Summary Quality Report for the Index of Production for Wales and the Index of Construction for Wales

1. Introduction

Summary Quality Reports are overview notes that pull together key qualitative information on the various dimensions of quality as well as providing a summary of methods used to compile the output.

The Index of Production for Wales and the Index of Construction for Wales (IoP/IoC) are National Statistics produced by the Office for National Statistics (ONS) on behalf of the Welsh Government and published by the Welsh Government in a quarterly Statistical First Release. The IoP/IoC covers activities in the production, manufacturing and construction industries in Wales as defined by the 2007 Standard Industrial Classification (SIC).

The Index of Production for Wales (IoP) and the Index of Construction for Wales (IoC) are two separate indices compiled to produce a single report. The Index of Production has three sub-indices covering Section B – Mining and Quarrying; Section C – Manufacturing and Sections DE – Electricity, Gas and Water Supply. The sections are from the 2007 Standard Industrial Classification (SIC); with the Index of Construction covering section F.

The latest information on the weights can be found within the most recent First Release. This can be found on the Welsh Government Website for the Short Term Output Indicators[1].

2. Summary of Quality

2.1 Relevance
The degree to which the statistical product meets user needs for both coverage and content.

The principal data source for the IoP/IoC is the Monthly Business Survey[8] (MBS) which collects information on turnover (defined as the value of sales, work done and services rendered and excludes VAT) and employees from businesses in the production and services industries. The Monthly Business Survey is now being carried out instead of the Monthly Production Inquiry (MPI) and the Monthly Inquiry into the Distribution and Service Sector (MIDSS).

The MBS is a UK-wide survey in which respondents are asked to provide their national total turnover for all of their activities. The results from this survey are used to calculate the relative movements of the individual series and these are in turn weighted together to produce the overall index. The weights to do this are derived from the distribution of Gross Value Added (GVA) for Wales using the Regional Accounts.

Both volume and sales data are used to compile the index. The sales data are deflated to 2005 prices using the deflators produced for the UK index, but with component price indices weighted together according to the share of Welsh sales.

The separate components of the production index are weighted together based on the 2008 Gross Value Added (GVA) figures for Wales. As such, the Index of Construction (IoC) has no weights as it is a separate series. The IoP/IoC aims to be comparable to the UK Index of Production and Construction sectors of UK quarterly Gross Domestic Product (GDP) by the output method. Currently there are no quarterly GDP estimates for Wales, so the short term output indices are used to identify short term trends in the output of the economy in Wales.

Given that Gross Value Added (GVA) is unavailable on a SIC2007 basis at present, the GVA weights contained within this release have been calculated by apportioning 2008 GVA from SIC2003 to SIC2007. It is intended that the real SIC2007 GVA weights will be included in the publication of the Index of Production for Wales and the Index of Construction for Wales Quarter 1, 2012.

Some industries are not covered by the monthly turnover survey. Examples include the whole of the construction industry, manufacture of steel and refined petroleum, and electricity and gas supply. For these industries alternative data sources have been found, mostly direct volume measures, and regular supply of data has been set up with the relevant providers via the Welsh Government. This data is collected by the Welsh Government for the Index of Production alone and accounts for approximately 21 per cent of the Welsh Index. The notable exception is the construction industry, for which ONS compiles and publishes regional data based on a separate survey. Some data are obtained from administrative sources; the list of sources is included in the [Statement of Administrative Sources][2].

In order to provide estimates with a sufficient level of regional accuracy, supplementary top-up data will be needed for many industries. To help in this we define 'regionality' as the proportion of total turnover provided by businesses sampled operating wholly within the region. A guideline cut-off of 70 per cent is used to determine good quality true regional indicators, on advice from ONS Methodology Directorate. Its purpose is to give a target to work with that will provide some degree of consistency and an approximate measure of regional relevance in an area where quality measures are scarce. There are several indices where the regionality falls below 70 per cent, however those indices are deemed publishable as either the sample size is large enough or coverage of the industry is sufficient. More information is given about this in the accuracy section.

