THE ECONOMIC AND SOCIAL RESEARCH INSTITUTE

Memorandum Series No. 159.

IRISH 1982 PRELIMINARY INPUT-OUTPUT STRUCTURES, WITH DERIVED MULTIPLIERS FOR EMPLOYMENT, GNP AND IMPORTS, AND SOME COMPARISONS WITH 1978

E.W. Henry

30 September 1983

Price IR£4

NOT CONFIDENTIAL

CONTENTS

TABLES

CONTENTS

1. INTRODUCTION

This Memorandum has as its first objective the updating to 1982 of various Irish input-output (I-O) results relating to 1978 and published in the Henry (1983) ESRI Memorandum No. 157. Underlying the increasing values of GDP at Current Market Prices there has been an implicit price inflation of 76 per cent between 1978 and 1982, as revealed by the data of tables 3(a) and 3(b) of Economic Review and Outlook Summer 1983. This severe price inflation alone could cause distortions and changes in the existing 1978 I-O results, thus making them less relevant to 1982 and later years. Thus a second objective closely allied to the first is to see how various coefficients and multipliers might have changed between 1978 and 1982. If we find consistency of size for some multipliers and coefficients in the face of the 76 per cent average price inflation mentioned above, then their credibility as predictors for future years, or for hypothetical economic structures, is enhanced.

Readers will appreciate that at the time of writing (September 1983) there is considerable scarcity of data for 1982. For instance, it may be a further four years before the detailed outputs and inputs of Manufacturing industries become available from the Central Statistics Office (CSO). Many annual reports of major sectors (such as the ESB) are not yet available for 1982. A fairly brief account of 1982 data sources and methods used will appear in Part 2 below, which describes the 1982 estimated transactions. In view of the 1982 scarcity of data and necessity to fill gaps by making reasonable estimates, one may ask whether the resulting 1982 figures and multipliers appearing in tables 1-10 below merit serious consideration as indicators of changes in economic structure since 1978 and results of Memo.No. 157? The answer is Yes, in the light of "holistic accuracy", a term used by Australian I-O practitioners and outlined by Jensen and West (1982) in the following quotation:

"A second important point refers to the question of the accuracy of both input-output tables and multipliers. The GRIT system rests on a notion of holistic accuracy (Jensen, 1980) which attempts to ensure accuracy of the table as a whole and concentrates research resources on those elements of the table with more influence on the various multipliers. This notion suggests that certain cells in the input-output table are insignificant in an operational sense and do not warrant the attention of expensive research resources. This means that multipliers discussed later in this paper should not be attributed the degree of accuracy suggested by the precision of their expression. Such a caveat should, presumably, accompany all economic research". (page 7)

At the holistic or macro-level, the data inputs to tables 1-10 include detailed factual exports and imports for 1982, together with first-estimate totals and subtotals of GNP components, by sector of origin and on the expenditure side (via Economic Review and Outlook Summer 1983). Sector outputs for 1982 are in some cases a combination of observed volume and wholesale price changes since 1978; they include factual 1982 output and cost data for agriculture as released by CSO (August 1982(2)). Thus there is a considerable input of actual or estimated 1982 data used in getting tables 1 and 2 below as projections of the 1978 tables 1 and 4 of ESRI Memo. No. 157; a major lack for 1982 is the absence of detailed independent industrial and service cost (or input) data. What all this amounts to is that important sectors and transactions of the 1982 tables will not change much, even when 1982 detailed data become available; a significant unchanged element will be the scale of operations, which incorporates the 76 per cent price inflation since 1978, and the various GNP components, which should not change significantly. What emerges is that we may take the estimated 1982 transactions and derived multipliers seriously; where large changes or close similarities are indicated for 1982 by reference to 1978, such changes or similarities are extremely likely to reoccur in future revised 1982 transactions.

This Memorandum follows closely the layout and treatment of 1978 etc. data appearing in ESRI Memo. No. 157. For methodology and discussion of the qualified uses of multipliers see Part 2 of that Memo. Thus treatment below can be brief, (i) in view of the basics being explained in Memo. No. 157; (ii) because it still is a fact that 1982 data are inadequate to permit detailed comparisons with 1978 results. A more complete study of 1982 would be worthwhile in perhaps 1987, when complete CSO industrial data become available.

The present Memorandum has 10 tables. Parts 2 to 6 follow. Part 2 describes the basic 1982 estimated transactions, as given in tables 1 and 2. Part 3 presents and discusses partial multipliers for GNP and its components, as set out in tables 3 to 5. Part 4 has analogous treatment of complete multipliers, shown in tables 6 and 7, with some comparisons with 1978. Part 5 discusses an employment analysis of 1982 and makes comparisons with 1978; the data appear in tables 8 to 10. Part 6 lists major findings and conclusions arising from the data and discussion of previous sections of the Memorandum.

2. DESCRIPTION OF 1982 TRANSACTIONS

The 1982 study is based on a transactions table of 22 inter-industry sectors, shown as Table 1, followed by a table of transactions of 26 balancing rows and columns, namely Table 2, thus permitting a 23-sector model for 1982 corresponding to that of 1978 given in ESRI Memo. No. 157. Because of data limitations already referred to above, these 1982 transactions are not of the same quality as the 1978 transactions of Memo. No. 157. However, the 1982 imports (derived from CSO Trade Statistics of Ireland, December 1982) have been allocated to purchasing sectors via 13 kinds of similar imports and 16 kinds of complimentary imports, as was done for 1978. In attempting a detailed allocation of inputs to the 15 categories of household expenditure, as was done for 1978, the control total for each category was estimated by projecting 1981 totals (shown in Table A11 of National Income and Expenditure 1981) to 1982 and using the 1978 detail (Table 3 of ESRI

TABLE 1: Ireland, 1982 22-sector estimated transactions at producer prices

£ million current

Source of Inputs		Solid fuel	Oil refining	Gas	Electricity	Stone,ores, gravel	Agric.fr. fishing	Food	Drink & Tobacco	Textiles	Clothing + footwear	Wood + furniture	Sectors	Paper + Printing	Chemicals, rubber, plastics	Clay,cement, glass	Metal, engineering, vehicles	Other manufact-uring	Construction new + repair	Transport, purchased	Trade marg. + services	Materials for repair	Packaging	Residual business current expenditure	Sectors	Personal consumption (except Tourist)	Net Govt. current Expend.	Increases in Stocks	Gross Fixed Capital Formation	Exports including Tourist	TOTAL OUTPUT	Sectors
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)								
Solid fuel	(1)	1			40								(1)								3				(1)	19				11	73	(1)
Oil refining	(2)			10			13	2	1				(2)		1	1	1		1	11	5			13	(2)	21				32	113	(2)
Gas	(3)				35								(3)								5			11	(3)	41					92	(3)
Electricity	(4)			1		16	33	30	6	9	2	3	(4)	7	25	15	30	3	9		64			39	(4)	278					570	(4)
Stone, ores, gravel	(5)					10	9						(5)			12			72			3			(5)	7				93	206	(5)
Agricult.,fr., fish.	(6)						24	1550	67			3	(6)								2				(6)	225		13	20	301	2205	(6)
Food	(7)						247	809	12	9	16		(7)								18				(7)	749				1684	3544	(7)
Drink & Tobacco	(8)							30	62				(8)												(8)	317				186	595	(8)
Textiles	(9)									9	8	1	(9)												(9)	61				308	387	(9)
Clothing + footwear	(10)										2		(10)												(10)	52				168	222	(10)
Wood + furniture	(11)											21	(11)						29						(11)	20			15	46	131	(11)
Sectors		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)		Pers	Gov.	Stock	Cap.	Exp.	TOTAL	
Paper + printing	(12)												(12)	64							20		49	155	(12)	33				69	390	(12)
Chemicals,rubber,plastics	(13)						58	4			3		(13)		43		43				5	13	30	13	(13)	22				924	1158	(13)
Clay,cement,glass	(14)					9							(14)			89			242		2		8		(14)	42				84	476	(14)
Metal,eng.,veh.	(15)			2			51			3	1	1	(15)	2	7	7	128		116	50	23	13	20	14	(15)	134			197	1952	2721	(15)
Other manufact.	(16)												(16)					32							(16)	203				131	366	(16)
Construction	(17)				7	4		13	4				(17)						336	17	20				(17)	30	141		1792		2364	(17)
Transport	(18)						44						(18)						109		17			15	(18)	204			31	412	832	(18)
Trade marg. + services	(19)	1		4		2	326	89	9	36	8	8	(19)	15	53	66	195	1	151	3	39	13		66	(19)	2249	2541		94	257	6226	(19)
Mat. for repair	(20)	4		1	21	10	4	21	7	5	1	1	(20)	3	56	14	38		25		14				(20)						225	(20)
Packaging	(21)	2						98	60	5	3	1	(21)	3	38	6	25	1			4				(21)	1					247	(21)
Resid. bus, curr, exp.	(22)	1	2	10	21	55	90	269	123	68	30	20	(22)	60	284	71	503	4	100	50	40				(22)						1801	(22)
Sectors		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)		Pers.	Gov.	Stock	Cap.	Exp.	TOTAL	
Imports: Coal								1					Coal			1	1				5				Coal	80					88	Coal
Crude oil			92										Crude												Crude						92	Crude
Refined + LPG		2	6	10	181	5	14	24	7	2		2	Refined	2	10	14	10		71	146	20			103	Refined	255		-54			830	Refined
Other imports (incl. lubric oil)		nil	9	2	nil	16	212	296	60	150	78	32	Oth.Imp.	93	368	48	941	80	199	nil	11	180	140	500	Other imp	1850	nil	35	943	27	6270	Other imp
Indirect taxes		1			1	3	39	5	3				tax	1	1	3	81		10	25	321	3		969	tax	789			85	59	2399	tax
less Subsidies							-93	-94					sub											-97	sub	-192				-371	-847	sub
Wages + salaries		34	2	26	116	53	90	277	123	74	59	31	wage	114	156	99	552	242	810	421	3989				wage					13	7281	wage
Profits		23	1	24	63	15	837	74	34	11	7	5	Prof	18	77	20	116	1	56	50	1044				Prof.					-653	1823	Prof.
Depreciation		4	1	2	85	8	207	46	17	6	4	2	Depr	8	39	10	57	2	28	59	555				Depr.						1140	Depr.
TOTAL INPUT		73	113	92	570	206	2205	3544	595	387	222	131	TOTAL	390	1158	476	2721	366	2364	832	6226	225	247	1801	TOTAL	7490	2682	-6	3177	5733		TOTAL
Sectors		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)		Pers.	Gov.	Stock	Cap.	Exp.	TOTAL	
Employment (000)		8.6	0.45	2.0	11.2	6.7	192.2	41.5	9.9	21.6	14.5	7.0	Empl	13.9	18.5	13.6	60.9	15.8	95.1	42.5	570.1				Empl						1146.05	Empl
Total Imports		2	107	12	181	21	226	321	67	152	78	34	Imports	95	378	63	952	80	270	146	36	180	140	603	Imports	2185	nil	-19	943	27	7280	Imports

