12}x_2 + \dots + a_{1n}x_n \text{ in order to satisfy all industries.}$$

The production of the economy must also be adjusted to fulfill both inter-industry needs and final demand (H).

In matrix notation

$$AX + H = X$$

$$(1 - A)X = H$$

hence

$$X = (1 - A)^{-1}H$$

⁵ See for example J.G. Williamson 'Public expenditure and revenue. An International comparison' - The Manchester School of Economic and Social Studies January 1961. Also Holmans A.E. 'The growth of Government expenditure since 1950'. The Manchester School of Economic and Social Studies 1968 and Peston M. op. cit.

As we wish to confine ourselves to an analysis of Government expenditure we must isolate those parts of final demand vector H, which corresponds to public expenditure. Government final demand being allocated between sectors as follows (millions of pounds).⁷

$$\begin{aligned} G_1 &= C_1 + I_1 = 33 \\ G_2 &= C_2 + I_2 = 15 \\ G_3 &= C_3 + I_3 = 1917 \\ G_4 &= C_4 + I_4 = 1397 \\ G_5 &= C_5 + I_5 = 237 \\ G_6 &= C_6 + I_6 = 3206 \\ G_{imp} &= C_{imp} + I_{imp} = 187 \end{aligned}$$

Using the values for the United Kingdom provided by the 'National Income and Expenditure' 1968.

1.0106769	.0112465	.0333004	.0103875	.0065117	.0038261	35	X_1
.0142694	1.0136754	.0324308	.0275753	.2228109	.0086262	15	X_2
.4236663	.2644410	1.328724	.4107380	.2191022	.1242904	1917	X_3
.0218564	.0190897	.0082371	1.0032521	.0151342	.0077827	1397	X_4
.0223089	.0334884	.0317162	.0139310	1.0189919	.0175006	237	X_5
.2420331	.1252375	.1791598	.1159881	.1513058	1.1059015	3206	X_6

Using this information we may estimate the necessary labour and capital requirements, effects on incomes and imports and the resulting expenditure deficit.

The affects upon labour and capital income can be found from the following equations, where K and B represent row vectors of capital and labour income respectively and G^* a column vector of Government final demand.

$$(1) G_k = K(1-A)^{-1} G^*$$

$$(2) G_B = L(1-A)^{-1} G^*$$

similarly if m represents a row vector of import requirements

$$(3) G_{imp} = m(1-A)^{-1} G^* \text{ will give us import requirements.}$$

The combined effect on factor incomes can be found by aggregating 1 and 2 such that

$$(4) \Delta Y = G_k + G_B$$

⁶ Brodersohn M.A. 'Fiscal policy and the composition of Government Purchases - the case of Argentina' Public Finance vol. 19 1964 p. 231.

⁷ Based on figures for gross capital formation by the public sector, supplied by the Central Statistical Office. These are estimates and therefore do not balance with those as shown in the National Income and Expenditure 1968.

More important perhaps is an analysis of the effects of such expenditure upon income distribution. If labour share in national income after Public expenditure is

$$(5) (i) S_1 = \frac{L_1}{L_1 + \pm I_1} \quad \begin{array}{l} L_1 = \text{Labour income after } G \\ \Pi_1 = \text{Capital income after } G \end{array}$$

It will be $S_2 = L_1 - G_B$ before G (5(ii))

$$(L_1 - G_B) + (\Pi_1 - G_k)$$

If $S_2 = \Delta S$ then if $\Delta S < 1$ labour share increases

$S_1 > 1$ labour share decreases

$= 1$ labour share remains constant

In addition the production of these goods and services will generate for the i th tax a yield of

$$(6) Gt_i = t_i(1-A)^{-1} G^* \text{ where } t_i = \text{row vector of the } i \text{ th tax}$$

Assuming m different taxes, total tax receipts will be

$$GT = \sum_{i=1}^m Gt_i$$

and the Budget deficit will be given by

$$(7) \Delta D = G - GT$$

EMPIRICAL ANALYSIS

Results from our inter-industry relationship as shown previously are presented below.