2.2 Accuracy
The closeness between an estimated result and the (unknown) true value.

The IoP/IoC makes the assumption that short-term movements in output track movements in Gross Value Added (GVA).

There are quality assurance procedures in place to understand and explain movements in the data, to allow informed quality adjustments and to check that the computer system is calculating the published indices correctly.

Tables contained at the back of the IoP/IoC First Releases inform the users whether the outputs have been revised or not (denoted "(r)"). Within the notes section of the release is a table showing the revisions to the most recent data. Tables giving the output for all quarters from Quarter 1 1998 through to the current quarter are available on [Stats Wales][2].

Revisions to data occur for a number of reasons: late returned forms, incorrect estimates or revised back data and revisions to seasonal adjustment factors which are re-estimated every period and

subject to annual review. The weights associated with the Welsh data are based on 2008 GVA data from the Regional Accounts at the Section Level, and this has been updated from 2006 GVA since the 2011 Q1 First Release, published in June 2011. All figures would have been revised to be referenced to make the new base year 2008=100.

The index numbers in the tables are all seasonally adjusted where the series have been identified as seasonal. This aids interpretation by removing annually recurring fluctuations, for example, due to holidays or other regular seasonal patterns.

In order to determine regionality the turnover data for the months of January to December 2010 have been assessed and the average sample sizes of Welsh industries have been determined. Where the sample sizes were found to be small, recommendations were made to combine industries, providing there was a sufficient degree of similarity in the nature of the activities covered.

The table below shows the relative sample sizes for the production industries covered by the MBS, and also shows the industries measured using other data sources. As can be seen due to recommendations some of the SIC divisions have been combined. The regionality over 2010 has also been included.

Table 1:

Section	SIC	Sample Size from MBS	Volume [1]	% Regionality
IoP	Total	523	+ Vol	79%
B	Total	5	+ Vol	94%
C	Total	492	+ Vol	75%
	CA	68	+ Vol	48%
	CB	19		83%
	CC	45		83%
	CD		Vol	100%
	CE-CF	39		70%
	CG	55		67%
	CH	68	+ Vol	86%
	CI-CJ	46		75%
	CK	36		75%
	CL	38		85%
	CM	78		83%
D	Total		Vol	100%
E	Total	26	+ Vol	98%
F	Total		Vol	N/A

(1) "Vol" indicates a range of different data sources other than MBS turnover,

not necessarily actual volume flows.

Users will note that some industries (CA – Food, beverages and Tobacco and CG – Rubber and plastics and other non-metallic minerals) which are currently published are below the 70 per cent regionality level specified by the ONS. However these have been considered as being reliable as the sample sizes are large enough. Users should also note that industries D&E have been combined to produce a more robust series for publication named as DE – Electricity, Gas and Water Supply.

More information on sample sizes can be found in the Regional Short Term Indicators Feasibility Study[3] whilst respondent burden information is given at the end of this report.

2.3 Timeliness and Punctuality

Timeliness refers to the lapse of time between publication and the period to which the data refer. Punctuality refers to the time lag between the actual and planned dates of publication.

The First Release is available online and there are scheduled outputs for economy and labour market notices of releases contained on the Welsh Government website Due out Soon[4] page.

The IoP/IoC is published quarterly. It is the earliest official indicator of the performance of the Welsh production and construction industries other than the UK figures which are produced by the Office for National Statistics monthly. The IoP/IoC is published on the Welsh Government's website as a First Release. There is approximately a 14 week lapse of time between publication and the period to which the release refers to.

As the IoP/IoC is a short-term indicator, the main users want the figures to be available as soon as possible after the end of the period to which they refer. As a result revisions are an inevitable consequence of the trade off between timeliness and accuracy.

2.4 Accessibility and Clarity

Accessibility is the ease with which users are able to access the data, also reflecting the format(s) in which the data are available and the availability of supporting information. Clarity refers to the quality and sufficiency of the metadata, illustrations and accompanying advice.