Memo. No. 157) as framework. Thus and similarly 1981 available data (e.g. Electricity Supply Board Annual Report) were projected to 1982, with some allowance for price increases, where 1982 direct estimates were not available. For a reasonably adequate description of how to make a table such as the 1982 Table 1 (under considerable data limitation) see Appendix 1 of the Henry (1980) study of 1976, with its list of Background References of typical data sources.

The present Memo. shows two tables of transactions, namely tables 1 and 2. They form the basis of the multipliers to be developed and discussed in further sections of this Memo. They are at producer or c.i.f. prices, known more recently as "approximate basic values" and described in ESRI Memo. No. 157 (page 14). All imports are allocated directly to purchasing sectors. All entries are rounded to the nearest £million, thus entries smaller than £0.5 million are excluded from the transactions.

Table 1: 22-Sector Transactions

This table is fairly typical of previous work by the writer to enable partial multipliers to be calculated; the same tabular design appears in Table 1 of ESRI Memo. No. 157. There are 22 rows of output balanced by 22 columns of input, each row total being equalled by the corresponding column total. These 22 rows and columns are the "interindustry" part of the table. Byproducts and "final buyers" are included as parts of rows producing main products or similar items.

The first four rows show estimated sales of domestically produced energy products. There are also three rows for energy imports. Because of lack of firm data for 1982, the entries along these rows are to be regarded as tentative estimates. The rest of imports appears in a single row of Table 1, with total imports of goods and services distributed along the bottom row. The £2,185m. appearing in the Personal consumption column takes account of CSO 1982 estimate of £1,786m. of "consumption goods ready for use" (Table 19 of

Economic Review and Outlook Summer 1983) plus an estimated 1982 expenditure abroad by Irish residents amounting to £354m. (estimate made by this writer). Likewise the £943m. of imports allocated to capital formation is based on the same Table 19.

There is a row for employment, showing the total 1146.05 thousand persons or manyears distributed among the 19 real-life sectors. These 1982 estimates were derived from 1978 corresponding entries via employment changes based on quarterly or monthly industrial data published in the Irish Statistical Bulletin or issued through the Government Information Services. Control totals for major economic grouped activity appeared as annual employment levels in Table 10 of the Economic Review and Outlook, Summer 1983. In summary, the 1982 employment estimates shown in Table 1 were derived from 1978 basic data, modified by changes derived from available data for 1978-1982, where direct 1982 amounts are not yet available.

Artificial sectors (20) to (22) are as explained on page 15 of Memo. No. 157. In general their 1982 output levels are based on 1978 estimates scaled up for volume and likely price changes since 1978 i.e. generally by scaling up corresponding rows of the 1978 Table 1, but with later modification to allow for changes in other inputs in each column.

The remaining rows, of "primary input", have as control totals for 1982 the National Accounts estimates shown in the first few tables of Economic Review and Outlook Summer 1983, thus they aggregate to GNP by sector of origin, apart from imports. The other columns (starting with Personal) are usually described as "final demand". Their column totals are again taken from the same 1982 National Accounts sources and aggregate to GNP expenditure, after deduction of total imports. The export column has made use of the detailed export statistics appearing in Trade Statistics of Ireland, December 1982.

Table 2: Ireland 1982 estimated transactions at producer prices, for which each of 26 rows is matched by a corresponding column, £ million

Source of Inputs		Solid Fuel	Oil Refining	Gas	Electricity	Stone, Ores, Gravel	Agriculture, Forestry, Fishing	Food	Drink and Tobacco	Textiles	Clothing and Footwear	Wood and Furniture	Sectors	Paper and Printing	Chemicals, Rubber, Plastics	Clay, Cement, Glass	Metal, Engineering, Vehicles	Other Manufacturing	Construction, New and Repair	Transport Purchased	Trade Margin and Services	Materials for Repair	Packaging	Residual business current expenditure	Sectors	Household expenditure and Savings	Government Expenditure Transfers & Savings	Capital Formation	Exports	Total Output	Sectors
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)		(23)	(24)	(25)	(26)		
Solid fuel	(1)				40								(1)								3				(1)	19			11	73	(1)
Oil refining	(2)	1		10			13	2	1				(2)		1	1	1		1	11	5			13	(2)	21			32	113	(2)
Gas	(3)				35								(3)								5			11	(3)	41				92	(3)
Electricity	(4)			1		16	33	30	6	9	2	3	(4)	7	25	15	30	3	9		64			39	(4)	278				570	(4)
Stone, ores, gravel	(5)					10	9						(5)			12			72			3			(5)	7			93	206	(5)
Agric., for., fish.	(6)						24	1550	67			3	(6)								2				(6)	225		33	301	2205	(6)
Food	(7)						247	809	12	9	16		(7)								18				(7)	749			1684	3544	(7)
Drink, tobacco	(8)							30	62				(8)												(8)	317			186	595	(8)
Textiles	(9)									9	8	1	(9)												(9)	61			308	387	(9)
Clothing, footwear	(10)										2		(10)												(10)	52			168	222	(10)
Wood, furniture	(11)											21	(11)						29						(11)	20		15	46	131	(11)
Sectors		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)		(23)	(24)	(25)	(26)	Total	
Paper, printing	(12)												(12)	64							20		49	155	(12)	33			69	390	(12)
Chem. rubber, plastic	(13)						55	4			3		(13)		43		43				5	13	30	13	(13)	22			924	1158	(13)
Clay, cement, glass	(14)					9							(14)			89			242		2		8		(14)	42			84	476	(14)
Metal, eng. veh.	(15)			2			51			3	1	1	(15)	2	7	7	128		116	50	23	13	20	14	(15)	134		197	1952	2721	(15)
Other manufacturing	(16)												(16)					32							(16)	203			131	366	(16)
Construction	(17)				7	4		13	4				(17)						336	17	20				(17)	30	141	1792		2364	(17)
Transport	(18)						44						(18)						109		17			15	(18)	204		31	412	832	(18)
Trade marg. & serv.	(19)	1		4		2	326	89	9	36	8	8	(19)	15	53	66	195	1	151	3	39	13		66	(19)	2249	2541	94	257	6226	(19)
Mats. for repair	(20)	4		1	21	10	4	21	7	5	1	1	(20)	3	56	14	38		25		14				(20)					225	(20)
Packaging	(21)	2						98	60	5	3	1	(21)	3	38	6	25	1			4				(21)	1				247	(21)
Resid. bus. curr. exp.	(22)	1	2	10	21	55	90	269	123	68	30	20	(22)	60	284	71	503	4	100	50	40				(22)					1801	(22)
Sectors		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)		(23)	(24)	(25)	(26)	Total	
Household income	(23)	27	2	21	90	40	842	214	95	57	45	24	(23)	88	124	76	422	181	538	281	2785				(23)		2642		855	9449	(23)
Govt. income	(24)	18		15	56	24	31	11	48	23	19	10	(24)	37	65	37	273	61	262	162	1962	3		872	(24)	597		85	-12	4659	(24)
Savings	(25)	5	1	4	87	9	207	50	19	7	4	2	(25)	9	46	11	64	2	29	62	563				(25)	1959	-1010		1041	3171	(25)
Imports	(26)	14	108	24	213	27	226	354	82	156	80	36	(26)	102	416	71	999	81	345	196	635	180	140	603	(26)	2185	345	924	27	8569	(26)
TOTAL INPUT		73	113	92	570	206	2205	3544	595	387	222	131	TOTAL	390	1158	476	2721	366	2364	832	6226	225	247	1801	Total	9449	4659	3171	8569		Total
Employment (000)		8.6	0.45	2.0	11.2	6.7	192.2	41.5	9.9	21.6	14.5	7.0	Empl.	13.9	18.5	13.6	60.9	15.8	95.1	42.5	570.1				Empl.					1146.05	Empl.
Sectors		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)		(23)	(24)	(25)	(26)	Total	

One could at this stage use the Table 1 22-sector inter-industry and primary inputs as described, in order to calculate an A-matrix and inverse $(I-A)^{-1}$ etc., so as to produce partial multipliers for the primary inputs as defined. This is not done, but the primary inputs are first re-worked, as will be mentioned below for Table 2. In any event Table 1 is available to readers for partial multiplier analysis, via application of primary input coefficients to the 22-sector inverse $(1-A)^{-1}$ shown below as the upper part of Table 4; this inverse is precisely the same as that to be derived from Table 1.

