



Methodological News

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ABS Methodology Division

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Predicting Survey Estimates by State Space Models Using Multiple Data Sources

The ABS is embarking on a transformation program, which includes, amongst other things, re-engineering and consolidating collections, using different collection modes for survey data, and using different, but more efficient, sampling frames and estimation methods for official statistics. Whilst this transformation is expected to bring about positive changes to official statistics, there is also a risk that such changes could lead to impacts on some ABS time series. The challenge for the ABS is to develop methodologies to monitor, measure and, where needed, adjust for any such impacts.

The methodology the ABS is proposing to implement for this purpose makes use of the data of related series. A special multiple time series model called a Seemingly Unrelated Time Series Equation (SUTSE) model has been investigated as a basis for predicting a target survey estimate using multiple data sources.

Where related series measure a similar concept to the target survey variable, but are not subject to measurement change, these can assist in understanding the change that occurs on the target survey variable. Under this method, the statistical impact can be assessed by intervention analysis, taking advantage of the cross-correlations and leading properties between the target survey variable and the other related series. The power of this method has been tested by estimating historical supplementary survey effects and the effect of past questionnaire redesign using Australian Labour Force

Survey data. This work has also been extended in a number of other directions.

A case study involving LFS unemployment confirmed that a standard bivariate SUTSE model with claimant count data offered improvements in terms of prediction error, detecting outliers and structural changes in the target unemployment estimates.

However, available related data sources may not have appropriate properties for applying a standard SUTSE model to predict survey estimates efficiently. As part of these investigations the ABS developed a strategy to select valuable data sources and adjust the way a SUTSE model is applied to take advantage of SUTSE modelling strength. Another case study considered employment estimates from the LFS, and demonstrated that such a strategy also has the potential to work much better than a univariate structural time series model, by borrowing strength from multiple source data in an efficient way.

Further Information

For more information, please contact Mark Zhang or Oksana Honchar (methodology@abs.gov.au).

Sample Redesigns for QBIS and Capex

New sample designs have recently been implemented for the Quarterly Business Indicators Survey (QBIS) and the Survey of Private New Capital Expenditure and Expected Expenditure (Capex). These surveys were last redesigned in 2009, hence there was significant scope to improve the efficiency of the sample designs by reflecting changes to the population of in-scope businesses that have occurred since then.

Business Statistics Methodology (BSM) conducted a range of investigations in the first half of 2016 to create the new sample designs. Both surveys remain stratified by State, Industry, Size, and Employment status (whether or not a business employs staff), but within this framework there have been several improvements. Some of these improvements are as follows:

- The size dimension of the stratification remains principally based on a business's number of employees, but there have been improvements to the treatment of units with small employment size but very large turnover. These units are now identified and moved to a bigger size group using a method consistent with that used for the Economic Activity Survey, which collects similar data on an annual basis. This replaces a less effective method that was used under the previous designs.
- ABS business surveys typically have a 'Completely Enumerated' (CE'd) sector, where all businesses above a certain size cut-off are guaranteed selection in the survey. For these new designs an industry-dependent CE'd cutoff was implemented in place of the previous single cutoff. This meant the CE'd cutoffs could be increased for some industries. This reduces the provider burden for businesses that no longer fall above the cut-offs while maintaining the quality of the survey outputs.
- The industry dimension of the stratification was rationalised to achieve much closer alignment in industry stratification between the two surveys. This will assist with survey consolidation initiatives which may occur in conjunction with the ABS' Statistical Business Transformation Program.
- Micro non-employing units remain out of scope of the surveys. These are non-employing units with turnover below certain industry dependent cutoffs. These cutoffs have been updated to account for inflation and changes to the economy since the last redesign.
- Public sector businesses remain out of scope of both surveys but the derivation of the variable used to identify public and private sector businesses has been improved.
- Due to population changes since the last redesign, the weights of selected businesses in some strata had increased undesirably. Sample was optimally allocated to the new stratification to meet specified relative standard error constraints for the key survey variables, while ensuring no

individual unit received a weight of greater than 400.

BSM supported the implementation and quality assurance of the new designs, which took effect for the September 2016 reference period.

Further Information

For more information, please contact Carrie Samuels (methodology@abs.gov.au).

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How to Contact Us and Email Subscriber List

Methodological News features articles and developments in relation to methodology work done within the ABS Methodology Division. By its nature, the work of the Division brings it into contact with virtually every other area of the ABS. Because of this, the newsletter is a way of letting all areas of the ABS know of some of the issues we are working on and help information flow. We hope the Methodological Newsletter is useful and we welcome comments.

If you would like to be added to or removed from our electronic mailing list, please contact:

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