

The demand of skilled employment within the Lanarkshire economy: An extended input-output analysis

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Introduction

The evolution of the Scottish economy has been the subject of many debates. Whilst 'de-industrialisation' and the shift from manufacturing to services are well documented, the new relationship between these two major components of the economy is less than clear. In the past manufacturing was typically the driver of economic activity whilst services were reliant upon the manufacturing base³.

The Lanarkshire economy has developed from a region dominated by heavy manufacturing into a melting pot of light manufacturing and services. This paper uses the Lanarkshire Labour Market Intelligence (LLMI) model⁴ to examine whether the traditional relationships between the various sectors of the Lanarkshire economy still hold.

Background

The relationship between manufacturing and services has often been described as symbiotic. Where manufacturing suffered or prospered, services would respectively decline or grow. Over recent years the relatively high value of sterling has hit exports from the manufacturing sector particularly hard. At the same time services within the UK and Scotland have continued to grow apace. This has convinced many to conclude that we are now a 'service-led' economy.

Arguably no region within Scotland embodies this phenomenon more than Lanarkshire. The former core of the Lanarkshire economy was steel and other heavy manufacturing. It now focuses upon lighter manufacturing, housing the larger part of silicon glen. Lanarkshire has also attracted a significant proportion of the new call centre industry into the area.

Data and Methodology

The LLMI model is an extended Input-Output model capable of simulating changes in the demand for skilled employment for given impacts upon the Lanarkshire economy. The LLMI model was produced on behalf of Scottish Enterprise Lanarkshire (SEL). The project involved the production of an Input-Output table measuring the linkages between 128 sectors within Lanarkshire and a set of satellite accounts detailing key labour market characteristics for the area. The satellite accounts record employment within 371 occupations in 128 industries with 40 qualifications in 7 social classes. The model itself consists of two components, an Input-Output economic model and a labour market satellite derived from the table and satellite accounts respectively. A detailed discussion of the LLMI model is given in the project report⁵.

An extended Input-Output model allows not only simulation but also a 'base-line' analysis of a snapshot of the economy. In this snapshot it will be possible to estimate which industries provide 'direct' employment by attracting external (final) demand, such as exports, investment, government expenditure and tourism.

All employment within Lanarkshire is recorded within the model and in addition to direct employment indirect and induced employment is also included. Indirect employment is generated by sectors supplying other industries within Lanarkshire. Workers spending part of their wages on local goods and services generate induced employment. Indirect and induced effects are often referred to as 'knock-on' effects.

The base year Lanarkshire Input-Output table was aggregated to 12 sectors. The model then estimated the direct, indirect and induced employment outcomes generated by the final demand sales of these sectors.

Table 1 shows the total employment within Lanarkshire was equal to 172,377 full time equivalent (FTE) jobs, where 2 part time jobs are the equivalent of 1 full time job. Direct employment generated by final demand stood at 119,619 FTE jobs whilst secondary⁶ employment was 52,758. Direct employment accounted for 69% of the total employment in Lanarkshire, the equivalent figure for the Scottish economy is 58%⁷. Because Lanarkshire is a smaller economy than Scotland, it will naturally tend to import and export more thus placing a greater reliance on final demand and direct employment.

Table 1 also shows the allocation of total employment within each sector to direct and secondary. The total employment within the agriculture forestry and fishing sector is 1,505 FTE jobs of which 1,192 jobs (79%) were direct employment generated by final demand sales of the

agriculture sector itself. The remaining 313 jobs were generated as 'knock-on' effects in the agriculture sector arising from the activities of other sectors within Lanarkshire.

The sector with the highest direct employment was construction with 92%, driven primarily by investment. Manufacturing was also high with 88% direct employment, driven primarily by exports.

The sector with the lowest direct employment was hotels and restaurants with 44% whilst the wholesale and retail trade sector was the next lowest with 46%. Attracting final demand in the form of tourists' expenditure created direct employment within these sectors. However, the main drivers were consumers within Lanarkshire spending their wages within these sectors (restaurants and retailing) and other sectors within Lanarkshire purchasing from them (wholesale trade).