The Index of Production for Wales and the Index of Construction for Wales First Releases are available for download in a pdf format after 9.30am on the pre-announced day of publication. They can be found on the Welsh Government Website[1] statistics pages and Stats Wales[2] from then onwards. Stats Wales is a free-to-use service that allows visitors to view, manipulate, create and download tables from the most detailed official data on Wales.

Welsh Government policy allows a list of agreed officials and ministers to have pre-release access to the data before publication. The Welsh IoP/IoC First Release conforms to the standards set out in the UK Statistics Authority Code of Practice for Official Statistics Release practises.

The First Releases provide charts of the major components (IoP, IoC and the Index of Manufacturing (IoM)) to visually show the movement of the industries. Charts showing the weighted changes are available in the release to emphasize the individual components and their contributions to the overall IoP/IoC. Currently tables with the output from 1999 quarter 1 up to the present are contained in the back of the release for the users to see where the calculations were derived from, and which data have been revised or not (denoted "(r)").

Within the release, commentary is provided to describe reasons for movements in the indices. This commentary includes as much detail as is possible from the underlying data without disclosing any information about a particular business and ensuring that changes which are robust enough are identified.

For queries on the IoP/IoC series, compilation methods, quality information or difficulties in finding the latest figures, please email: economic.stats@wales.gsi.gov.uk.

2.5 Comparability
The degree to which data can be compared over time and domain.

The IoP/IoC classifies the activities of businesses operating in Wales to the industry of the enterprise as held on the Inter-Departmental Business Register (IDBR), regardless of the actual activity being carried out at the sites (local units) in Wales. The main reason for this approach is to maintain consistency (and hence comparability) with the corresponding national indicators, which also classify all activities of an enterprise to the industry of its major activity regardless of the mix of activities the company is actually engaged in.

The IoP/IoC aims to be comparable to the UK Index of Production and the production and construction sectors of UK quarterly Gross Domestic Product (GDP) by the output method. Every effort is made to ensure that the series is comparable over time; as such data are available back to 1998 on Stats Wales and 1999 on the release. Where possible, changes to methodology are applied to the whole series to ensure this comparability is maintained.

A First Release is also produced for the Index of Market Services for Wales (IoMS) which complements the IoP/IoC. Both releases provide a short-term measure of change in the output from private sector businesses in Wales.

The Scottish Government (SG) produces short-term output indicators for Scotland, and the Department of Enterprise, Trade and Investment Northern Ireland (DETINI) produces short-term output indicators for Northern Ireland both independent of the ONS. The basic principles underlying the indicators in Scotland and Northern Ireland are the same as those used in Wales. The data used are deflated turnover from monthly and quarterly surveys, with other industries measured by deflated production, direct volume measures or employment numbers. Component indices are aggregated by annual chain-linking.

Scotland is the only sub-UK area for which quarterly estimates of Gross Domestic Product (GDP) are produced covering the whole economy. One of the differences between the Scottish and Welsh approaches is the scope; Scotland has indicators for Agriculture, Forestry and Fishing, and for the public sector services: Public Administration, Education, and Health and Social Work. Wales does not currently have indicators for these industries.

DETINI publishes indices covering the Production and Service sectors of the economy. Construction indices for Northern Ireland are produced by ONS and published by the Northern Ireland Statistics and Research Agency (NISRA). Northern Ireland weights for aggregating component series are taken from the Northern Ireland Annual Business Inquiry (NIABI).

Wales uses Regional Accounts GVA for section and sub-section level weights, with lower level detail from the regional Annual Business Survey (ABS) results. Data for the Welsh Construction industry are supplied by ONS, and are produced in the same way as those for Northern Ireland, Scotland and the English regions.

For more information on the difference between the Scottish and Irish methods, see the Regional Short Term Indicators (RSTI) Feasibility Study[3] by the ONS.

2.6 Coherence

The degree to which data that are derived from different sources or methods, but which refer to the same phenomenon, are similar.

