EUROPEAN COMMISSION
DIRECTORATE GENERAL
ECONOMIC AND FINANCIAL AFFAIRS
Policy coordination, economic forecasts and communication
Economic situation, forecasts, business and consumer surveys

Methodological note

Restoration of consistent BCS survey time series for Ireland

March 2025

This methodological note accompanies the release of harmonised consumer survey data for the month of March 2025.

1. Background

The Harmonised EU Programme of Business and Consumer Surveys (BCS), managed by the European Commission, covers all EU Member States and five Candidate Countries, allowing for meaningful comparisons of business cycle developments across countries and the derivation of consistent European aggregates.

In February 2023, the Irish BCS partner withdrew from the programme. This implied that BCS data provision for Ireland stopped in that month, and that all EU and euro area (EA) aggregates of BCS series, including the headline ESI[1] indicator, had to be computed without Irish data. Eighteen months passed before the collection of harmonised BCS data for Ireland re-started in August 2024. Since the entity conducting the surveys and processing the new data has remained the same as under the previous partner, the survey methodology and data-generating process have remained the same. This makes the old and new data directly comparable. Still, the new data has not yet been disseminated to the public, because with only 6 months of consecutive observations (at the time of writing), the data could not be properly seasonally adjusted. The practice in the BCS programme is that a minimum of three years of consecutive observations are needed before the data are disseminated, a lag that is imposed predominantly[2] by the need for reliable seasonal adjustment.

To enable the seasonal adjustment of the new Irish data points and reinstate the full coverage of the EU and EA aggregates, Commission staff filled the 18 months' data gap with estimates based on regression analysis.[3]

2. Methodological approach to the linking of time series

Commission staff estimated the missing data for 39 monthly and two quarterly survey variables[4] for Ireland. The time series were reconstructed at the level of balances for TOTAL sector aggregates only.[5]

Each individual BCS balance series was regressed on variables presenting a high degree of conceptual and empirical similitude, and the regression coefficients were applied to the regressor(s)' series in the period February 2023-July 2024 to project the missing BCS observations. The regressions were run with the observations available from May 2016[6] until January 2023, as well as the new observations collected from August 2024 to January 2025.

The exercise was facilitated by the rather short period of missing data (18 months or 6 quarters), the absence of major (additional) macro-economic shocks in that period, and the fact that conceptually and empirically close regressors could be identified for all 39 monthly and 2 quarterly BCS questions (see Table 1).

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[1] See BCS User guide.
[2] Clearly, the assessment of the data quality in terms of ability to track short-term trends, absence of excessive sampling volatility and general plausibility (cross-question and cross-country) also requires a sufficient number of observations. While the quality of the newly collected data has been assessed as satisfactory across all three criteria, the full continuity of the survey methodology with the time series until February 2023 provided additional reassurance on data quality.
[3] Precedents were the restoration of results for the Romanian consumer survey in 2024 for the period 2020-2023 (note) and Irish business and consumer surveys in 2019 for the period between 2008 and 2016 (note).
[4] See the list of questions in the BCS User guide for details. Data for the monthly labour hoarding question in the four business surveys could not be restored, given that it was only added to the BCS programme in May 2023 (i.e. there are no historical data points). Data for the monthly question on factors limiting production in the construction survey could not be linked either. Of the quarterly questions, only the questions on capacity utilisation in industry and services could be restored.
[5] I.e. no imputation of results for percentages of responses, subsectors or sociodemographic breakdowns.
[6] Data collection by the current BCS data provider for Ireland started in May 2016. Given that the sectoral uncertainty questions were only introduced in May 2021, regressions had to be run over shorter samples.

3. Regressors used

For the business survey questions, advantage was taken of the availability of Purchasing Manager Indices (PMI)[7] for the manufacturing, services and construction sectors. The series, retrieved via DataInsight, show a high degree of co-movement with the BCS series. For the Consumer survey, five variables from another consumer sentiment survey for Ireland - administered and compiled by Core Research – were used as regressors for most of the projected consumer variables.[8]

Given their largely overlapping scope and definition, the survey variables used in the regression analysis generally displayed a better fit with the respective dependent variables than the short-term economic indicators that the BCS indicators are intended to help predict. In cases where similar variables from other surveys could not be found, or where the regression fit was unsatisfactory, additional variables were included in the equations. For example, developments in HICP inflation were used in the regressions for consumers' price perceptions and expectations, and measures of stock market volatility[9] and the Economic Policy uncertainty indicator for Ireland[10] were used to estimate the sectoral uncertainty indicators of the BCS programme. For retail trade, where no comparable sector-specific survey data is available, the regressions where informed by developments in the volume of retail trade sales, inflation and employment in the sector, but also consumer sentiment and/or developments in the respective BCS results for the euro area (without Ireland).