Table 1 provides an overview of direct and secondary employment creation within each sector. Before any conclusions may be drawn the sectors which create the secondary employment must be identified. For example employment within the wholesale and retail trade consisted of 18,284 secondary jobs created by the demand from other sectors within Lanarkshire. Table 1 does not indicate which 'other sectors' created the demand.

Table 2 shows the total skilled employment created by each sector. The employment created by agriculture et al was estimated at 1,677 jobs, which is higher than the employment within the sector itself (1,505 jobs), as shown in Table 1. This is because the secondary employment created by the agriculture sector is also included in the results of table 2. Workers within the agriculture sector may spend part of their wages in local restaurants thereby creating secondary (induced) employment within Lanarkshire.

The table also gives a breakdown of skills⁸ by social class, which indicates the skill level of employment created by each sector. The financial sector creates relatively highly skilled employment with 6% in professional occupations and only 2% in unskilled jobs. The hotels and restaurants sector creates relatively low skilled employment with 0% in professional occupations and 9% in unskilled jobs.

Greater insight into the economic processes at work in Lanarkshire can be obtained by comparing employment generated by a sector with actual employment *in* the sector itself. Table 3 shows the total employment within each sector from table 1 and its impact upon the rest of the economy from table 2. A ratio was calculated by dividing the impact of each sector by its size. Sectors that punch above their weight in terms of job creation will have a ratio above 100%.

As expected both construction and manufacturing punch above their weight in terms of job creation. Construction has a ratio of 121% and manufacturing 112% just ahead of agriculture at 111%. The ratios of all but one service sector fell below 100% suggesting the old manufacturing base relationship still existed. However, the other services sector ratio stood at 276% more than double the next highest sector (construction). There were 2 reasons for the exceptionally high job creation of this sector.

Firstly an injection into the economy which is often overlooked in Input-Output modelling is unearned income such as benefits or income from investments (pensions etc). This is injected through the household sector, which is included within the other services sector in the aggregate table used in this analysis. The injection is large and tends to be spent locally.

Secondly the other services sector includes domestic, personal and recreational services. These activities are highly labour intensive, and tend to employ Lanarkshire residents. Thus, a high proportion of their total operating expenditures is made up of local wage and salary payments. For example, labour purchases within domestic services such as cleaners, gardeners, cooks and child-carers make up 93% of the sectors total inputs.

Conclusions

Care must be taken in using an 'export base' approach to analyse the economy. Competitiveness is partly derived from suppliers to exporters so that so-called 'secondary' employment may actually contribute towards exports and other final demand⁹. For example the Lanarkshire economy has a larger than expected output of glass and packaging products which are sold to the Dairy sector. The export base identifies this industrial cluster but does not distinguish the 'value added' at each point in the cluster.

The results from the LLMI model suggest that service activities within Lanarkshire are not wholly dependent upon the manufacturing base. Manufacturing continues to be a significant driver alongside other production sectors such as construction and agriculture.

A large share of service activities is still dependent on production activities. However, the LLMI model also identified a service base consisting of recreational, domestic and personal services in which households within Lanarkshire play a significant role. Demand from this service base creates employment within other sectors including production such as manufacturing and construction. This is a reversal of the traditional manufacturing base relationship.

Table 1: Direct, secondary and total FTE employment within each sector

<i>Code</i>	<i>Description</i>	<i>Direct</i>	<i>Secondary</i>	<i>Total</i>
1	Agriculture, Forestry and Fishing	1,192	313 1,505	
2	Mining and Quarrying	320	297	616
3	Manufacturing	42,482	5,579	48,061
4	Electricity, Gas and Water Supply	183	413	596
5	Construction	11,801	1,069	12,870
6	Wholesale and Retail Trade	15,318	18,284	33,602
7	Hotels and Restaurants	4,572	5,799	10,371
8	Transport Storage and Communication	8,101	4,429	12,530
9	Financial Intermediation	1,970	1,523	3,493
10	Business Activities	9,425	4,495	13,920
11	Public Administration	19,772	5,384	25,155
12	Other Services	4,485	5,175	9,660
-	Total	119,619	52,758	172,377