There are three other similar data sources which also cover output of the Welsh economy:

ABS[5] –formerly known as the Annual Business Inquiry - part 2 (ABI/2), this is an annual publication which produces estimates of turnover and approximate Gross Value Added (GVA) (using non-national accounting based definitions). These estimates are not deflated and do not have complete coverage of the Welsh economy.

GVA[6] – this is an annual publication which shows the total economic output for Wales and its sub-regions by industry. It is produced to internationally agreed standards. The data given are in £ millions and are not deflated. These estimates are produced using the income approach.

The ONS are also investigating producing Gross Value Added using the production approach[7]. This may lead to estimates of GVA in real terms (i.e. deflated for value) being made available annually.

3. Summary of Methods Used to Compile the Output

The principal data source for the IoP/IoC is the ONS Monthly Business Survey (MBS). This monthly survey provides most of the data used to derive the Index of Production for Wales and Index of Construction for Wales. The MBS is a UK-wide survey in which respondents are asked to provide their national total turnover for all of their activities. There is no explicit regional breakdown of the data. Because the national turnover surveys are not designed to collect regional data, the coverage of Wales can vary over time. Although large companies are selected continually, smaller businesses are selected via a rotational sampling scheme, and the number of these businesses operating in Wales that are selected is subject to random variation.

The IoP/IoC uses a wide variety of different data from several sources. Each industry in the IoP/IoC is expressed as an index series and therefore to be able to compile higher level aggregates the industries are weighted together. This is done according to their relative contribution to total GDP, based on their gross value added at a set point in time. In general the larger the gross value added for a particular industry the larger will be its relative contribution to total GDP and so the higher will be the 'weight' associated with that industry.

The IoP/IoC Production team uses a variety of procedures to try to ensure that the estimate is of high quality. The purpose of these is to understand and explain movements in the data, to allow informed quality adjustments and to check that the computer system is calculating the published indices correctly.

Estimation of Regional Turnover

The process for deriving regional turnover estimates from national survey results is as follows:

1. Obtain monthly regional data extracts from the survey computer system;
2. Divide the data up into industries;
3. For each industry, calculate average turnover per head (TPH) for each month;
4. Multiply average TPH by total workforce in Wales for each industry;
5. Aggregate three months to obtain quarterly estimate.

In more detail:

1. The regional data extracts include respondent level data for all companies in the national survey that have at least one site (local unit) operating within the region of interest. For each company its total employment and its employment in the region of interest are listed for the latest period, and these are used to derive a proportion of the company that is within the region. This proportion is then applied to the company's total grossed turnover and total grossed employment to provide regional grossed turnover and regional grossed employment estimates.

2. The extracts also include each company's SIC at the 5-digit level. Judgement is used to decide on an appropriate level at which to process the data. This is generally a compromise between ensuring a meaningful degree of homogeneity amongst the businesses grouped together, and ensuring a sufficiently large sample in all periods to produce a reliable time series.

3. Because the regional sample varies randomly over time, there is no consistency in the levels of total turnover and total employment included from one month to the next. We therefore calculate average turnover per head, which is far more robust to sample changes. The national grossing weights are retained in order to allow the relatively few smaller businesses included to represent non-sampled companies in the region; otherwise the estimates would be heavily biased towards the larger companies with a presence in the region.

4. Once we have an estimate of average turnover per head for each month, we multiply this by the number of employees in that industry in the region during that month, to obtain an estimate of total regional turnover. The most accurate source we have for this is the Inter-Departmental Business Register (IDBR), from which we obtain monthly employment totals for all local units within the region. The IDBR data are subject to lags due to the processes for updating the information held, but there are plans to update more frequently in the future.

5. Once we have estimates for three months we can simply add them together to obtain a quarterly estimate. A variety of quality assurance procedures is used to understand and explain movements in the data, to allow informed quality adjustments and to check that the computer system is calculating the published indices correctly.

Other methodological information

Single period estimator

The Welsh Short Term Indicators use what is known as a single period estimator; that is, the level of output is measured independently for each quarter and growth is derived from changes in these independent measures. This method is preferred over the alternative 'matched pairs' method, in which the change between two consecutive periods is measured for a fixed sample of businesses, because it provides an unbiased estimate of growth. The matched pairs estimator tends to be subject to bias due to its relative inability to respond to changes in the population of businesses, or to changes in productivity over time (from, for example, technological improvements).

