

**Assessment of compliance with the Code of  
Practice for Statistics**

**Statistics from the Annual  
Purchases Survey**

*(produced by Office for National Statistics)*

# Introduction

- I.1 Understanding what goods and services businesses purchase, and from whom, is essential to building an accurate picture of the economy. ONS uses its Annual Purchases Survey as the basis for estimating the value of goods and services that businesses use as part of their production processes – in the National Accounts called ‘intermediate consumption’.
- I.2 ONS previously ran a Purchases Inquiry, with the most-recent usable results relating to 2004. The survey was suspended in 2007, but this suspension became permanent. There followed a ten-year period where no data were collected on intermediate consumption patterns, following which ONS introduced the Annual Purchases Survey to collect data from 2015 onwards.
- I.3 The hiatus meant that ONS was relying on outdated information about purchases at a time when substantial changes are taking place to purchasing patterns and production processes, not least in the light of the global financial crisis in 2008. ONS mitigated the effects of this to some extent by adjusting its modelled estimates of intermediate consumption based on additional data from the Annual Business Survey, HM Treasury and the Ministry for Housing, Communities and Local Government. In addition, ONS boosted the resources dedicated to manual balancing using staff members’ specific knowledge and broad economic experience. Estimates of intermediate consumption also fell short of EU best practice of updating the supply-use information at least every five years.
- I.4 We recognise the significant challenges and costs that ONS faces to collect purchases data, and the significant work that it has done to date. We also recognise ONS’s ambitions to achieve National Statistics status, which means that the statistics meet the highest standards of **public value**, are **high quality** and are produced in a way **worthy of trust** and comply with all aspects of the [Code of Practice for Statistics](#).
- I.5 This report documents the findings of our assessment, which has focused on key elements of quality and value. The following sections explore in detail the quality issues we have identified from our assessment, and the work that ONS had underway to address them. We identify various steps that we require ONS to undertake before we consider a further assessment of Annual Purchases Survey statistics against the Code of Practice.

# Detailed findings

## Quality: comparability and coherence

1. The Purchases Survey is a rich data source that offers detail on the purchasing patterns of UK businesses. ONS has published statistics from the Purchases Survey in the form of a statistical report titled [Annual Purchases Survey: UK](#) for 2015 data, and [Energy, goods and services used by UK businesses](#) for data from 2016 to 2018. Each is accompanied by [detailed statistical tables](#). The data are also used as a key input to Supply-Use Tables (SUTs).
2. The Purchases Survey provides estimates of the breakdown of intermediate consumption by product and industry. The purpose of the Purchases Survey is to produce up-to-date purchasing patterns within industries to improve estimates of intermediate consumption by product. Data from the Purchases Survey on the breakdowns of intermediate consumption are benchmarked to totals of intermediate consumption estimated from the Annual Business Survey (ABS). The ABS does not specifically collect intermediate consumption, but does ask businesses for their total purchases and contains a number of questions that can be used to derive an estimated total figure. Figures from the Purchases Survey are benchmarked to the ABS estimates to ensure consistency and comparability, and the ABS has a larger sample size and gives a better aggregate estimate of intermediate consumption.
3. ONS's [analysis](#) of estimates of the level of intermediate consumption from the Purchases Survey and ABS for 2015 showed a marked difference between the two estimates, and we understand that a gap between the two sets of estimates continues. More work is needed to investigate and quantify the differences between the sources – the quality of the estimates from the Purchases Survey cannot be fully determined until these differences are understood.
4. There are also some substantial changes in estimates between years for the survey, particularly evident at finer industry breakdowns. Some of these reflect genuine business activity, whereas others reflect sample rotation, and some may appear counter-intuitive compared with expected behaviours by these industries across this time period. The full supply-use 107x109 cell matrix of purchases by product and industry group shows many extreme changes, with some cells changing by a factor of 10 or more year-on-year.
5. At the division level (2-digit level of the [Standard Industrial Classification](#)), a handful of industries show very large annual changes of purchases. These are typically the smaller divisions and may be as a result of, for example, the reclassification of businesses or other artefacts of the statistical processes at fine-detailed levels. Implausibly large changes render these data difficult to use for industry-level analysis. To help users evaluate the extent to which they can use these data, any extreme or unusual changes at the industry level need to be accompanied by a suitable explanation describing the potential economic rationale underpinning legitimate changes and clarifying the quality and usability of the estimates, subject to any constraints on protecting confidentiality of individual business data. ONS also needs to analyse the reasons behind these large changes in order that it can assure itself and its users about quality and make appropriate improvements to data collection and statistical production processes.
6. ONS has undertaken a substantial amount of analysis to understand the differences between the two survey sources.