Table 2: FTE Employment by social class caused by sectoral final demand

	<i>Professional Occupations</i>	<i>Intermediate Occupations</i>	<i>Skilled Occupations (non-manual)</i>	<i>Skilled Occupations (manual)</i>	<i>Partly Skilled Occupations</i>	<i>Unskilled Occupations</i>	<i>Armed Forces</i>
Agriculture, Forestry & Fishing (1,677)	18 (1%)	559 (33%)	213 (13%)	242 (14%)	615 (37%)	30 (2%)	0 (0%)
Mining & Quarrying (520)	9 (2%)	205 (40%)	105 (20%)	136 (26%)	54 (10%)	11(2%)	0 (0%)
Manufactures (53,655)	2,144 (4%)	10,625 (20%)	7,042 (13%)	17,410 (32%)	14,803 (28%)	1,631 (3%)	0 (0%)
Electricity, Gas & Water Supply (312)	20 (6%)	112 (36%)	41 (13%)	60 (19%)	45 (15%)	34 (11%)	0 (0%)
Construction (15,570)	552 (4%)	3,177 (20%)	1,881 (12%)	7,151 (46%)	1,824 (12%)	985 (6%)	0 (0%)
Wholesale & Retail Trade (18,245)	372 (2%)	4,588 (25%)	8,707 (48%)	2,267 (12%)	1,877 (10%)	434 (2%)	0 (0%)
Hotels & Restaurants (4,981)	15 (0%)	891 (18%)	571 (12%)	978 (20%)	2,063 (41%)	463 (9%)	0 (0%)
Transport, Storage & Com. (12,094)	230 (2%)	2,239 (19%)	1,978 (16%)	5,483 (45%)	1,635 (14%)	529 (4%)	0 (0%)
Financial Intermediation (2,329)	147 (6%)	884 (38%)	1,096 (47%)	71 (3%)	96 (4%)	35 (2%)	0 (0%)
Business Activities (12,345)	1,662 (14%)	3,012 (24%)	3,171 (26%)	1,310 (11%)	1,889 (15%)	1,301 (10%)	0 (0%)
Public Admin (24,001)	1,907 (8%)	9,664 (40%)	5,623 (24%)	2,179 (9%)	2,847 (12%)	1,507 (6%)	274 (1%)
Other Services (26,651)	853 (3%)	6,786 (26%)	6,752 (25%)	5,580 (21%)	5,142 (19%)	1,538 (6%)	0 (0%)
Total (172,377)	7,930 (5%)	42,741 (25%)	37,179 (21%)	42,867 (25%)	32,890 (19%)	8,496 (5%)	274 (0%)

Table 3: Ratio of total impact employment generated by each sector to total employment within sector

<i>Code</i>	<i>Description</i>	<i>Total</i>	<i>Impact</i>	<i>Ratio</i>
1	Agriculture, Forestry and Fishing	1,505	1,677	111%
2	Mining and Quarrying	616	520	84%
3	Manufacturing	48,061	53,655	112%
4	Electricity, Gas and Water Supply	596	312	52%
5	Construction	12,870	15,570	121%
6	Wholesale and Retail Trade	33,602	18,245	54%
7	Hotels and Restaurants	10,371	4,981	48%
8	Transport Storage and Communication	12,530	12,094	97%
9	Financial Intermediation	3,493	2,329	67%
10	Business Activities	13,920	12,345	89%
11	Public Administration	25,155	24,001	95%
12	Other Services	9,660	26,651	276%
-	Total	172,377	172,377	100%

Endnotes

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³ Note that this is usually referred to as the 'export base', however in this model we consider all sources of final/external demand which include but are not limited to exports

⁴ Recent work undertaken on behalf of Scottish Enterprise Lanarkshire (SEL) developed an extended Input-Output model for simulating the demand for skilled labour within the Lanarkshire economy

⁵ The Lanarkshire labour market intelligence report, Strathclyde Papers in Economics Discussion Paper 2001/2, University of Strathclyde.

⁶ The tables within this report refer to the combination of indirect and induced effects as secondary.

⁷ Taken from the previous Scottish labour market intelligence (SLMI) model

⁸ Within the LLMI model 'skills' are defined with 3 dimensions in terms of occupation, qualification and social class

⁹ The classic example being forestry and logging where exports from logging are dependent upon forestry. An export base approach would define forestry as indirect or 'passive' whereas this is clearly not the case.