Table 2: Transactions for 26 rows matched by 26 columns

In order to get from Table 1 transactions to those of Table 2, a considerable amount of work is required, mostly on the Table 1 primary input rows. A summary of this work for 1978 appeared in Appendix 1 of ESRI Memo. No. 157. Similar work has been done by the writer for 1982, using 1982 data where available, otherwise details shown for 1981 in National Income and Expenditure 1981 projected to 1982 through 1981-1982 changes shown in either Budget 1982 or Estimates for Public Services for the Year Ending 31 December 1982.

Table 1 has 22 matching rows and columns, whereas Table 2 has 26 matching rows and columns, corresponding exactly to the design of Table 4 of ESRI Memo. No. 157. Table 2 has a household income row (23) matched by a household expenditure and saving column (23). Row and column (24) make an analogous statement for government. Row (25) shows savings, matched by column (25) capital formation. Row (26) shows imports and column (26) exports. Table 2 totals for rows and columns (1) to (22) are identical with corresponding Table 1 totals.

One main purpose of compiling Table 2 is to enable a household row and column to be brought into the inverse $(I-A)^{-1}$ matrix, thus enabling "complete" multipliers to be calculated. A further purpose is that the derived 23-sector

model will include households as a sector and thus enable the full "direct plus indirect plus induced" effects to be found of structural changes to final demand. Three noticeable features of Table 2 deserve mention:

(a) There is a balance of payments deficit of £1,041 million, shown as a savings row (25) entry in the exports column (26); put otherwise, all incomings and credits from abroad are £1,041 million short of all outpayments and debits. This debit agrees exactly with that shown for 1982 as the net balance on current account in Table 23 of Economic Review and Outlook Summer 1983.

(b) The Government is in debt on current account to the extent of £1,010 million, shown as a negative entry in row (25) of column (24).

(c) Table 2 row (26) imports, valued at £8,569 million, are £1,289 million greater than the aggregate of the total import row of Table 1, namely £7,280 million. This extra £1,289 million is a gross outflow of profits and investment income not shown gross in Table 1, but shown (net of corresponding inflows) as -653 £million in Table 1 export column, profits row, and £13m. in the wage row. Thus in showing this extra £1,289 million outflow of Table 2, it has been distributed as £345m. in government column (24) for national debt interest paid abroad and £944m. among likely sectors in proportion to Table 1 profits and added to Table 1 imports, with in effect, Table 1 profits reduced accordingly. One example will help to clarify: Table 1 food column (7) total imports show the value £321 million, whereas corresponding Table 2 imports show £354 million i.e., an outflow of an estimated £33m. of profits and dividends has been allocated to the 1978 food sector (7). The distribution of this £944 million among likely sectors as a share of profits is not a fully satisfactory method of allocating it; but short of exact information seems a reasonable method of estimation.

Table 2 rows (23), (24) and (25) aggregate to GNP by Sector of Origin for each of columns (1) to (22). Thus these rows of Table 2 correspond to Table 1 primary input rows: indirect taxes, negative subsidies, wages etc., profits, depreciation; the sum of entries in those Table 1 rows gives GDP by Sector of Origin for each of columns (1) to (22) of Table 1. The contrast between Table 1 GDP and Table 2 GNP is that the latter is net of estimated outflows of profits and dividends at the sectoral level (i.e., in each column) whereas Table 1 does not subtract these outflows from its profits, at the level of detail of individual columns.

3. PARTIAL 1982 MULTIPLIERS FOR GNP AND ITS COMPONENTS

This section discusses the calculation of partial multipliers for GNP and its components via a 22-sector inverse derived from the transactions of Table 2. The numerical results appear in tables 3-5. Only a very brief discussion is required, in view of the fairly lengthy treatment appearing in the Methodology section of Memo. No. 157 and the background sources and references quoted in that section.

Table 3 shows the 1982 direct input coefficients derived from Table 2, for columns (1) to (23). Direct employment coefficients are also shown, in manyears per £million total output (which is the same as total input). The sum of entries in rows (23), (24) and (25) shows the direct input coefficient for GNP, in each column.

Table 4 shows the 1982 22-sector $(I-A)^{-1}$ inverse derived from Table 3, together with partial multipliers of the Keynesian type for rows (23) to (26) and employment. The inverse $(I-A)^{-1}$ itself occupies the upper 22 rows of Table 4. For any column, say food column (7), the entries of these 22 rows give the amounts required by, or associated with, one unit of final demand for food directly and indirectly. The row (6) entry shows 0.6143 required (upstream) from agriculture

TABLE 3: Ireland, 1982 direct input coefficients derived from Table 2 columns (1) to (23)

Source of Inputs	Solid fuel (1)	Oil refining (2)	Gas (3)	Electricity (4)	Stone, ores gravel (5)	Agriculture, forestry, fishing (6)	Food (7)	Drink & tobacco (8)	Textiles (9)	Clothing and footwear (10)	Wood and furniture (11)	Sectors	Paper & Printing (12)	Chemicals rubber, plast., (13)	Clay, cement glass (14)	Metal, engin., vehicles (15)	Other manufacturing (16)	Construction, new & repair (17)	Transport, purchased (18)	Trade margin and services (19)	Materials for repair (20)	Packaging (21)	Residual business current expenditure (22)	Sectors	Household expend. and savings (23)
Solid fuel (1)				.0702								(1)								.0005				(1)	.0020
Oil refining (2)	.0137		.1087			.0059	.0006	.0017				(2)		.0009	.0021	.0004		.0004	.0132	.0008			.0072	(2)	.0022
Gas (3)				.0614								(3)								.0008			.0061	(3)	.0043
Electricity (4)			.0109		.0777	.0150	.0085	.0101	.0233	.0090	.0229	(4)	.0179	.0216	.0315	.0110	.0082	.0038		.0103			.0217	(4)	.0294
Stone, ores, gravel (5)					.0485	.0041						(5)			.0252			.0305			.0133			(5)	.0007
Agric., for., fish. (6)						.0109	.4374	.1126			.0229	(6)								.0003				(6)	.0238
Food (7)						.1120	.2283	.0202	.0233	.0721		(7)								.0029				(7)	.0793
Drink, tobacco (8)							.0085	.1042				(8)												(8)	.0335
Textiles (9)									.0233	.0360	.0076	(9)												(9)	.0065
Clothing, footwear (10)										.0090		(10)												(10)	.0055
Wood, furniture (11)											.1603	(11)						.0123						(11)	.0021
Sectors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	sect.	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	sect.	(23)
Paper, printing (12)												(12)	.1641							.0032		.1984	.0861	(12)	.0035
Chemicals, rubber, plastics, (13)						.0263	.0011			.0135		(13)		.0371		.0158				.0008	.0578	.1215	.0072	(13)	.0023
Clay, cement, glass (14)					.0437							(14)			.1870			.1024		.0003		.0324		(14)	.0044
Metal, eng., veh. (15)			.0217			.0231			.0078	.0045	.0076	(15)	.0051	.0060	.0147	.0470		.0491	.0601	.0037	.0578	.0810	.0078	(15)	.0142
Other manufact. (16)												(16)					.0874							(16)	.0215
Construction (17)				.0123	.0194		.0037	.0067				(17)						.1421	.0204	.0032				(17)	.0032
Transport (18)						.0200						(18)						.0461		.0027			.0083	(18)	.0216
Trade marg. + services (19)	.0137		.0435		.0097	.1478	.0251	.0151	.0930	.0360	.0611	(19)	.0385	.0458	.1387	.0717	.0027	.0639	.0036	.0063	.0578		.0366	(19)	.2380
Mats. for repair (20)	.0548		.0109	.0368	.0485	.0018	.0059	.0118	.0129	.0045	.0076	(20)	.0077	.0484	.0294	.0140		.0106		.0022				(20)	
Packaging (21)	.0274						.0277	.1008	.0129	.0137	.0076	(21)	.0077	.0328	.0126	.0092	.0027			.0006				(21)	.0001
Resid. bus. curr. expediture (22)	.0137	.0177	.1087	.0368	.2670	.0408	.0759	.2067	.1757	.1351	.1527	(22)	.1538	.2453	.1492	.1849	.0109	.0423	.0601	.0064				(22)	
Sectors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	sect.	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	sect.	(23)
Household income (23)	.3699	.0177	.2283	.1579	.1942	.3819	.0604	.1597	.1473	.2027	.1832	(23)	.2256	.1071	.1597	.1551	.4945	.2276	.3377	.4473				(23)	
Gov. income (24)	.2466		.1630	.0982	.1165	.0141	.0031	.0807	.0594	.0856	.0763	(24)	.0949	.0561	.0777	.1003	.1667	.1108	.1947	.3151	.0133		.4842	(24)	.0632
Savings (25)	.0685	.0089	.0435	.1526	.0437	.0939	.0141	.0319	.0181	.0180	.0153	(25)	.0231	.0397	.0231	.0235	.0055	.0123	.0745	.0904				(25)	.2073
Imports (26)	.1918	.9558	.2609	.3737	.1311	.1025	.0999	.1378	.4031	.3604	.2748	(26)	.2615	.3592	.1492	.3671	.2213	.1459	.2356	.1020	.8000	.5668	.3348	(26)	.2312
GNP [(23) to (25)]	.6850	.0266	.4348	.4087	.3544	.4899	.0776	.2723	.2248	.3063	.2748	GNP	.3436	.2029	.2605	.2789	.6667	.3507	.6069	.8528	.0133	nil	.4842	GNP	.2705
TOTAL INPUT	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	TOTAL	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	TOTAL	1.
Employment (manyears per £million)	117.8	4.0	21.7	19.6	32.5	87.2	11.7	16.6	55.8	65.3	53.4	Empl	35.6	16.0	28.6	22.4	43.2	40.2	51.1	91.6				Empl	
Sectors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	sect.	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	sect.	(23)