7. ONS has worked closely with the Supply-Use Tables (SUT) team throughout the development process of the Purchases Survey. This has resulted in substantial improvements in the quality of survey data across the development period and further joint working should help to improve the quality of the data. ONS also works closely with the Department for Business, Energy & Industrial Strategy regarding quality assurance of energy data.
8. ONS's [own analysis](#) of the first year of Purchases Survey data suggests that a substantial portion of the difference for the 2015 data is attributable to businesses common to each survey returning different figures, with some returning higher values to the Purchases Survey and some higher values to the ABS. The Purchases team at ONS has contacted respondents of both surveys to try to understand where the difference in returns has occurred, and how the two can be better aligned. This has fed into improvements to the survey questionnaire and accompanying guidance for businesses.
9. ONS has also recently restructured the teams responsible for the Purchases Survey and ABS into a single team to enable better data confrontation, and improvements to both sources. We understand from the ONS team that this is already proving successful, and the sharing of expertise and knowledge across the various sources will be a helpful foundation for future analysis.
10. ONS has also recently begun a programme of 'industry reviews' where data from a range of different survey sources – the Purchases Survey, ABS, the Annual Survey of Goods and Services, Prodcom (the survey of UK manufacturers' sales by product) and the Monthly Business Survey – along with company accounts are confronted to better understand the relative quality of each. As well as improving Purchases Survey data, these should have an impact beyond the Purchases Survey. It will be important for ONS to maintain this programme of reviews and to incorporate relevant findings to further develop its business surveys. ONS should also include relevant findings as part of its publications on quality in order to enhance engagement with users and experts outside of ONS to further boost quality and value.
11. In addition to the differences described earlier, a range of other factors relating to the concepts, and methods (particularly data collection, sampling and estimation methods) of the two surveys may cause inconsistency. For example:
  - The ABS and Purchases Survey are collecting conceptually different data. The ABS does not ask businesses for intermediate consumption directly, deriving intermediate consumption from other questions contained within the survey. The Purchases Survey questionnaire asks for a specific total figure for "energy, services, goods and materials used up or transformed" – a lay definition of intermediate consumption.
  - The Purchases Survey has 109 industry-specific questionnaire types, whereas the ABS has 49 different questionnaire types, depending on the industry.
  - The ABS uses turnover as an auxiliary variable in weighting most data relating to intermediate consumption (apart from employment costs where employment is used as the auxiliary variable). The Purchases Survey uses employment for all variables.
  - The ABS has double the Purchases Survey's sample size
12. ONS has made a range of methodological improvements to the survey, as follows.
  - a. ONS has already introduced enhanced validation checks for the survey data, which should also lead to a reduced number of extreme results. The Purchases