The table below shows the regressors used for each of the estimated variables, the lead or lags applied to the regressors and the correlation coefficient. Lead and lags were determined on the basis of bilateral correlograms with the respective dependent variable and confirmed in multivariate regression set-ups.

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[7] By S&P Global and AIB for the manufacturing and services PMIs, S&P Global and BNP Paribas Real Estate Ireland for the construction PMI.

[8] The Commission is grateful to the Irish League of Credit Unions in partnership with Core Research for supplying their historical data series facilitating the restoration of the Irish consumer survey data in the EU harmonised business and consumer survey programme. For the releases of the Irish Consumer Sentiment Index, published by the Irish League of Credit Unions in partnership with Core Research, see here.

[9] Irish stock market volatility was estimated using a basic GARCH(1,1) approach, using daily returns on the ISEQ All Share index (Ireland Stock Exchange Overall Index), retrieved from DataInsight. The resulting daily variances were transformed into standard deviations. The monthly volatility series used as a regressor is the average of the daily standard deviations for each month.

[10] See Economic Policy Uncertainty Index

Table 1

BCS series for Ireland		Regressors	lead (+) or lag (-)	Correl
INDU				
Q1	Production trend observed in recent months	Manufacturing PMI Output Index	-1	0.61
Q2	Assessment of order-book levels	Manufacturing PMI New Orders Index	-1	0.67
Q3	Assessment of export order-book levels	Manufacturing PMI New Export Orders Index	-4	0.45
Q4	Assessment of stocks of finished products	Manufacturing PMI Stocks of Purchases (inverted) *	+3	0.45
Q5	Production expectations for the months ahead	Manufacturing PMI Future Output	0	0.67
Q6	Selling price expectations for the months ahead	Manufacturing PMI Output Prices Index	0	0.90
Q7	Employment expectations for the months ahead	Manufacturing PMI Employment Index	0	0.69
Q13	Current level of capacity utilization (quarterly)	Manufacturing PMI Employment Index **	0	0.66
Q51	Uncertainty Business Situation	Economic Policy Uncertainty Index (domestic)	0	0.49
		Stock market volatility	-3	0.58
SERV				
Q1	Business situation development over the past 3 months	Services PMI Business Activity Index	-1	0,88
Q2	Evolution of the demand over the past 3 months	Services PMI Incoming New Business Index	-1	0,88
Q3	Expectation of the demand over the next 3 months	Services PMI Future Activity Index	0	0,83
Q5	Expectations of the employment over the next 3 months	Services PMI Employment Index	+1	0,79
Q6	Expectations of the prices over the next 3 months	Services PMI Output Prices Index	0	0,85
Q8	Current level of capacity utilization (quarterly)	Services PMI Backlogs of Work Index	-1	0,71
Q31	Uncertainty Business Situation	Economic Policy Uncertainty Index (domestic)	+2	0,46
		Stock market volatility	0	0,48
RETA				
Q1	Business activity (sales) development over the past 3 months	Core Research Consumer Sentiment Index	0	0.56
		Q1 for the EA	0	0.57
Q2	Volume of stock currently hold	Volume of trade sales (inverted)	0	0.27
		Q2 for the EA	0	0.67
Q3	Orders expectations over the next 3 months	Core Research Consumer Sentiment Index	0	0.57
		Volume of trade sales	0	0.40
Q4	Business activity expectations over the next 3 months	Core Research Consumer Sentiment Index	0	0.80
		Volume of trade sales	0	0.40
Q5	Employment expectations over the next 3 months	Persons employed in retail trade (3m % change)	0	0.21
		Q5 for the EA	0	0.54
Q6	Prices expectations over the next 3 months	HICP (annual % change)	+3	0.96
		Q6 for the EA	0	0.94
Q41	Uncertainty Business Situation	Economic Policy Uncertainty Index (domestic)	-3	0.30
		Core Research Consumer Sentiment Index (inverted)	0	0.38
		Stock market volatility	-5	0.65
BUIL				
Q1	Building activity development over the past 3 months	Construction PMI Total Activity Index	-1	0,84
Q3	Assessment of your current overall order books	Construction PMI New Orders Index	-1	0,84
Q4	Employment expectations over the next 3 months	Construction PMI Employment Index	0	0,77
Q5	Prices expectations over the next 3 months	Construction PMI Input Prices Index	0	0,88
Q41	Uncertainty Business Situation	Stock market volatility	-1	0,54
		Economic Policy Uncertainty Index (domestic)	+2	0,42
CONS				
Q1	Financial situation over last 12 months	Core Research Financial situation over last 12 months	0	0,86
Q2	Financial situation over next 12 months	Core Research Financial situation over next 12 months	0	0,90
Q3	General economic situation over last 12 months	Core Research General economic outlook	-2	0,81
Q4	General economic situation over next 12 months	Core Research General economic outlook	0	0,95
Q5	Price trends over last 12 months	HICP (annual % change)	+2	0,85
		Q5 for the EA	0	0,96
Q6	Price trends over next 12 months	HICP (annual % change)	+4	0,77
Q7	Unemployment expectations over next 12 months	Core Research Outlook for unemployment	0	0,97
Q8	Major purchases at present	Core Research Major purchases	0	0,93
Q9	Major purchases over next 12 months	Core Research Major purchases	0	0,76
Q11	Savings over next 12 months	Q11 for the EA	0	0,63
Q12	Statement on financial situation of household	Q12 for the EA	+1	0,82
Q21	Uncertainty Financial Situation	Core Research Fin. sit. over next 12 months (inverted)	0	0,94