TABLE 4: Ireland, 1982 22-sector inverse $(I-A)^{-1}$ derived from Table 3, together with "direct plus indirect" primary inputs and employment per unit final demand.

Source of Inputs		Solid fuel	Oil refining	Gas	Elect.	Stone, ores, gravel	Agric. for. fish.	Food	Drink & tobacco	Textiles	Cloth. & footwear	Wood & furniture	SECTORS	Paper & printing	Chem., rubb. & plastics	Clay, cement, glass	Metal, engin., veh.	Other manuf.	Constr. new & repair	Transp. purchased	Trade margin & serv.	Mats for repair	Pack-aging	Resid. Bus. Curr. Exp.	SECT-ORS
		(1)	(2)	(3)	(4)	(5)	(6)*	(7)	(8)	(9)	(10)	(11)		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	
Solid fuel	(1)	1.0001		.0010	.0703	.0065	.0017	.0020	.0016	.0022	.0012	.0024	(1)	.0019	.0021	.0035	.0013	.0007	.0013	.0002	.0013	.0004	.0009	.0018	(1)
Oil refining	(2)	.0139	1.0001	.1098	.0081	.0033	.0077	.0062	.0052	.0020	.0019	.0021	(2)	.0018	.0034	.0048	.0023	.0002	.0026	.0139	.0011	.0004	.0011	.0084	(2)
Gas	(3)	.0002	.0001	1.0017	.0618	.0075	.0020	.0027	.0030	.0031	.0021	.0033	(3)	.0029	.0035	.0044	.0024	.0007	.0018	.0007	.0015	.0005	.0013	.0078	(3)
Electricity	(4)	.0011	.0004	.0146	1.0023	.0917	.0226	.0274	.0222	.0304	.0167	.0339	(4)	.0269	.0301	.0488	.0179	.0094	.0173	.0030	.0109	.0046	.0120	.0249	(4)
Stone, ores, gravel	(5)	.0008		.0002	.0011	1.0542	.0048	.0031	.0013	.0003	.0004	.0003	(5)	.0002	.0008	.0333	.0003		.0417	.0009	.0002	.0141	.0012	.0001	(5)
Agric., for., fish.	(6)			.0001		.0001	1.0809	.6143	.1498	.0149	.0453	.0298	(6)	.0001	.0001	.0004	.0002		.0007		.0021	.0001	.0001	.0001	(6)
Food	(7)	.0001		.0002		.0002	.1576	1.3858	.0511	.0334	.1022	.0049	(7)	.0002	.0003	.0008	.0004		.0005	.0001	.0041	.0003	.0001	.0002	(7)
Drink, tobacco	(8)						.0015	.0131	1.1168	.0003	.0010		(8)												(8)
Textiles	(9)									1.0238	.0372	.0093	(9)						.0001						(9)
Clothing, footwear	(10)										1.0091		(10)												(10)
Wood, furniture	(11)				.0002	.0004		.0001	.0001			1.1909	(11)						.0171	.0004	.0001				(11)
SECTORS		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	Sectors	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	
Paper, printing	(12)	.0086	.0019	.0126	.0056	.0318	.0100	.0260	.0546	.0238	.0214	.0228	(12)	1.2186	.0362	.0259	.0240	.0021	.0120	.0081	.0051	.0042	.2489	.1058	(12)
Chem., rubb, plast.	(13)	.0071	.0001	.0021	.0033	.0061	.0321	.0260	.0220	.0050	.0197	.0045	(13)	.0035	1.0485	.0067	.0213	.0005	.0037	.0019	.0014	.0620	.1300	.0082	(13)
Clay, cement, glass	(14)	.0012		.0001	.0020	.0599	.0009	.0028	.0059	.0008	.0009	.0006	(14)	.0005	.0016	1.2328	.0006	.0001	.1495	.0031	.0010	.0010	.0403	.0002	(14)
Metal, eng., veh.	(15)	.0061	.0002	.0250	.0055	.0091	.0303	.0227	.0183	.0133	.0103	.0143	(15)	.0101	.0157	.0259	1.0538	.0005	.0691	.0654	.0048	.0622	.0901	.0102	(15)
Other manufacturing	(16)												(16)					1.0958							(16)
Construction	(17)	.0001		.0004	.0144	.0254	.0023	.0073	.0097	.0011	.0010	.0009	(17)	.0006	.0007	.0022	.0006	.0002	1.1686	.0240	.0040	.0007	.0003	.0007	(17)
Transport	(18)	.0002	.0002	.0012	.0011	.0038	.0228	.0142	.0058	.0023	.0025	.0025	(18)	.0018	.0024	.0023	.0020	.0001	.0551	1.0018	.0031	.0005	.0009	.0087	(18)
Trade marg. + services	(19)	.0190	.0008	.0514	.0099	.0375	.1726	.1379	.0573	.1094	.0587	.0889	(19)	.0561	.0643	.1860	.0868	.0037	.1086	.0137	1.0084	.0675	.0320	.0436	(19)
Materials for repair	(20)	.0555		.0122	.0420	.0578	.0066	.0130	.0169	.0156	.0079	.0115	(20)	.0110	.0527	.0412	.0169	.0005	.0211	.0016	.0030	1.0050	.0113	.0026	(20)
Packaging	(21)	.0278		.0005	.0022	.0015	.0061	.0411	.1155	.0148	.0180	.0099	(21)	.0097	.0350	.0164	.0107	.0031	.0030	.0008	.0009	.0027	1.0076	.0013	(21)
Resid. bus. curr. exp.	(22)	.0187	.0181	.1189	.0488	.3045	.0766	.1523	.2617	.1931	.1644	.1949	(22)	.1922	.2683	.2071	.2056	.0130	.1060	.0763	.0101	.0320	.0941	1.0230	(22)
SECTORS		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	Sectors	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	
Direct plus indirect* per unit final demand:																									
Household income	(23)	.3830	.0187	.2638	.2097	.2661	.5242	.4076	.2920	.2230	.2733	.2871	(23)	.3086	.1595	.3087	.2149	.5462	.3860	.3638	.4589	.0517	.1080	.0555	(23)
Govt. income	(24)	.2646	.0093	.2431	.1566	.3072	.1214	.1454	.2515	.1979	.1950	.2234	(24)	.2318	.2195	.2717	.2393	.1916	.2544	.2472	.3265	.0628	.1008	.5265	(24)
Savings	(25)	.0712	.0091	.0525	.1622	.0674	.1272	.0981	.0626	.0365	.0344	.0360	(25)	.0381	.0539	.0564	.0372	.0079	.0387	.0787	.0939	.0116	.0189	.0120	(25)
Imports	(26)	.2812	.9629	.4406	.4716	.3592	.2271	.3489	.3939	.5426	.4973	.4534	(26)	.4216	.5671	.3632	.5086	.2543	.3208	.3103	.1207	.8739	.7723	.4060	(26)
GNP [(23) to (25)]		.7188	.0371	.5594	.5285	.6407	.7728	.6511	.6061	.4574	.5027	.5465	GNP	.5785	.4329	.6368	.4914	.7457	.6791	.6897	.8793	.1261	.2277	.5940	GNP
Employment (manyears per £ million)		120.3	4.2	28.5	31.4	44.9	115.6	86.5	41.8	71.2	80.6	77.4	Empl.	49.8	25.5	56.7	33.5	48.0	69.0	55.5	93.6	9.4	17.5	9.5	Empl.
SECTORS		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	Sectors	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	sect.

*Entries in rows (23) to (26) and in employment row may be regarded as Keynesian-type partial multipliers.

i.e. £0.6143 of agriculture and fishing input per £1 final output of food sector (7); here final output includes household expenditure on food because the latter occurs in column (23) and we are considering a 22-sector inverse. These inverse $(I-A)^{-1}$ elements (or coefficients) may themselves be regarded as partial multipliers e.g., the food column partial multiplier for agriculture etc., is 0.6143; the term "multiplier", however, is usually reserved for GNP components, imports and employment.