- Survey's [technical report](#) reports the validation procedures in place, including checking for large year-on-year increases in intermediate consumption.
- b. ONS has revised its methods for imputing data for unit non-response (where there is no response for the entire business) and for item non-response (where the business responds only partially), applying these back to the 2015 data.
  - c. ONS has reviewed its methods for identifying and dealing with outliers in Purchases Survey data.
  - d. ONS has made its sampling arrangements for the Purchases Survey and ABS more consistent from 2019.
13. The work that has been done so far to better align the returns from the two surveys has not yet significantly impacted the discrepancy between the two, which has remained relatively constant. As a result, concerns about quality that arise from the difference between the measures of intermediate consumption remain and it is hoped that ONS's ongoing and planned work will quickly identify and be able to address these issues in order to establish confidence in the quality and usefulness of estimates from the Purchases Survey.
14. We look forward to ONS being able to quantify the reasons for the discrepancy between the two sets of estimates and see it as essential for ONS to develop and use this knowledge to both improve the survey, and to maximise value for users through being able to better explain the relative strengths and weaknesses of its related statistics. **In order to establish credibility with users, and in order for ONS to: (a) understand for itself the quality of the data; (b) use this understanding to improve the statistics; and (c) explain quality to users in a way that helps them in their use, ONS needs to continue to identify and quantify the reasons for the differences between ABS and Purchases Survey data, drawing on insights and analysis from other data sources as appropriate. ONS should seek to foster its engagement with users by being transparent with them about the findings from the various strands of its development work.**

### Quality: Data collection and quality assurance

15. The technical report notes that the Purchases Survey is a relatively complex survey, which naturally imposes a large burden on business, and leads to challenges regarding data quality. Some businesses are not able to provide the full level of detailed breakdowns of purchases that are required. Some of the main issues are:
- Intermediate consumption is not a standard accounting concept and may therefore not be typically well understood by respondents or recorded in a business's accounts.
  - Respondents may not understand clearly the Purchases Survey's purpose.
  - Businesses may lack the resources or recording capabilities to accurately record their purchases to the required granularity. For example, many smaller businesses record their purchases in a single area, such as the general ledger or profit and loss accounts.
  - The type of accounting software used by a business also affects the granularity of the purchases information which they can easily provide.
  - The survey asks for information in areas where it is often not common for businesses, especially smaller businesses, to record. For example, expenditure on "paper and paper products" is asked separately from "pens and writing implements"

- whereas many businesses would record stationery as a single item. This may affect accuracy and respondent motivation to provide accurate data.
- There is the possibility of overlap and omission through items listed as included and excluded from calculating expenditure. For example, expenditure for “pharmaceutical products and preparations” includes adhesive dressings but excludes medical equipment, yet neither is accurately defined. Similarly, medical instruments are included elsewhere but not defined any more accurately than that.
16. The Purchases Survey team has worked with ONS’s behavioural insights unit to investigate whether changes in how the Purchases Survey and ABS are dispatched, presented and communicated will improve the coherence of these estimates. The Purchases Survey team started to address these issues by making revisions to the questionnaire for 2018. The changes included the introduction of a checklist to help businesses complete the questionnaire, further guidance on how they can provide a best estimate and a re-positioning of questions on additional products. ONS plans to further review its Purchases Survey questionnaires over the coming 12 months. This will involve a review the impact of the changes made so far once data for the 2018 reference year are available.
  17. A further recent development is ONS’s launch of its [International Business Unit](#). The unit will work with some of the largest multi-national businesses to improve the quality and consistency of data collection from them.
  18. Each of these developments, including learning from the initiatives outlined in the previous section of this report, should help ONS to understand and address concerns about the quality of incoming data. **As part of its work on understanding and improving the quality of its collected data, ONS should continue to develop its data collection methods, including clarifying explanations of what data should be recorded.**