Notes: All correlations computed over periods starting in 5/2016, except for uncertainty questions, which are available only since 5/2021. *The Manufacturing PMI Stocks of Finished Goods Index proved insufficiently correlated with the BCS question on stocks of finished products. ** The Manufacturing PMI Capacity Utilisation and Backlogs of Work Indices proved insufficiently correlated with the BCS question on capacity utilisation.

4. Seasonality

Seasonality was explicitly taken into account in the analysis. Since data of different types or collected by different providers can display different seasonal patterns, all regressions were performed using seasonally adjusted data.[11] Since the new observations collected in the period 8/2024-1/2025 were not yet available in seasonally adjusted (SA) form, preliminary SA data were generated under the assumption that the seasonal pattern in this period was identical to that of the period 8/2022-1/2023 for each time series. Given that there were no strong shocks or trends in the period of missing data, additivity of seasonality was assumed. Being based on SA series, the projections for the missing 18 months (6 quarters) are thus preliminary SA observations for each of the BCS variables.

To retrieve the underlying non-seasonally adjusted (NSA) observations, the assumption of stable seasonal patterns was applied again, i.e. the seasonal component for each month in the latest available 12-month period 2/2022-1/2023 was added to the preliminary SA projections for 2/2023-7/2024.

In a last step, the complete series of NSA observations was run through seasonal adjustment using the customary JDemetra package, thereby creating the final SA values for the period of missing observations and the period of new data collected since August 2024.

5. Caveats

All estimated data rest on the assumption that the observed co-movements between the available data for the dependent and independent variables prevailed also in the period of missing data.

The presented methodology to fill the gap in data collection is designed to ensure reliable and plausible estimates and allow for the seasonal adjustment of the whole time series. While the focus of analytical work should not be on the estimated month-on-month (or quarter-on-quarter) changes during the imputation period 2/2023-7/2024, the methodology ensures the correct assessment of the newly collected data points from 8/2024 against a consistent historical benchmark.

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[11] The two quarterly variables and some of the monthly variables do not display a seasonal pattern according to the JDemetra package used for seasonal adjustment in the BCS programme, i.e. SA and NSA series are identical. Also in these cases, as the BCS series do not have a seasonal component, regressions were run with the regressors in SA form. Given the short available time series for the five sectoral uncertainty questions (introduced only in May 2021), the regressions had to be run with NSA data.