Quality and methodology

Uncertainty

All estimates are subject to statistical uncertainty and for many well-established statistics we measure and publish the sampling error and non-sampling error associated with the estimate, using this as an indicator of accuracy.

Unlike many indicators that NISRA publish, there is no simple way of measuring the accuracy of the NICEI. The NICEI is constructed from a variety of data sources, some of which are not based on random samples or do not have published sampling and non-sampling errors available. As such it is very difficult to measure both error aspects and their impact on the NICEI. As a result we don't publish a measure of the sampling error or non-sampling error associated with the NICEI.

One dimension of measuring accuracy is reliability, which can be measured using evidence from analyses of revisions to assess the closeness of earlier to subsequent estimates. Revisions are an inevitable consequence of the trade-off between timeliness and accuracy. It is our role to produce the best possible estimate of the NICEI using all of the available information at that time. Therefore, the only way to avoid subsequent revisions would be to either delay publication until all the relevant information has been received, or to publish an estimate and then ignore any subsequent new data and any methodological improvements. So, revisions should be treated as generally a good thing, as long as we document the reasons for them and communicate this to users.

All NICEI estimates are provisional and subject to revision in light of:

- Ongoing data validation and clarification of responses from individual businesses and late responses to surveys and administrative sources which form input to the Index.
- Revisions to seasonal adjustment factors, which are re-estimated every month and reviewed annually.
- Changes to the methodological processes used to gather and process the data and other revisions and developments implemented by the input sources.
- Incorporating new annual GVA data from the ONS.

The NICEI back series is calculated each quarter, typically the revisions to the NICEI are reasonably minor. Comparing the Q3 2023 NICEI back series with the Q2 2023 back series, revisions to each quarter of the index ranged between -0.7 and 0.3 index points.

A full comparison of the NICEI Series at Q3 2023 and Q2 2023 is available in Table 10 of the **NICEI spreadsheet**.

NICEI component data

The NICEI is based on a range of Official and National Statistics datasets as outlined below. Whilst the component survey data is based on sample surveys, the processes employed by each individual survey to gross results to be representative of the respective business population use employment and turnover data from the Interdepartmental Business Register. This is a register of c78,000 NI businesses and as such the NICEI results are considered to be a robust barometer of the performance of the NI economy.

Agricultural Output Index: The agricultural output index is an unpublished dataset based on survey and administrative sources held by the Department of Agriculture, Environment and Rural Affairs (DAERA).

HMF: The number of Her Majesty's Forces (HMF) stationed in Northern Ireland is included in the NICEI. This data is published by the Ministry of Defence (MoD) and further information can be found **here**.

IOP: The quarterly NI Index of Production (IOP) is currently based on a sample of around 1,200 businesses out of a population of c. 5,500. This covers approximately 92% of the turnover of the population at the time of selection and a targeted response rate of 75%. This includes a census of all companies employing 40 or more employees as well as those employing 0 to 39 employees and having a turnover of £10 million or more. The sample has been designed to have a minimum precision of 10% for each of the production subsectors.

IOS: The quarterly NI Index of Services (IOS) is currently based on a sample of around 3,600 businesses out of a population of c. 43,000. The sample consists of a census of dominant companies and a Neyman stratified random sample of the remaining companies and covers approximately 75% of turnover. The census element consists of all companies employing 100 or more employees as well as those employing 0 to 99 employees and having a turnover of £10 million or more.

LFS: The Labour Force Survey (LFS) is a quarterly sample survey carried out by interviewing people about their personal circumstances and work. The quarterly survey has been designed to give reliable estimates for each quarter, as well as estimates of change over consecutive quarters. These aims have been achieved by using an unclustered sample with a large element of overlap between quarters. The theoretical sample for each quarter of around 3,900 addresses, made up of five 'waves', each containing approximately 780 private households. Every sampled address is interviewed in five successive quarters, such that in any one quarter one wave will be receiving their first interview, one wave their second and so on, with one wave receiving their fifth and final interview. This results in an 80% sample overlap between quarters.

QCE: From a sampling universe of approximately 10,000 firms, a disproportionate sample of 750 construction firms is randomly selected to take part in the NI Quarterly Construction Enquiry (QCE). The sample is disproportionately stratified (into six strata) using Inter Departmental Business Register (IDBR) turnover as the stratification variable. This includes a census of all companies with a turnover of £5.25m or greater, and a representative sample of smaller businesses. Further information on the QCE sample coverage and methodology can be found **here**.   NICEI includes private sector construction only.

QES: The Quarterly Employment Survey (QES) provides short-term employee jobs estimates for Northern Ireland. It has a sample size of approximately 6,000 and covers all private sector firms with 25 or more employees, all public sector employers and a representative sample of smaller firms. The QES excludes the self-employed, HM Armed Forces, private domestic servants, homeworkers and training for success trainees without a contract of employment (non-employed status). The number of jobs are counted rather than the number of persons with jobs. For example, a person holding both a full-time job and part-time job, or someone with two part-time jobs, will be counted twice.

Weighting the components

Weights are based on the balanced estimate of **Gross Value Added (GVA (B))** by industry obtained from **Regional Accounts produced by ONS**. The latest available GVA by industry published in April 2023 including figures for 2021. The NICEI calculations are based on GVA balanced figures up to and including the 2019 year.

Annual chain-linking

Annual chain-linking is a method for aggregating volume measures on a yearly basis - it can be thought of as rebasing every year rather than having a fixed base year to which all subsequent years are weighted. In this way dynamic changes in the structure of the economy are better reflected in the index. Instead of referring back to value shares from a base year, volume measures for each year are produced in prices of the previous year. These volume measures are then "chain-linked" together to produce a continuous time series, preserving the growth rates of the underlying component series. The use of annual chain-linking is standard National Accounts practice. Using chained volume measures makes use of more up-to-date weights and is therefore more relevant. Rebasing will affect the relative movements between periods.

Re-referencing

The reference year for the index is currently 2019 (i.e. 2019=100). NISRA changes the NICEI reference period (a process known as re-referencing) from time to time, but not frequently. This is because frequently changing the reference base is inconvenient for users. Re-referencing should not be confused with rebasing. Re-referencing does not change the relative movements between periods

Seasonal adjustment

The indirect method of seasonal adjustment was employed. Seasonally adjusted figures were input (where possible) and when the combined output series were tested for seasonality there was no residual seasonality found, therefore no seasonal adjustment was required.

Official Statistics in development

Official statistics in development (previously known as experimental statistics) are official statistics that are undergoing a development; they may be new or existing statistics, and will be tested with users, in line with the standards of trustworthiness, quality, and value in the **Code of Practice for Statistics**.

Please refer to the **NICEI Methodology report** for further information.