Employment supported by Scottish Export Demand

April 2017

Introduction

We have been asked to estimate the number of jobs in Scotland linked to the demand for exports from the rest of the UK, the rest of the EU and other international exports.

There are a number of different methodologies that can be employed to arrive at such an estimate. This note sets out one such approach and the key results that follow. As with all such analysis, these figures are estimates and should be viewed as such. However, they give a relatively robust indication of the employment supported by Scottish exports.

To undertake this analysis we use data published by the Scottish Government in their most recent input output tables – for 2013 – and export information published in Export Statistics Scotland. Both are National Statistics reports. The methodology is outlined below.

The headline results are contained in the following table[1].

Table 1: Scottish employment supported by external demand, 2013

	Non-resident households[2]	RUK exports	REU exports	RWorld exports	Total
Direct Employment	52,053	304,140	71,945	101,265	529,403
Indirect Employment	8,930	142,213	32,206	46,257	229,606
Induced Employment	7,158	82,354	21,055	30,031	140,598
Total	68,141	528,707	125,206	177,553	

Source: Fraser of Allander

According to the methodology and data set out below, it is estimated that around 530,000 jobs in Scotland are supported by demand for our goods and services from the rest of the UK.

Around 125,000 jobs in Scotland are supported by export demand from the rest of the EU, and slightly over 175,000 jobs are supported by export demand from the rest of the world.

[1] See below for a discussion of the definitions of direct, indirect and induced employment.

[2] Non-resident households refers effectively to tourist spending in Scotland (which is classified as an export). We do not disaggregate these into geographical areas due to a lack of data. Tourists will invariably come from all three geographic groups in different proportions. But overall, there inclusion will not drastically alter the key results.

What are these as a share of total employment in Scotland?

We can convert these numbers into shares of total employment in Scotland using comparable data – again from the Scottish Government input-output tables – on total employment in Scotland.

Putting this all together shows that in 2013, **24.0%** of Scotland's employment was supported (summing direct, indirect, and induced effects) by trade with the rest of the UK (RUK).

The equivalent number for trade with the rest of the EU (REU) was **5.7%** and for the rest of the world (ROW) was **8.1%**.

The table below gives the shares of Scottish employment supported by demand from each source, in 2013, by type of employment effect.

Table 2: Total Scottish employment supported by each source of external demand, 2013

	RUK exports	REU exports	RWorld exports
Direct Employment	13.8%	3.3%	4.6%
Indirect Employment	6.5%	1.5%	2.1%
Induced Employment	3.7%	1.0%	1.4%

Source: Fraser of Allander

One might naturally wonder, given differences in sectoral demand across different sources of exports, whether the % of employment supported by RUK, REU and ROW demand vary in terms of the components (direct, indirect, induced). This information is contained in the table below.

Table 3: % of direct/indirect/induced employment supported by each source of external demand[3]

	RUK exports	REU exports	RWorld exports
Direct Employment	63.7%	15.1%	21.2%
Indirect Employment	64.4%	14.6%	21.0%
Induced Employment	61.7%	15.8%	22.5%

Source: Fraser of Allander

It is clear, the shares are fairly stable, there is little difference between considering the impact of these individually (direct v. indirect v. induced) or collectively, except in terms of scale.

In Table 4 we look in more detail at a sectoral level, and we can see the sectors where Scotland's export demands support the most jobs. Tourist demand, as one would expect, support jobs mostly in Scotland's services sector. Elsewhere, REU export demand support jobs mostly in manufacturing and

[3] Note rows may not sum exactly to 100% due to rounding.

services in relatively equal measure, with ROW exports supporting slightly more employment in services than manufacturing. RUK trade, as one might also expect, support more employment in services than in manufacturing.

Table 4: Sectoral breakdown of jobs supported by export demand[4]

	Non-resident households	RUK exports	REU exports	RWorld exports	Export Total
Agriculture & Mining	967	50,378	5,154	8,827	65,326
Manufacturing, Utilities and Construction	1,525	150,159	55,178	64,028	270,890
Services	65,649	328,171	64,875	104,697	563,392
Total	68,142	528,708	125,207	177,552	

Source: Fraser of Allander

Overall, most of Scotland's export demand supports employment in the Services sector (62.6%), with 30.1% of the employment supported by export demand in the manufacturing sector and 7.3% in the Agricultures sector.

Methodology

Data

In this exercise we use the most recent (2013) input-output tables for Scotland (link here). Economic input-output tables provide a complete picture of the flows of goods and services (products) in the economy for a given year.

They detail the relationship between producers and consumers and track the interdependencies of industries. They are constructed directly from survey and other data sources and provide the most accurate and comprehensive picture of the national economy that is available.

Given the scale of resources that goes into compiling these tables, they are typically published with a lag. Hence, why the 2013 tables are the most recent.

