



# Welsh Economic Review

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Welsh
Input-Output
Project Update

### **Welsh Input-Output Project Update**

#### Introduction

Input-Output Tables provide a financial picture of an economy, showing domestic and international trade flows between different industries, consumers and government sectors during a particular year. This accounting framework enables inter-industry transactions (sales and purchases) to be mapped and quantified, enabling detailed descriptions of economy interactions, whilst manipulation of these tables allows the effects of changes in that economy to be estimated, via calculation of economic multipliers.

Input-Output (I-O) tables are produced regularly at a UK level, as part of the national accounting process. They have been less available at a regional or local level within the UK. However, I-O tables are now regularly produced for Scotland (by the Scottish Executive) the South West of England (by the South West Economy Centre, Plymouth Business School), and Wales (by WERU).

The Welsh Input-Output Project is now in its fourth phase of development. Welsh tables relating to 1994, 1995 and 1996 have been already been produced during phases 1-3, with a separate subregional table for industrial South Wales also compiled for 1995 and 1996. Phases 1-3 were sponsored by a subgroup of the South Wales Economic Research Forum, a group comprising largely of local authorities, TECs and the WDA.

#### Welsh I-O Tables

The most recent Welsh I-O tables relate to the economy in 1996. These tables contain 67 separately defined industry groups or sectors, including 35 manufacturing sectors, 25 service sectors, plus energy, agricultural and construction sectors. These tables were constructed using survey data generated from purpose-designed I-O questionnaires as well as information obtained from various WERU projects, together with other published and unpublished data. For sectors where

little or no survey data were available, non-survey methods were applied to estimate transactions (for a more detailed account of the methodology see Brand, S. Hill, S., and Roberts, A., 1998, Welsh Input-Output Tables for 1995, University of Wales Press, Cardiff).

The table below presents an aggregate version of the 1996 Welsh tables, where the Welsh economy is divided into 7 separate sectors. Purchases by sectors are shown in the columns, whilst sales are shown in the rows. For example, according to I-O estimates, and reading down the column, the Welsh manufacturing sector purchased an estimated £220m from the agricultural sector, £1.775bn from manufacturing sectors etc. Total intermediate purchases from other Welsh sectors summed to £4.4bn. In addition, manufacturing purchase labour inputs, imports, second hand/recycled products, and pay taxes and generate other value added (gross profits etc), giving total inputs (which

#### Summary Transactions Table, Wales 1996, £m

SECTOR	Agric- culture	Mfrg & Extract	Energy & Water	Const- ruction	Distrib ution	Transp/ Comm	Other Services	TOTAL	Con- sumers	Govern- ment	Invest- ment	Stocks	Exports to UK	Exports Overseas	TOTAL
Agric	92	220	0	2	16	1	11	341	48	0	3	8	603	125	1128
Manf	96	1775	102	176	226	120	602	3096	1260	0	406	-24	14248	7465	26452
Energy	10	454	63	13	61	24	170	795	562	0	19	0	774	6	2156
Const	8	52	1	243	21	3	265	593	132	0	922	14	569	101	2331
Dist	37	470	8	40	116	62	146	880	3700	0	19	0	1397	276	6270
Transp	9	363	9	17	267	144	347	1156	377	0	13	0	780	278	2604
Other	60	1079	61	141	400	168	2118	4027	4543	9001	192	0	1602	400	19765
TOTAL	313	4412	244	632	1107	521	3658	10888	10622	9001	1574	-2	19973	8650	60707
Income from emp	360	3947	177	841	2536	925	9008	17794	0	0	0	0	0	0	17794
Imp UK	270	6497	673	634	1150	470	2328	12022	5716	0	2094	8	185	135	20161
Imp OS	72	5223	176	113	122	64	413	6183	2347	0	1371	0	128	47	10076
SFD	1	399	1	4	4	7	135	552	431	-476	-601	0	38	57	0
Tax	-10	2458	384	9	566	146	1011	4564	2411	0	330	2	0	0	7307
OVA	121	3515	502	98	786	470	3212	8704	0	0	0	0	0	0	8704
TOTAL	1128	26452	2156	2331	6270	2604	19765	60707	21527	8525	4768	8	20324	8890	124748
Fte	32686	218970	7447	65430	183400	48772	409476	966181	9-110						966181

Income from Employment - Gross wages and salaries including employers NIC etc, plus self-employed income.

Imp UK - Imports from the rest of the UK

Imp OS - Imports from Overseas

SFD - Sales by Final Demand (purchase of second hand equipment etc)

Tax - Taxes less subsidies

OVA - Other Value Added (Gross profits, rents etc)

Ftes - Full-time equivalent employees and self-employed

Consumers - Consumers expenditure

Government - General Government Final Consumption
Investment - Gross Domestic Fixed Capital Formation
Stocks - Value of the physical stock change

equal gross industry outputs) of £26.452bn. The final row of the table shows estimated employment in terms of full-time equivalent jobs. The project also further disaggregated employment into different occupation types.

Reading across the manufacturing row, the sector sold an estimated £96m to the agricultural sector, £1.775 to other manufacturing sectors etc. Total intermediate sales to other Welsh sectors were an estimated £3bn. In addition, consumers in Wales purchased manufactured products, with manufacturing output also purchased for investment. Manufacturing sectors in Wales sold an estimated £7.5bn of goods overseas, with a further £14.2bn sold to the rest of the UK.

#### **Applications**

The I-O tables enable the sectors of an economy to be described in terms of size (employment, output and GDP contribution), import or export intensity, local purchasing, labour intensity etc.

The other main use of the tables is to predict the economic consequences of changes by tracing impacts though supply chains. For example, if a manufacturing industry expands, perhaps because of a new export order,

then that industry will require extra inputs (including labour) to satisfy the extra demand. Suppliers to the industry in turn will then also require extra inputs etc. The I-O tables allow the effects of these changes to be estimated by calculating the flow-on, or multiplier impacts. Multipliers can be calculated for output, income, employment (including by occupation) and GDP. In a similar way the tables can be manipulated to explore the possible outcomes of policy changes, and to assess the relative significance (including indirect incomes, supported) of different jobs, etc sectors.

Examples of recent WERU projects involving the I-O tables include an assessment of the economic significance of Arts and Cultural Industries in Wales, the Forestry Multiplier study, Tourism Planning Model for Wales, and the potential economic effects of infrastructure development (a full list of WERU projects can be found on www.weru.org.uk).

### Developments - Phase 4 Onwards.

The present phase of the Welsh I-O project, to further develop 'core' (all Wales level) tables is being financed jointly by WDA and Cardiff Business School and involves:

- Updating the first stage (due to be completed by the end of March 2000) will update (using new survey data) the Wales level table, to 1998. Subsequent years will update further. This updated table will detail trade flows within Wales, estimate exports and imports by sector, and provide occupational disaggregations.
- Methodological changes, reflecting UK changes in relation to European System of Accounts (ESA).
- Other methodological developments, such as incorporating supply-side constraints and changes will be explored.

Additional to the development of the core project, a number of further complimentary extensions are possible, including:

- Environmental analysis. WERU is currently exploring methodologies for including environmental extensions to the I-O tables. This would allow the environmental impacts of actual or potential economy changes to be simulated.
- Modelling qualification and vocational skill use
- Development of sub-regional models.