Table 5: Ireland, 1982 Primary Input Content* of Table 1 aggregate Final Demands, with derived percentages, and corresponding 1978 percentages

Type of Primary Input	Personal Consumption (ex. tourist)	Net Govt. Current Expenditure	Capital Formation (Fixed plus Stock Incr.)	Exports including Tourist	Total Final Demand
	£ million				
Direct plus indirect content*:					
Household income	2509	1220	810	2009	6548
Government income	1190	866	634	1072	3762
Savings	416	244	93	429	1182
Imports	3375	352	1634	2863	8224 (a)
TOTAL INPUT	7490	2682	3171	6373#	19716
Derived Percentages:					
Household income	33.5	45.5	25.5	31.5	33.2
Government income	15.9	32.3	20.0	16.8	19.1
Savings	5.6	9.1	2.9	6.7	6.0
(GNP)	(54.9)	(86.9)	(48.5)	(55.1)	(58.3)
Imports	45.1	13.1	51.5	44.9	41.7
TOTAL INPUT	100-	100-	100-	100-	100-
Corresponding 1978 Percentages:					
Household income	30.7	47.6	26.5	40.2	35.0
Government income	22.6	30.0	16.7	3.4	16.2
Savings	6.7	11.5	3.3	7.8	7.0
(GNP)	(60.0)	(89.1)	(46.5)	(51.5)	(58.2)
Imports	40.0	10.9	53.5	48.5	41.8
TOTAL INPUT	100-	100-	100-	100-	100-

excluding wages and profits, as shown in Table 1, with similar treatment of 1978 exports.

(a) includes 944 £m. outflow of trading and investment income for 1982, with similar treatment of 1978 imports.

* The word "Content" can also be taken to mean "associated with" or "related to".

These latter partial multipliers occupying the bottom rows of Table 4 reveal considerable variation. The GNP multiplier for trade margin and services sector (19) is 0.8793, whereas that for oil refining is 0.0371. The imports multiplier in each column is the compliment of that of GNP i.e., the sum of these two multipliers is unity, after allowing for rounding errors in the fourth decimal place. So in any column a relatively large GNP multiplier implies a relatively small imports multiplier and vice versa. The employment multipliers also show considerable variation. For example, agriculture etc. sector (6) shows a partial multiplier of 115.6 manyears per £m. final demand, whereas that of chemicals etc. sector (13) is 25.5. Readers are again reminded at this point that all the Table 4 multipliers are Keynesian-type, since they quote amounts per unit final demand, the unit being generally £1 million.

Table 5 shows how 1982 primary inputs can be allocated to Table 1 final demands, via the 22-sector inverse $(I-A)^{-1}$. The algebra and arithmetic of the underlying model is such that it applies to each final demand column the equation:

aggregate primary input = aggregate final demand.

This is obviously true for Table 1, because for sectors (1) to (22) each row total equals each column total. Subtract out the 22 x 22 square matrix of inter-industry transactions to get: primary input aggregate for columns (1) to (22) equals final demand aggregate for rows (1) to (22). To each side of this equation add the aggregate of the bottom right-hand quadrant. We thus get that the aggregate primary input of bottom rows (GNP plus imports) equals aggregate final demand (columns to the right of column (22)). Since Table 3 direct input coefficients have been used, the imports include outflows of profits and dividends, and the other three items combine to give GNP.

The derived percentages forming the lower part of Table 5 show how the GNP content (or related to) varies from one final demand to another. The average global content is 58 per cent; personal consumption shows 55 per cent, government current expenditure 87 per cent and the other two categories show some 48-55 per cent. For each final demand category the imports percentage is the compliment of GNP, i.e., makes up the rest of the full 100 per cent. Capital formation is the most import-intensive, showing a content of 52 per cent imports. These percentages could also be thought of as macro or weighted multipliers per unit final demand, for the Table 1 column aggregates.

At the bottom of Table 5 are shown the corresponding 1978 percentages. For total final demand we find no change since 1978 in the major subdivision between GNP content and import content: for both 1978 and 1982 imports (including outflows of profits, dividends, interest etc.) take 42 per cent and GNP the remaining 58 per cent. But at the level of the four components there are noticeable changes: personal consumption has a 1982 GNP content of 55 per cent, which is smaller than the 1978 percentage of 60; thus personal consumption has become more import-intensive between 1978 and 1982, the percentage content increasing from 40 to 45. Net government current expenditure shows a slight GNP decrease, from 89 per cent for 1978 to 87 per cent for 1982. By contrast, the other two major components of final demand show slight increases of GNP intensity since 1978: capital formation had 46 per cent for 1978 and 48 per cent for 1982; exports including tourist expenditure had 51 per cent GNP for 1978 and 55 per cent for 1982.

The overall impression given by comparison of these Table 5 percentages is one of satisfactory stability between 1978 and 1982. In view of the 76 per cent general price inflation during that period one might expect larger changes in the shares of final demand taken by GNP or imports.

TABLE 6: Ireland, 1982 23-sector inverse $(I-A)^{-1}$ derived from Table 3, together with "direct plus indirect plus induced" primary inputs and employment per unit final demand.