As can be seen from above, Government final demand generated domestic intermediate production of 3028 million pounds. Thus total domestic production for Government purchases amounted to 9832 million of which domestic inputs represented 31% and spending on domestic production of consumption and investment goods for Government activities 69%.

The impact of such purchases on the balance of payments may be seen from the 708 million pounds of imports induced. Total incidence of imports on the economy resulted in a level of 895 million pounds, 21% being that required to satisfy directly, public expenditures and 79% being to satisfy the intermediate requirements induced.

LABOUR AND CAPITAL

The generation of production will obviously call upon factors of production in the economy, the extent to which they do can be shown from

the above results. The table below indicates the extent of control of the public sector on capital in the United Kingdom at the end of 1963. Government gross capital stock represented 40.7% of the capital stock of the

Table IV

GROSS CAPITAL STOCK AT 1958 REPLACEMENT COST:
BY INDUSTRY AT THE END OF 1963⁸

£'000 MILLION					
INDUSTRY	TOTAL	PUBLIC	INDUSTRY	TOTAL	PUBLIC
Agriculture, forestry, fishing	0.8	-	Other transport	4.4	1.7
Mining and Quarrying	1.5	1.3	Post Office, radio etc.	2.2	2.2
Manufacturing (Excluding Textiles)	20.3	1.0	Distribution and other services	9.6	-
Construction	1.0	-	Dwellings	29.4	9.4
Gas, electricity, water	8.8	8.4	Roads	2.2	2.2
Railways	5.5	5.5	Other Industry & services	11.0	7.7
				96.7	39.4

economy. In order to estimate the requirements of capital for intermediate production generated by Government final demand the ratio of capital/production (x) can be calculated.

$$x_1 = \frac{k_1}{P_1} = .473 \quad x_2 = \frac{k_2}{P_2} = .1826 \quad x_3 = \frac{k_3}{P_3} = .9736$$

$$x_4 = \frac{k_4}{P_4} = .3175 \quad x_5 = \frac{k_5}{P_5} = .2481 \quad x_6 = \frac{k_6}{P_6} = 1.9788$$

Where P_1 = output of the agricultural sector and K_1 = total private capital of the agricultural sector. Other symbols representing, respectively, the industrial sectors as shown in the previous table.

Hence indirect requirements are represented by:

$$k_i^g = xiP_i^g$$

K_i^g = indirect requirement of capital used by the i th sector to produce inputs necessary to satisfy government final demand.

P_i^g = Government final demand for produce of the i th sector.

xi = ratio of total private capital and output of the i th sector.

⁸ Calculated from Table 66 National Income & Expenditure 1968. Figures for public sector capital stock being supplied by the Central Statistical Office.

Table III

(£'s million)										
PURCHASES SALES	AGRICULTURE FORESTRY FISHING	MINING & QUARRYING	MANUFACTURING	CONSTRUCTION	GAS ELECTRICITY WATER	OTHER INDUSTRY TRADE	TOTAL INTERMEDIATE OUTPUT	FINAL DEMAND	TOTAL OUTPUT	
Agriculture, fishing, forestry	-	.9	89.4	-	-	.9	91.2	33	124.2	
Mining, Quarrying	.1	.2	67.7	23.9	81.1	8.8	181.8	15	196.8	
Manufacturing	36.7	35.6	790.0	434.5	41.6	333.9	1672.3	1917	3598.3	
Construction	2.2	3.2	15.4	-	35	25.6	49.9	1397	1446.9	
Gas, electricity, water	1.2	5.0	75.7	4.1	2.2	53.7	141.9	237	378.9	
Other industry & trade	20.8	15.3	414.3	78.1	35.2	327	890.7	3206	4096.7	
Imports	11.2	1.5	469.5	67.1	4.5	154.2	708.0	187	895	
Wages	26.2	104.6	1116.8	626.5	87.9	2122	4084.0	-	4084	
Profit etc.	44.4	27.1	490.0	187.4	106.7	976.8	832.4	-	1832.4	
Taxes on expenditure less subsidies	18.6	3.4	60.5	25.3	16.2	93.8	180.6	-	180.6	
Total Sales	124.2	196.8	3589.3	1446.9	378.9	4096.7	9832.8	6992	16824.8	