## Value: The production of a consistent time series

19. The Annual Purchases Inquiry (API), the predecessor to the Purchases Survey, collected its final year of data in 2005 (covering the 2004 reference year). Between 2004 and 2015 product-level expenditure estimates in the SUTs were apportioned based on the patterns of the 2004 API data.
20. Changes to production processes, the structure of the economy, and economic shocks – such as those arising from the 2008 global financial crisis – are expected to have markedly changed the nature and form of business transactions since 2004, reducing the usefulness of estimates of purchasing patterns based on 2004 data. There is consequently a need to bridge the gap between the 2004 and 2015 proportional purchase data provided by the API and the Purchases Survey.
21. While neither the Purchases Survey nor the ABS are designed to produce a time series, ONS undertook some work in 2018 under the auspices of the Economic Statistics Centre of Excellence (ESCoE), to develop a linked back series, for use by the SUT team only. This was created using a blended approach of linear interpolation of UK data between 2004 and 2015, with data on changes in the intermediate consumption of specific industries in the Netherlands, in order to proxy patterns that may have been exhibited in the UK. The work was exploratory in nature, and ONS recognises the clear limitations of the approach taken. Nonetheless, there has been considerable interest in the production of a back series from government users, many of them indicating it would add significantly to the value of the output.

22. We welcome ONS's previous ambitions to link the previous and current series. We also recognise the challenge that this presents because of absence of data, the quality of the previous data series, and the ongoing developments to the new series.
- Nevertheless, ONS should engage with users to determine whether more work should be done to develop a consistent time series, taking into the account the value that such a series could add, along with considering the costs and benefits of developing such a series. In order to help facilitate its engagement with users on this topic, and to showcase its development work more generally, ONS should publish the outcomes of its work to date.**

### Value: Working with users to generate further value and insight from Purchases Survey data

23. ONS engaged widely on the re-introduction and the quality assurance of the new Purchases Survey. Our feedback from government users indicates that they have clear confidence in the Purchases Survey production team and have an appreciation of the potential for data from the survey.
24. There is, however, a wider range of potential users – including academics, government departments and the private sector – who would be interested in the insights and value that Purchases Survey data can deliver beyond their use in the construction of SUTs and the National Accounts. These users have a range of interests including better understanding the resource profile of UK businesses trading abroad, the interdependencies of UK industrial sectors and consequently an enhanced business view of the drivers of the productivity puzzle.
25. These users also highlighted areas for development which they believe will enhance the usefulness of these statistics. We are pleased to note that some of these, such as volume measures, have already been realised. Further examples of suggested enhancements include:
- A split marker of domestic/imported goods
  - Regional splits and commentary on regional variations
  - Information on confidence intervals and sample sizes
  - Improved SIC and product labelling
26. We welcome that ONS has recently made microdata from the Purchases Survey available on its [Secure Research Service](#) facility. This provides several valuable opportunities for:
- a. Users to maximise the use of available data for further analysis and research
  - b. ONS to better understand the various uses made of the data, which it can use as part of its work to add further value from the Purchases Survey
  - c. Users to feedback quality concerns to ONS based on their experience of analysing the microdata
27. **To enhance users' interpretation of survey data, ONS should provide a supporting economic narrative covering changes in the economic environment to bring further insight on the purchasing patterns of UK businesses.**
28. **ONS should continue to develop its understanding of the potential value of the statistics by engaging with a wide range of users, particularly those in the**

**business and academic community. ONS should use this understanding to further enhance the value provided by the statistics.**

- 29. ONS should publish a clear statement covering the potential uses of Purchases and Intermediate Consumption data, beyond their core function as an input to the SUT, in order to help facilitate and enhance its user engagement.**

## Next Steps

30. We welcome that ONS is taking a range of steps to address these quality issues. We welcome the restructure of teams within ONS, so that a single team will now be validating survey data from both the Purchases Survey and the ABS. This should lead to significantly improved coherence and comparability between the two sources, and a greater understanding of the respective data sources that can be used to improve each of them. This should also reduce the burden placed on businesses in terms of follow-up queries.
31. We are encouraged by ONS's continued engagement with respondents will should enable ONS to further maximise the accuracy and validity of the survey return data and we welcome the wide range of work that ONS has already completed (including engagement with a wide range of people) to investigate and quantify the reasons for the differences, and we look forward to the results from that work.
32. We will keep in touch with ONS's progress on this work. We expect ONS to formally respond to the requirements in this report by end-March 2020.