Sources of Inputs		Solid fuel (1)	Oil refining (2)	Gas (3)	Elect. (4)	Stone, ores, gravel (5)	Agric., forest., fishing (6)	Food (7)	Drink & Tobacco (8)	Textiles (9)	Clothing & footwear (10)	Wood & furniture (11)	Sectors	Paper & printing (12)	Chem., rubb. & plastics (13)	Clay, cement, glass (14)	Metal, engin., veh. (15)	Other manuf-acturing (16)	Constr., new & repair (17)	Transp., purch. (18)	Trade margin & serv. (19)	Mats. for repair (20)	Pack-aging (21)	Resid. Bus. Curr. Exp. (22)	Sect.	H. hold exp. & savings (23)
Solid fuel	(1)	1.0024	.0001	.0026	.0716	.0080	.0048	.0044	.0033	.0035	.0028	.0041	(1)	.0037	.0031	.0053	.0026	.0039	.0036	.0024	.0040	.0007	.0015	.0021	(1)	.0059
Oil refining	(2)	.0160	1.0002	.1113	.0093	.0048	.0107	.0085	.0068	.0033	.0034	.0037	(2)	.0035	.0042	.0066	.0035	.0033	.0048	.0160	.0037	.0007	.0017	.0087	(2)	.0056
Gas	(3)	.0036	.0003	1.0040	.0637	.0099	.0066	.0063	.0056	.0051	.0045	.0059	(3)	.0056	.0049	.0071	.0043	.0055	.0052	.0039	.0056	.0010	.0023	.0083	(3)	.0088
Electricity	(4)	.0188	.0013	.0268	1.0120	.1041	.0469	.0463	.0358	.0407	.0294	.0472	(4)	.0412	.0375	.0631	.0279	.0347	.0352	.0198	.0322	.0070	.0170	.0275	(4)	.0464
Stone, ores, gravel	(5)	.0016		.0007	.0015	1.0548	.0059	.0039	.0019	.0008	.0009	.0009	(5)	.0008	.0011	.0339	.0007	.0011	.0424	.0016	.0011	.0142	.0015	.0002	(5)	.0020
Agric., for., fish.	(6)	.0386	.0019	.0267	.0212	.0269	1.1337	.6554	.1792	.0373	.0729	.0587	(6)	.0312	.0162	.0315	.0218	.0551	.0396	.0367	.0484	.0054	.0110	.0057	(6)	.1008
Food	(7)	.0563	.0027	.0389	.0308	.0392	.2345	1.4457	.0940	.0662	.1423	.0471	(7)	.0455	.0237	.0461	.0319	.0802	.0572	.0535	.0715	.0079	.0160	.0083	(7)	.1468
Drink & tobacco	(8)	.0185	.0009	.0128	.0101	.0129	.0268	.0328	1.1309	.0111	.0142	.0139	(8)	.0149	.0077	.0149	.0104	.0264	.0187	.0176	.0222	.0025	.0052	.0027	(8)	.0483
Textiles	(9)	.0033	.0002	.0023	.0018	.0023	.0045	.0035	.0025	1.0257	.0396	.0118	(9)	.0026	.0014	.0026	.0018	.0047	.0034	.0031	.0039	.0004	.0009	.0005	(9)	.0086
Cloth. & footwear	(10)	.0027	.0001	.0018	.0015	.0019	.0036	.0028	.0020	.0016	1.0110	.0020	(10)	.0021	.0011	.0021	.0015	.0038	.0027	.0025	.0032	.0004	.0008	.0004	(10)	.0070
Wood & furniture	(11)	.0013	.0001	.0009	.0009	.0012	.0018	.0014	.0011	.0007	.0009	1.1919	(11)	.0010	.0005	.0010	.0007	.0018	.0183	.0015	.0016	.0002	.0004	.0002	(11)	.0033
Sectors		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	Sectors	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	Sector	(23)
Paper & printing	(12)	.0139	.0021	.0162	.0085	.0355	.0172	.0316	.0586	.0269	.0252	.0267	(12)	1.2229	.0384	.0302	.0270	.0096	.0174	.0131	.0115	.0049	.2504	.1066	(12)	.0138
Chem., rubb., plast.	(13)	.0105	.0003	.0045	.0051	.0085	.0367	.0296	.0246	.0070	.0221	.0071	(13)	.0063	1.0499	.0094	.0232	.0053	.0071	.0051	.0054	.0624	.1309	.0087	(13)	.0088
Clay, cement, glass	(14)	.0044	.0002	.0024	.0038	.0622	.0053	.0063	.0084	.0027	.0032	.0030	(14)	.0031	.0029	1.2354	.0024	.0048	.1528	.0062	.0049	.0014	.0412	.0006	(14)	.0086
Metal. eng., veh.	(15)	.0164	.0007	.0321	.0111	.0163	.0445	.0336	.0262	.0193	.0176	.0220	(15)	.0184	.0201	.0342	1.0596	.0152	.0795	.0752	.0172	.0636	.0930	.0117	(15)	.0270
Other manufacturing	(16)	.0113	.0006	.0078	.0062	.0079	.0155	.0120	.0086	.0066	.0081	.0085	(16)	.0091	.0047	.0091	.0063	1.1119	.0114	.0107	.0135	.0015	.0032	.0016	(16)	.0295
Construction	(17)	.0033	.0002	.0026	.0162	.0276	.0067	.0107	.0121	.0029	.0032	.0033	(17)	.0032	.0021	.0048	.0024	.0047	1.1718	.0270	.0078	.0011	.0012	.0012	(17)	.0083
Transport	(18)	.0120	.0007	.0093	.0075	.0120	.0389	.0268	.0147	.0091	.0109	.0113	(18)	.0113	.0074	.0118	.0086	.0169	.0669	1.0130	.0172	.0021	.0042	.0104	(18)	.0307
Trade marg. & serv.	(19)	.1447	.0069	.1380	.0788	.1249	.3447	.2717	.1532	.1826	.1485	.1832	(19)	.1574	.1166	.2874	.1573	.1831	.2353	.1331	1.1590	.0845	.0674	.0618	(19)	.3283
Mats. for repair	(20)	.0578	.0002	.0137	.0433	.0594	.0097	.0155	.0186	.0170	.0095	.0133	(20)	.0128	.0537	.0431	.0182	.0037	.0234	.0038	.0058	1.0053	.0119	.0029	(20)	.0060
Packaging	(21)	.0318	.0002	.0032	.0044	.0043	.0116	.0454	.1186	.0171	.0209	.0130	(21)	.0129	.0366	.0197	.0129	.0088	.0070	.0046	.0058	.0033	1.0087	.0018	(21)	.0105
Resid. Bus. Curr. Exp.	(22)	.0366	.0190	.1313	.0586	.3169	.1011	.1713	.2753	.2035	.1772	.2083	(22)	.2066	.2757	.2215	.2156	.0385	.1240	.0933	.0315	.0344	.0991	1.0256	(22)	.0468
Sectors		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	Sectors	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	Sectors	(23)
Household income*	(23)	.4801	.0234	.3307	.2629	.3337	.6572	.5110	.3661	.2796	.3427	.3599	(23)	.3868	.2000	.3870	.2694	.6847	.4839	.4561	.5753	.0648	.1354	.0696	(23)	1.2537
Direct plus indirect plus induced per unit final demand*:																										
Government income	(24)	.3554	.0138	.3056	.2063	.3703	.2458	.2421	.3207	.2508	.2598	.2915	(24)	.3050	.2574	.3449	.2903	.3212	.3460	.3335	.4354	.0751	.1264	.5397	(24)	.2372
Savings	(25)	.1919	.0149	.1357	.2283	.1513	.2924	.2265	.1546	.1068	.1205	.1265	(25)	.1353	.1041	.1537	.1049	.1800	.1604	.1933	.2385	.0279	.0530	.0294	(25)	.3151
Imports	(26)	.4527	.9713	.5587	.5654	.4784	.4618	.5314	.5246	.6424	.6197	.5820	(26)	.5597	.6385	.5014	.6048	.4988	.4936	.4731	.3261	.8971	.8206	.4309	(26)	.4477
GNP [(23) to (25)]		1.0274	.0521	.7720	.6975	.8553	1.1954	.9796	.8414	.6372	.7230	.7779	GNP	.8271	.5615	.8856	.6646	1.1859	.9903	.9829	1.2492	.1678	.3148	.6387	GNP	1.8060
Employment (manyears per £million)		139.1	5.1	41.4	41.7	57.9	141.3	106.5	56.1	82.1	94.0	91.5	Empl.	65.0	33.3	71.8	44.0	74.8	87.9	73.3	116.1	11.9	22.8	12.2	Empl.	49.0
Sectors		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	Sectors	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	Sectors	(23)

* Entries in rows (23) to (26) and in employment row may be regarded as Keynesian-type complete multipliers.

4. COMPLETE 1982 MULTIPLIERS FOR GNP AND ITS COMPONENTS, WITH 1978 CORRESPONDING RESULTS

This section is the exact analogue of Section 3, for results of a 23-sector inverse $(I-A)^{-1}$ in parallel with the 22-sector results of Section 3 above. Tables 6 and 7 show 23-sector results, the 23rd sector being households. Thus we may speak of tables 6 and 7 as having complete multipliers.

Table 6 shows the 23-sector inverse $(I-A)^{-1}$ and related primary input "direct plus indirect plus induced" amounts per unit final demand. Thus all Table 6 entries can be regarded as Keynesian-type complete multipliers. Our main interest lies in the household income, GNP, import and employment multipliers, although entries in rows (1) to (22) can also be thought of as complete multipliers per unit final demand, the latter confined to Table 2 columns (24) to (26), i.e., government, capital, exports.

The Table 6 household income row (23) shows a wide range of variation. The biggest value, 1.2537, is in the household column itself and says that £1 direct transfer or payment of income to households has £1.2537 of household income associated with it, on average, when the spending and income process has been finally completed throughout the economy. This means a further £0.2537 has been induced, or could possibly be induced, according to the model we are using. This multiplier 1.2537 can be thought of as the general Keynesian-type household income multiplier for the data under analysis. Other household income multipliers of Table 6 are generally smaller than that of column (23): a relatively large value is 0.6572 for (6) agriculture etc. and a relatively small value is 0.2000 for (13) chemicals etc.

The GNP multipliers are the sum of entries in Table 6 rows (23) to (25). Their variation is considerable. The household column (23) value of 1.81 is again the largest: two further large entries are 1.20 for (6) agriculture etc. and

1.25 for (19) trade margin etc.; a small value is 0.64 for (9) textiles etc.

The import multipliers of Table 6 row (26) are also highly variable. The biggest is 0.97 under (2) oil refining and the smallest is 0.33 in sector (19) trade margin etc. These import multipliers are generally larger than corresponding multipliers of Table 4, because they include imports going into household consumption as well as those required by the 22-sector input structure.

The employment multipliers for columns (1) to (22) broadly follow the relative magnitudes of GDP: large employment multipliers are the 139.1 for (1) solid fuel, 141.3 for (6) agriculture, 116.1 for (19) trade margin etc.; small employment multipliers are 41.7 for (4) electricity, 33.3 for (13) chemicals etc. and 44.0 for (15) metal etc. There is a negative association between employment and imports: a big import multiplier implies a small employment multiplier and vice versa.

We now pass on to Table 7 to consider the 1982 Keynesian-type complete multipliers for household income, GNP and imports, in comparison with corresponding 1978 ratios. The 1982 household income multipliers are in all sectors smaller than those of 1978, the underlying reason being that 1982 government income multipliers are generally larger than those of 1978 (1982 Table 6 versus Table 9 of ESRI Memo. No. 157); thus taxation in 1982 is more intense per unit final demand and has reduced disposable household income, when 1982 is compared with 1978.

Among the GNP multipliers, 15 are smaller in 1982 than in 1978, and 8 are the same or larger. A mixed result is to be expected, in view of the aggregate GNP content of aggregate final demand being the same (58 per cent) in both years, as discussed above for Table 5 results. The GNP multiplier for sector (6) agriculture has the value 1.20 for 1982 and 1.41 for 1978, and thus is

Table 7: Ireland, comparison of 1982 amounts per unit final demand (complete multipliers) with corresponding 1978 ratios, for Household Income, GNP, Imports.

Sectors as listed in Table 2	Household Income		GNP		Imports	
	1982	1978	1982	1978	1982	1978
1. Solid fuel	.480	.588	1.027	1.162	.453	.426
2. Oil refining	.023	.023	.052	.052	.971	.971
3. Gas	.331	.386	.772	.738	.559	.647
4. Electricity	.263	.310	.698	.696	.565	.614
5. Stone, etc.	.334	.424	.855	.917	.478	.507
6. Agriculture etc.	.657	.835	1.195	1.407	.462	.428
7. Food	.511	.624	.980	1.095	.531	.529
8. Drink, tobacco	.366	.444	.841	.894	.525	.550
9. Textiles	.280	.276	.637	.532	.642	.743
10. Clothing etc.	.343	.405	.723	.763	.620	.642
11. Wood etc.	.360	.435	.778	.847	.582	.586
12. Paper etc.	.387	.398	.827	.781	.560	.617
13. Chemicals etc.	.200	.230	.562	.541	.639	.688
14. Clay etc.	.387	.449	.886	.924	.501	.525
15. Metal etc.	.269	.272	.665	.566	.605	.706
16. Other manuf.	.685	.745	1.186	1.238	.499	.508
17. Construction	.484	.621	.990	1.161	.494	.459
18. Transport	.456	.527	.983	1.055	.473	.472
19. Trade marg.	.575	.625	1.249	1.332	.326	.293
20. Mats. for rep.	.065	.226	.168	.491	.897	.735
21. Packaging	.135	.226	.315	.470	.821	.756
22. Resid.b.c.e.	.070	.197	.639	.630	.431	.567
23. Household	1.254	1.313	1.806	1.906	.448	.407

Sources: 1982 data came from Table 6 above; those of 1978 from Table 12 of ESRI Memo. No. 157.