Table V

CAPITAL REQUIREMENTS FOR THE PUBLIC SECTOR AT 1958 REPLACEMENT COST FOR 1963

MILLION POUNDS			
INDUSTRY	INDIRECT	DIRECT	TOTAL
Agriculture	59.2840	-	59.2840
Mining & Quarrying	35.9452	1,300	1335.9452
Manufacturing	3494.6017	1,000	4494.6017
Construction	459.3333	-	459.3333
Gas, electricity, water	94.0198	8,400	8494.0198
Other industry & trade	8106.4154	28,700	36806.4154
	11790.2661	39,400	51190.2661

Of the total requirements of capital, 77% represents capital used directly to satisfy Government needs and 23% to satisfy intermediate production generated by the former.

In the same way the indirect and direct labour requirements can be calculated by using the labour/production ratio. The results obtained are presented below.

Table VI

LABOUR REQUIREMENTS FOR THE PUBLIC SECTOR IN 1963

INDUSTRY	INDIRECT	DIRECT*	TOTAL
Agriculture, forestry & fishing	40,832	15,000	55,832
Mining and quarrying	13,479	611,000	624,479
Manufacturing	1,548,670	201,000	1,749,670
Construction	659,143	147,000	806,143
Gas, electricity, water	4,231	386,000†	390,231
Other industry and trade	1,593,047	4,031,000	5,624,047
TOTAL	3,859,402	5,391,000	9,250,402

Source * Economic Trends No. 180 October 1968 Table 2

† Central Statistical Office

Indirect labour requirements represent 41.7% of the total requirements of the public sector, total control of employment being 40% of total employment of the United Kingdom. Analysis of this kind could be expanded such that the capital labour relation for each product could be compared when several projects are to be evaluated.

We have so far assessed only the quantitative aspects of employment generation, we are also able to make some quantitative judgement on both the size and distribution of the increments of income due to the public sector expenditure. Capital and labour income in the period under analysis was raised by 1832.4 million and 4,084 million pounds respectively as a result of Government expenditure. The implications for income distribution being shown by making use of:

$$\text{Labour share after } G = L_1 = 67.83\% = S_1$$

$$L_1 + \Pi_1$$

$$\text{Labour share before } G = \frac{L_1 - G_B}{(L_1 - G_B) + (\Pi_1 - G_K)} = 61.5\% = S_2$$

The consequence of the given level of public expenditures was therefore to raise labour's share in national income; that is $\frac{S_2}{S_1} = \Delta S < 1$. Such a method of being able to quantify the effect of alternate spending programmes upon labour income could be proved to be invaluable, in the context of a regional model, for those expenditures based in the so called 'Development' areas.

TAX AND EXPENDITURE RELATIONSHIPS

Table VII

STRUCTURAL CHARACTERISTICS OF U.K. INDUSTRY 1963⁹

INDUSTRY	INCOME TAX		PROFITS TAX [⊕]	TAXES ON EXPENDITURE LESS SUBSIDIES	TOTAL
	SCHEDULE E*†	SCHEDULE D†			
Agriculture, forestry & fishing	17.10	34.30	2	-252	-198.60
Mining & Quarrying	39.80	5.70	3	19	67.50
Manufacturing	596.33	550.60	234	334	1714.93
Construction	104.76	49.10	17	55	225.86
Gas, electricity, water	29.53	1.90	-	69	100.43
Other industry & trade	746.69	535.30	176	412	1869.99

Source * Report of the Inland Revenue 111th Report up to the 31st March 1968 Table 43 January 1969.