Using these data we can attribute jobs to RUK export demand using the information in the tables themselves on export demand from RUK by sector and applying the appropriate employment effects for each sector[5]. These are calculated by the Scottish Government and provided with the input-output tables.

[4] Note- the totals in this table do not exactly match those in Table 1 due to rounding.

[5] Employment effects are defined as showing "the direct plus indirect (plus induced if Type II multipliers are used) employment change to the direct output change due to a unit increase in final demand." www.gov.scot/Topics/Statistics/Browse/Economy/Input-Output/Mulitipliers

Calculation of REU and ROW Exports

For trade with the rest of the EU, we have to first disaggregate the information on export demand from the rest of the world. This is done using Export Statistics Scotland (ESS) data produced by the Scottish Government (link here). In this case, we use the 2015 data. The reason for this is that the 2013 ESS data do not break ROW export demand at a sectoral level down into demand from REU and demand from ROW.

We therefore use the sectoral *shares* of export demand based on 2015 ESS data, but otherwise, everything is constrained and based on the 2013 Scottish input-output data. Thus the 'scale' in terms of the sum of employment supported by REU and ROW export demand is the same regardless of the way we split out total ROW demand using the Export Statistics Scotland data.

As with all such estimates and methodologies, slightly different assumptions and changes in data will impact on the final estimates. However, these changes will be relatively marginal in the overall scheme of things.

Having disaggregated ROW export demand from the input-output tables into demand from the rest of the EU and the rest of the world, we apply sectoral employment effects from the input-output tables as we did for RUK trade.

Export Statistics Scotland

The source of export data we use in this analysis to allocate shares is from the Export Statistics Scotland (ESS) publication. This National Statistics publication is produced by the Scottish Government and is the most comprehensive measure of Scottish exports.

It is based upon a survey – the Global Connections Survey – sent to 5,500 business in Scotland each year and is targeted at the most export intensive companies. Other data are then used to enhance the GCS.

The data in ESS is based upon the final destination of a particular product. Therefore, even if a product – such as Scotch whisky exports – leave from a port or airport elsewhere in the UK they will still be counted as a 'Scottish export'.

For some products, a company may export a good to another company in the rest of the UK who, in turn, export it somewhere else (or use it as an input into a bigger product that is exported). Provided that the final destination is known then the first of these will count as a Scottish export. But on some occasions, if the end destination is unknown, the good will show up as an export to the rest of the UK.

It is currently very difficult to estimate cross border flows of complex supply chains as there is no 'economic border' between Scotland and the rest of the UK where such flows can be monitored.

The Scottish Government has indicated that they believe that whilst it is not possible to estimate the exact scale of such effects, over half of all goods exported to the rest of the UK are in services – such as financial services – or utilities etc. and are therefore unlikely to be onward exported.

Part of our new research programme – supported by the new ONS Economic Statistics Centre of Excellence – aims to see if we can obtain improved estimates of such trade flows.

A note on different employment effects

We can think of three different types of employment supported by demand for the output of a sector.

Firstly there is *direct* employment, that is, employment in that sector. This can be estimated by taking the number of people working in a particular sector, divided by the output of that sector. This gives an estimate of employment per £m of output of that sector.

Next, one can think about *indirect* employment supported by the output of that sector. That is, employment in other sectors which are in the supply chain. This is the key reason why we use the input-output data in our analysis as it can capture these sectoral interdependencies in the economy. Any exported product will be made using a variety of intermediate inputs. The production of these intermediate inputs requires people to work in the sector that produces these inputs supporting more jobs.

Finally, we have the *induced* employment effects. The production of the output of a sector requires the employment of workers in that sector and in the wider economy to produce inputs. These workers (households) receive income for this work, a portion of which they then, in turn, spend on goods and services across the economy as a whole. This increases demand in the economy and further stimulates employment. The increase in employment as a result of this spending is referred to as the induced effect.

For a discussion of these different effects, see www.gov.scot/Resource/0048/00484660.pdf.

Note

The analysis set out above has been conducted by the Fraser of Allander Institute (FAI) at the University of Strathclyde. The FAI is a leading independent academic research centre focussed on the Scottish economy. The report was commissioned by the Scotland Office. The Scotland Office determined the specific research question to be analysed.

> *We would like to conduct an economic analysis that shows how many jobs in Scotland are linked to exports with the rest of the UK and how many jobs are linked to EU exports and other international exports. This should estimate the number of jobs in Scotland that depend directly and indirectly on exports. It is desirable to include a sectoral breakdown.*

The technical analysis, methodology and writing of the results was undertaken independently by the FAI.

The FAI is committed to informing and encouraging public debate through the provision of the highest quality analytical advice and analysis. We therefore are happy to respond to requests for factual advice and analysis. Any technical errors or omissions are those of the FAI.

April 2017