Table 8: Ireland, 1982 employment coefficients and derived Moore-type Multipliers, partial and complete.

Input-Output Sector	Manyears per £million final demand			Moore-type Multipliers	
	Direct (1)	Direct & Indirect (2)	Direct + indirect + induced (3)	Partial (2) ÷ (1) (4)	Complete (3) ÷ (1) (5)
1. Solid fuel	117.8	120.3	139.1	1.02	1.18
2. Oil refining	4.0	4.2	5.1	1.05	1.28
3. Gas	21.7	28.5	41.4	1.31	1.91
4. Electricity	19.6	31.4	41.7	1.60	2.13
5. Stone etc.	32.5	44.9	57.9	1.38	1.78
6. Agriculture etc.	87.2	115.6	141.3	1.33	1.62
7. Food	11.7	86.5	106.5	7.39	9.10
8. Drink, tobacco	16.6	41.8	56.1	2.52	3.38
9. Textiles	55.8	71.2	82.1	1.28	1.47
10. Clothing etc.	65.3	80.6	94.0	1.23	1.44
11. Wood etc.	53.4	77.4	91.5	1.45	1.71
12. Paper etc.	35.6	49.8	65.0	1.40	1.83
13. Chemicals etc.	16.0	25.5	33.3	1.59	2.08
14. Clay etc.	28.6	56.7	71.8	1.98	2.51
15. Metal etc.	22.4	33.5	44.0	1.50	1.96
16. Other manufacturing	43.2	48.0	74.8	1.11	1.73
17. Construction	40.2	69.0	87.9	1.72	2.19
18. Transport	51.1	55.5	73.3	1.09	1.43
19. Trade marg. etc.	91.6	93.6	116.1	1.02	1.27
20. Mats. for rep.		9.4	11.9	*	*
21. Packaging		17.5	22.8	*	*
22. Res. b.c.e.		9.5	12.2	*	*
23. Household			49.0	*	*

Sources: Direct, table 3; direct + indirect, table 4; direct + indirect + induced, table 6.

* Not meaningful

15 per cent smaller in 1982; this result reflects the failure of agricultural output prices to keep pace with general price inflation since 1978, as is well known. Another large sector to show a smaller 1982 GNP multiplier is (19) trade margin and services; the multiplier has the value 1.25 for 1982 compared with 1.33 for 1978. The direct stimulus to sector (23) itself, household income, also produces smaller results in 1982, namely 1.81 as against 1.91 for 1978.

Changes in import multipliers tend to go in the opposite direction to those of GNP. Imports here of course include the outflows of profits, interest etc. There are no major changes between 1978 and 1982, with 1982 multipliers smaller in 13 sectors and the same or larger in 10 sectors. The household import partial multiplier has already been discussed in connection with Table 5 above; the corresponding complete multipliers of Table 7 have closely similar values in both years.

5. EMPLOYMENT FOR 1982, WITH SOME 1978 CORRESPONDING RESULTS

A brief discussion of 1982 employment multipliers is of interest. Comparison with those of 1978 is also relevant, if only to draw attention to the fact that price inflation of output reduces the size of related Keynesian-type multipliers. The data to be discussed are shown in tables 8 to 10.

Employment Coefficients and Moore-type Multipliers

The first column of Table 8 shows the direct employment coefficients of sectors (1) to (19), in manyears per £million final demand. The second column shows corresponding direct plus indirect requirements, i.e. Keynesian-type employment multipliers of the partial kind. The third column shows corresponding complete Keynesian-type multipliers. Their relative magnitudes as between sectors have been briefly commented on already in Section 4 above, so these comments will not be repeated here. The five largest column (2) values are, in decreasing order of magnitude, the latter shown in parentheses: (1) solid fuel (120.3),

(6) agriculture (115.6), (19) trade margin (93.6), (7) food (86,5), (10) clothing (80.6). The five largest column (3) values i.e., complete multipliers are: (6) agriculture (141.3), (1)solid fuel (139.1), (19) trade margin (116.1), (7) food (106.5), (10) clothing (94.0). So we find good agreement between relative magnitudes of column (2) and column (3), in other words, relatively large partial multipliers occur for the same sectors as do relatively large complete multipliers. The solid fuel employment results are to be treated with reserve as they contain employment imputed to farmers' peat, which is not as reliable as Bord na Mona data.

Column (4) shows Moore-type partial multipliers. The food sector shows a multiplier of about 7, this being far larger than any of the others. These range in value from 1.02 for (19) trade to 2.52 for (8) drink and tobacco. So the range between the smallest and largest values is in a scale of about 1:2.5. Column (5) is occupied by the Moore-type complete multipliers. The value of the (7) food multiplier is 9.10; among the others the smallest is 1.27 for (19) trade and the largest is 3.38 for (8) drink and tobacco.

Employment related to final demand

Table 9 shows employment results for the various final demand sectors, as allocated or related by the 22-sector model, and then via the 23-sector model, both for 1982 and 1978.

The 22-sector model treats the household column as final demand and for 1982 allocates 370 thousand manyears to it, i.e. 32 per cent of the total. The 23-sector model, by contrast, treats households as inter-industry and so allocates all employment to the other three final demand sectors. We see exports thus accounting for, or related to, 524 thousand manyears, which is 46 per cent of total employment. The importance of exports, as an employment stimulus, is thus amply demonstrated.

Table 9: Ireland, 1982 Employment related to Final Demand via Table 4 and Table 6, with corresponding 1978 results

Model of Allocation	Household	Government	Capital Formation	Exports	Total Final Demand
1982 Results:					
22-sector and Table 4 (A) 000 manyears direct + indirect	369.54	247.65	145.65	383.21	1,146.05
23-sector and Table 6 (B) 000 manyears direct + indirect		437.04	185.37	523.64	1,146.05
Ratio (B) ÷ (A)		1.76	1.27	1.37	
1978 Results*:					
22-sector (C) 000 manyears direct + indirect	378.37	184.83	146.33	400.47	1,110.00
23-sector (D) 000 manyears direct + indirect + induced		350.86	192.16	566.98	1,110.00
Ratio (D) ÷ (C)		1.90	1.31	1.42	

* Source, Table 14 of ESRI Memo No. 157.

Table 10: Ireland, comparison of 1982 and 1978 employment coefficients and Moore Multipliers

Input-Output Sector	Direct plus indirect, manyears per £million final demand		Moore-type Multipliers			
			Partial		Complete	
	1982	1978	1982	1978	1982	1978
1. Solid fuel	120.3	208.7	1.02	1.06	1.18	1.27
2. Oil refining#	4.2	3.9	1.05	1.56	1.28	2.24
3. Gas	28.5	76.8	1.31	1.25	1.91	1.70
4. Electricity	31.4	60.3	1.60	1.58	2.13	2.17
5. Stone etc.	44.9	82.6	1.38	1.54	1.78	2.12
6. Agriculture etc.	115.6	180.4	1.33	1.32	1.62	1.76
7. Food	86.5	136.6	7.39	6.90	9.10	9.19
8. Drink, tobacco	41.8	85.5	2.52	2.12	3.38	2.92
9. Textiles	71.2	94.3	1.28	1.17	1.47	1.42
10.Clothing etc.	80.6	132.0	1.23	1.24	1.44	1.52
11.Wood etc.	77.4	124.6	1.45	1.54	1.71	1.93
12.Paper etc.	49.8	83.0	1.40	1.24	1.83	1.68
13.Chemicals etc.	25.5	47.7	1.59	1.53	2.08	2.07
14.Clay etc.	56.7	95.7	1.98	2.03	2.51	2.73
15.Metal etc.	33.5	62.2	1.50	1.18	1.96	1.56
16.Other manuf.	48.0	82.5	1.11	1.02	1.73	1.69
17.Construction	69.0	143.5	1.72	1.61	2.19	2.12
18.Transport	55.5	109.4	1.09	1.19	1.43	1.60
19.Trade marg. etc.	93.6	158.9	1.02	1.03	1.27	1.33
20.Mats. for rep.	9.4	52.4	*	*	*	*
21.Packaging	17.5	48.0	*	*	*	*
22.Res. b.c.e.	9.5	46.5	*	*	*	*

Sources: 1982 data, Table 8; 1978 data, Table 13 of ESRI Memo. No. 157.

Inconsistent employment treatment between 1978 and 1982.

* Not meaningful.