Using independent measures does tend to result in a more erratic time series, particularly at a low level of industrial aggregation, since sample changes can result in a different estimate of turnover per head for a given industry. Over time, however, the index will tend to fluctuate around the true mean, and a reliable long-term trend will emerge. For this reason we advise users not to focus on the quarterly movements in isolation, but instead to concentrate on longer term growth rates, such as four quarters on previous four quarters.

Deflation to constant prices

The current price turnover series are deflated to provide constant price indices by dividing them by appropriate price indices, representing changes in the price of relevant goods and services over time. At present there are no regional price indices available, so we use the same national price indices that are used to deflate the corresponding national short-term indicators.

Where we need to combine price indices to derive an aggregate deflator for a higher level industry (due to the IoP/IoC combining industries to increase the sample size) the component price indices are weighted together using Welsh turnover weights to represent the product composition in the region.

Direct volume measures are already independent of price so they do not need to be deflated.

Seasonal Adjustments

Seasonal adjustment is the process of removing from a time series variations that are due to annually recurring events and patterns of economic activity; for instance, retail sales are always high in the period leading up to Christmas. These effects are removed to allow growth to be measured on a consistent basis.

The IoP/IoC is reviewed biannually by ONS Methodology Directorate using the X-12-ARIMA software, and recommendations are made for appropriates model parameter settings. Seasonal Adjustment is carried out within the WinCSDB computer system, which uses the X-11-ARIMA software package. The two versions are compatible; X-12-ARIMA providing enhanced diagnostics to assist in analysis and setting model parameters.

Aggregation by annual chain-linking

Industries are aggregated using Gross Value Added (GVA) weights obtained from ONS Regional Accounts, with lower level detail being derived from regional Annual Business Survey (ABS) results. To better reflect changes in the relative sizes of component industries over time different weights are used for each year of the series up to the current reference year (generally the most recent year for which weights are available).

The series is effectively broken up into separate years, and then the years are rejoined using a linking process that removes any step changes resulting from differences in the weights between years, while retaining the underlying growth between the years as measured on a consistent basis.

Respondent Burden

As part of the compilation of the Index of Production some industries include a top-up to the MBS to ensure that the regionality criteria are met. In 2010/11 it is estimated that the burden on businesses was £1,224 for the IoP (based on 69 forms sent).

4. References

	Title of Reference	Website Location
1	Welsh Government Statistics Homepage; Economic Indices. Also has related links to the Methodology Reviews.	www.wales.gov.uk/topics/statistics/theme/economy/econ-indices/
2	Stats Wales	www.statswales.wales.gov.uk/ReportFolders/reportfolders.aspx?IF_ActivePath=P,3,16,30
3	Regional Short Term Indicators Feasibility Study and Pilot.	http://www.ons.gov.uk/ons/rel/regional-accounts/reg-short-term-ind-exp/january-2010/feasibility-study.pdf
4	Due Out Soon Statistics Webpage.	www.wales.gov.uk/topics/statistics/due/due-theme/econ/
5	Annual Business Survey (ABS) Data	http://www.ons.gov.uk/ons/about-ons/surveys/a-z-of-surveys/annual-business-survey/index.html
6	Regional Gross Value Added (GVA)	http://www.ons.gov.uk/ons/rel/elmr/economic-and-labour-market-review/no--6--june-2010/regional-gross-value-added.pdf
7	Regional GVA Production Approach, ONS.	http://www.ons.gov.uk/ons/guide-method/development-programmes/allsopp-programme/regional-gva--production-approach-/index.html
8	Monthly Business Survey (MBS)	http://www.ons.gov.uk/about/surveys/a-z-of-surveys/monthly-business-survey--production-and-services-/index.html
9	Statement of Administrative Sources	http://wales.gov.uk/topics/statistics/about/compliance/administrative/