† Inland Revenue Authorities.

⊕ Report of the Inland Revenue 108th Report up to the 31st March 1965 Table 86 February 1966.

⁹ This does not give a complete picture as both surtax and schedule A cannot be apportioned to any individual sector. Figures also exclude those payments by Nationalised Industries.

Following (6) and using tax coefficients calculated from Table VII we can ascertain the amount of tax revenue created by Government expenditure in 1963, and from this we are then able to calculate the budget deficit.

Equation 6 gives a tax feed back of £1046.2, this being compared with a domestic expenditure of £6805 million. Thus a budget deficit of £5758.8 exists. That is 15.37% of domestic expenditure is recouped through the tax system.

CONCLUSION

Obviously the analysis above would have to be extended and refined in order for policy decisions to be based upon it. In times when the Government is assessing its position as an important purchaser in the industrial field the possibility of being able to trace direct and indirect tax feed back effects on the budget, income effects, income distribution effects, employment effects and balance of payments effects, should be useful if only for short run policy decisions. The indirect requirements shown previously would have been ignored with the conventional approach if only the direct impact had been considered. As Peacock & Stewart stated 'multiplier effects produced by expenditure on goods and services in the usual fiscal policy models can only be produced by a change in the amount of expenditures, because it is usual to assume that the national output is an homogenous entity. We must cease thinking in terms of a one-commodity world'.¹⁰

LAURENT ROPA

par F. CUNEN

1. ACTUALITE

Il faut du courage, du génie ou le sens du paradoxe pour oser de nos jours prendre parti contre la contestation. Quelques solitaires, tel Louis Pauwels, ont l'audace de contester le désordre, le pessimisme, et de prétendre donner ingénument à une génération jeune (mérite-t-elle ce qualificatif?) une recette infallible, celle du bonheur, d'un bonheur effrontément décomplexé. A nos 'jeunes' intoxiqués par une des plus vastes campagnes de démoralisation que l'Occident ait connues, semant la sinistrose et la névrose, certains rares auteurs opposent, au risque de se faire passer pour ingénus ou fascistes, un optimisme qui soutient résolument la civilisation occidentale.

Il n'en était guère autrement entre les deux guerres, en cette époque de marasme littéraire et philosophique. Et il ne fallait pas moins de courage à de rares isolés, comme Laurent Ropa, pour combattre la médiocrité et viser à l'Absolu. On ne peut évidemment s'attendre à ce que la période postérieure, soit les années 1945 à 1970, ait réhabilité ces poètes ou romanciers, modestes et vaillants qui refusaient le sensationnel et la mode, étant donné que le vertige de l'auto-critique et du pessimisme qui n'avait pu les entraîner n'a cessé de se faire sentir toujours davantage sur l'Occident d'après-guerre, penchant un nombre toujours croissant d'esprits au-dessus d'un abîme d'auto-destruction. Faudra-t-il que les événements que ces prophètes de malheur auront bien contribué à provoquer se soient produits? Faudra-t-il qu'au terme d'une longue nuit, celle de la conquête, pacifique ou non, d'un Occident démoralisé par un Orient resté vert et lucide, les forces purifiées de l'Occident se trempent dans le creuset de l'épreuve? Est-ce alors seulement que l'on pourra rendre hommage aux tenants de la clarté, aux amis de la simplicité, aux disciples d'un classicisme modeste mais sûr de lui?

Il est une autre raison qui explique l'obscurité de Ropa. Comment un nom pouvait-il émerger de cette liste très chargée, de poètes de l'époque contemporaine, s'il se vouait volontairement à la modestie? Ceux d'ailleurs qu'on eût pu croire illustres avant la guerre, qui s'en souvient aujourd'hui? A condition, bien entendu, qu'ils n'appartiennent pas à des Ecoles qui alors déjà vouaient toutes leurs forces vives à la négation de la Vie, et leurs richesses positives au négativisme, tels les Surréalistes.

¹⁰ Op. Cit. p. 136.