The final row of the upper part of Table 9 shows the ratio of 23-sector to 22-sector employment allocation, for the three relevant final demand sectors. The government column ratio has the value 1.76, that of capital formation 1.27 and that of exports 1.37. Thus the induced spending effect, as shown by these ratios, is considerably more for the government stimulus than for either of the other two. The considerable difference between the ratio of the government column and that of the other two also illustrates the danger inherent in making the assumption that all three ratios would be the same i.e., have a value 1.48 obtained by distributing the 22-sector household employment 369.54 units evenly over the remainder (1,146.05 - 369.54) and given by 1,146.05/776.51.

The lower part of Table 9 reproduces corresponding 1978 results, taken from Table 14 of ESRI Memo. No. 157. We see that the 1978 ratios of 23-sector to 22-sector employment are larger than corresponding 1982 ratios for all three final demands considered, by an amount in the range 3 to 8 per cent of 1982 values. That these ratios (for induced employment effects) are smaller in 1982 than in 1978 makes sense, because Table 7 above shows generally smaller household income complete multipliers for 1982 than for 1978, and there is a strong positive correlation between household income and employment.

Comparison of 1982 and 1978 Employment Coefficients and Moore-type Multipliers

Table 10 shows comparisons of 1982 and 1978 employment coefficients and Moore-type multipliers. The first pair of columns compare "direct plus indirect" employment coefficients for the two years and show 1982 values smaller than those of 1978 in all sectors except (2) oil refining, which has inconsistent employment for 1982 compared with 1978, and which anyhow employs only a few hundred persons so that its results need not be taken seriously. These first two columns are included to show how price inflation of output since 1978 has reduced labour intensity per unit final demand: we have seen in the Introduction that the implicit price inflation of GDP between 1978 and 1982 was 76 per cent; we would therefore expect a

corresponding general decrease of employment/output coefficients due to such price inflation, apart from any effects of increased productivity, between 1978 and 1982. And this is what appears: the first pair of columns of Table 10 show reductions of one-third to one-half in the magnitudes of these Keynesian-type partial employment multipliers between 1978 and 1982. We may ignore artificial sectors (20) to (22) which have no direct employment and are of highly tentative input structure for 1982.

The next two columns compare Moore-type partial multipliers for both years and these being ratios of employment to employment are independent of price inflation effects of the kind considered in the previous paragraph. The food multiplier of course is largest of all in both years, but not greatly changed between times, being 7.4 for 1982 and 6.9 for 1978. We ignore the oil refining sector and find that the remaining 17 multipliers are generally of the same order of magnitude in both years - out of these 17 comparisons 7 show the 1982 value smaller than that of 1978 while 10 show it larger. There is therefore no general tendency for 1982 to show smaller multipliers than 1978. This outcome might be expected under 1982 generally depressed economic conditions and little prospect of increased labour productivity.

The final two columns of Table 10 compare Moore-type complete multipliers for 1982 and 1978. Here again the food multiplier is largest, being 9.1 for 1982 and 9.2 for 1978, i.e. almost identical. If we ignore the oil refining sector we find once more that the remaining 17 multipliers are generally of the same order of magnitude in both years, with 9 showing a 1982 value smaller than that of 1978 and 8 showing it larger. Here again there is no general tendency for 1982 to show smaller multipliers than 1978.

In summary the Keynesian-type employment coefficients or multipliers can be considerably changed in the course of a few years by price inflation, so one must be careful to use data at constant prices for their application. The Moore-type multipliers, on the other hand, are generally free of price-inflation effects, but may to some extent tend to decrease with advancing time, in response to increasing labour productivity, i.e., output per manyear. However, there is no general tendency towards such decreases evident between 1978 and 1982, with numbers of sectors roughly equally divided between increases and decreases.

6. MAIN FINDINGS AND CONCLUSIONS

This section bring together important points and findings already stated above and offers a few conclusions. It is not intended as a summary of the report, which is quite brief.

Holistic accuracy of 1982 transactions

In view of the considerable input of 1982 data we may accept that the 1982 transactions of tables 1 and 2 have holistic accuracy and are therefore to be taken seriously. We may therefore use them, and coefficients derived from them, as estimators of 1982 economic structures until better 1982 results become available. We may also take seriously major changes, between 1978 and 1982, of multipliers etc., as well as close similarities between such results for the two years being compared.

Unchanged import content of aggregate final demand between 1978 and 1982

Table 5 shows that for both 1978 and 1982 imports took 42 per cent of total final demand, and GNP took the remaining 58 per cent. But at a more detailed level there are noticeable changes: personal consumption had 1982 GNP content of 55 per cent compared with 60 per cent for 1978; capital formation

had 48 and 46 per cent GNP, respectively; exports including tourist expenditure had 55 and 51 per cent GNP, respectively. The overall impression given by comparison of Table 5 percentages is one of satisfactory stability between 1978 and 1982, in view of the 76 per cent general price inflation.

Smaller 1982 household income multipliers

The 1982 household income (complete) multipliers are smaller in all sectors than those of 1978, because taxation in 1982 is more intense per unit final demand and has reduced disposable income, by comparison with 1978.

Mixed results for GNP and import complete multipliers

Among the GNP multipliers, 15 are smaller and 8 are larger in 1982 than in 1978. The erosion of agricultural prices is reflected in the reduced size of the agriculture complete GNP multiplier: 1.20 for 1982 as against 1.41 for 1978. The trade margin plus services multiplier too is smaller in 1982 than in 1978: 1.25 versus 1.33. Import complete multipliers show no major changes between 1978 and 1982, with 1982 multipliers smaller in 13 sectors and the same or larger in 10 sectors.

Induced employment effects smaller in 1982 than in 1978

The induced employment effects of household spending are shown in Table 9. These ratios are smaller (by some 3 to 8 per cent of 1982 values) in 1982 than in 1978, in accord with closely related household income (complete) multipliers also being smaller in 1978, due to heavier government taxation per unit final demand, as has been commented on above.

Employment multipliers stable, after allowance for price inflation

The implicit price inflation of GDP between 1978 and 1982 was 76 per cent. We would therefore expect a corresponding general decrease of employment/output coefficients due to such price inflation. Table 10 shows reductions of one-third to one-half in the magnitudes of the Keynesian-type partial employment multipliers between 1978 and 1982.

But the Moore-type employment multipliers, being ratios of employment to employment, are independent of this kind of price inflation. For such multipliers, both partial and complete, there is no general tendency for 1982 values to be smaller than those of 1978.

In summary, the Keynesian-type (i.e. per unit final demand) employment coefficients or multipliers must be used only with data at constant prices, of the year to which they relate. The Moore-type employment multipliers, by contrast, are generally free of price-inflation effects (although they may tend to decrease with increasing labour productivity "upstream" of the sector being considered). These multipliers are also best used with constant-price data, at price-levels of the year to which they relate. This advice should help to ensure proper use of both kinds of multiplier.

REFERENCES AND DATA SOURCES

BORD NA MONA, 1982, 36TH ANNUAL REPORT 1981/82 Bord na Mona, Dublin.

CENTRAL STATISTICS OFFICE, Irish Statistical Bulletin, various quarterly issues. Stationery Office, Dublin.

CENTRAL STATISTICS OFFICE, 1983 (1), Trade Statistics of Ireland, December 1982. Stationery Office, Dublin.

CENTRAL STATISTICS OFFICE, 1983 (2), National Income and Expenditure 1981. Stationery Office, Dublin.

CENTRAL STATISTICS OFFICE, March 1983 (1), Industrial Production Index December 1982. Government Information Services, Dublin.

CENTRAL STATISTICS OFFICE, March 1983 (2), Wholesale Price Index December 1982. Government Information Services, Dublin.

CENTRAL STATISTICS OFFICE, August 1983(1), Industrial Employment, Earnings and Hours Worked, December 1982 and March 1983 (Provisional Results). Government Information Services, Dublin.

CENTRAL STATISTICS OFFICE, August 1983(2), Agricultural Output 1982. Government Information Services, Dublin.

ELECTRICITY SUPPLY BOARD, 1983, Fifty fifth Annual Report for Year Ended 31 March 1982. Electricity Supply Board, Dublin.

FINANCE, DEPARTMENT OF, 1982(1), Budget 1982. (Presented to Dail Eireann by Minister for Finance on 25 March 1982). Stationery Office, Dublin.

FINANCE, DEPARTMENT OF, 1982(2), Estimates for Public Services for the Year Ending 31 December 1982. Stationery Office, Dublin.

FINANCE, DEPARTMENT OF, 1983, Economic Review and Outlook, Summer 1983. Stationery Office, Dublin.

HENRY, E.W., 1980, Irish Input-Output Structures, 1976. Paper No. 99 of General Research Series. Economic and Social Research Institute, Dublin.

HENRY, E.W., 1983, Irish 1978 Input-Output Structures, with Derived Multipliers for Employment, GNP and Imports, and some Comparisons with 1976, 1974 and 1968. No. 157 of Memorandum Series. Economic and Social Research Institute, Dublin.

JENSEN, R.C. and G.R. WEST, 1982, On the Nature of Regional Multipliers. Paper presented to Session in Honour of William H. Miernyk. North American Meeting of Regional Science Association, Pittsburg, November session.

Footnote: Some of the periodicals listed above for 1982 may also have been used for 1978 in earlier issues; these instances will be obvious or implied from the discussion in the text above.