

# Methodological News

A Quarterly Information Bulletin



ABS Methodology and Data Management Division

September 2013

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## Robust Modelling of Design Effects for Household Survey Design

To date the ABS lacked a consistent and reliable set of methods to model design effects (DEFFs) from past survey data in order to assess the sampling error properties of proposed household surveys. Therefore a paper was composed that articulated the key challenges in modelling robust DEFFs for household surveys and examined general solutions in the context of two recent sample design applications.

The first sample design application was for the well-established Survey of Income and Housing 2013/14. In this instance, the effect of alternative cluster sizes on sample design considerations was investigated via a comprehensive simulation approach.

The second application was the newly formed Health Services Survey. This instance was one where relatively fine-level stratification was conducted, and the design was therefore made challenging through limited historical data being readily available at such fine levels.

A focus was placed on seeking to consolidate best-practice around design effect modelling using historical survey data, rather than census data. A subsequent assessment of the suitability of proposed solutions was conducted in order to gauge appropriateness as standard methods for ongoing and future application.

The key challenges include:

- modelling design effects under alternate sample clustering scenarios

- addressing the small data problem for specific sub-populations of interest - volatility undermining the design optimisation
- assessing the utility of design effects in meeting a multiplicity of output objectives, summarising across multiple items of interest.

This research was presented to the Methodological Advisory Committee in June 2013.

### Further Information

For more information, please contact Ryan Defina (02 9268 4074, [ryan.defina@abs.gov.au](mailto:ryan.defina@abs.gov.au)) or Jack Steel (02 6252 5788, [jack.steel@abs.gov.au](mailto:jack.steel@abs.gov.au))

## Flagship Projects 2013-14

Methodology and Data Management Division (MDMD) have introduced "Flagship Projects" which are research projects or projects of corporate significance. These projects will position MDMD to deliver corporate outcomes and advance ABS goals, build capability and will have a high likelihood of success with support by statistical areas.

In the near term, the ABS strategic goals relevant to the flagship projects are to create new and better official statistics, improve the efficiency of statistical production and support Census 2016.

Whilst the purpose of the Flagship Projects is important, so too is the research and significant projects included in them! The division makes a significant contribution to the operation and intellectual standing of the

ABS - and that is reflected in the list of projects below.

1. Census 2016 (Mark Zhang)
2. Small Domain Estimation (Alistair Rogers)
3. Household Survey Futures (Ross Watmuff)
4. Methodological support to Strategic Review of Economic and Environmental Collections (Justin Farrow)
5. Statistical Quality Control (Mark Zhang) & Risk Mitigation (Justin Farrow)
6. Data Integration, Access and Confidentiality (Phil Gould)
7. Methods for Social, Economic, Environmental and Demographic Analysis (Ruel Abello)
8. Data Visualisation (Phil Carruthers)
9. Methodology Architecture (Bill Gross)
10. Statistical Metadata (Juliet Fallace, Chris Hinchcliffe)
11. Responsive Design (Mark Zhang)
12. Statistical Methods refresh (Alistair Rogers)
13. Collection Methodology in an ABS2017 world (Jo Edwards)
14. Optimum allocation of collection resources to economic statistics (Justin Farrow)
15. International Collaboration (Siu-Ming Tam)
16. Statistical and leadership Capability (Chris Duffy)
17. Big Data (Ric Clarke)

The flagship projects will be managed with a minimal amount of administration by a governance board chaired by the Chief Methodologist. The board's role will be to ensure the projects are aligned with business needs, are tracking to plan, and in particular

if the project is not achieving the expected benefits then stopping the project so resources can be allocated to a new project. In coming months we will provide articles on various flagship projects.

## Further Information

For more information on the flagship projects, please contact the relevant person above (via the ABS switchboard) or Carolyn Cruden (02 6252 7779, [carolyn.cruden@abs.gov.au](mailto:carolyn.cruden@abs.gov.au))

## Disclosure-Protected Frequency Tables from Linked Microdata

The ABS is undertaking several data integration projects as an Integrating Authority. An Integrating Authority brings together data collected by different data custodians, at the unit level, to enable analysis of a combined set of information for statistical and research purposes. The option of enabling access, via a remote server, to linked microdata in order to produce frequency tables is being explored. The ABS must not publish information, such as frequency counts, in a manner that is likely to enable the identification of a person or organisation. The significant disclosure risk that must be managed by an Integrating Authority is that one data custodian may use the microdata it supplied to the Integrating Authority and the frequency tables released from the remote server to disclose information about a person or organisation that was supplied by the other data custodian. The Data Access and Confidentiality Methodology Unit has investigated the disclosure risks of allowing analysts access via a remote server to

flexibly generated tables based on the linked microdata. This was a continuation of previous work which investigated the disclosure risk of releasing regression output from linked microdata.

## Further Information

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## Reviewing the Impact of Major Data Revisions to the Seasonal Adjustment of the Building and Construction Collection

Earlier this year, the Building Approvals collection implemented extensive revisions to their Original estimates from July 2001 onwards due to a combination of:

- the introduction of the new Australian Statistical Geography Standard<sup>1</sup>
- the introduction of the revised ABS Functional Classification of Buildings<sup>2</sup>
- a major audit of data provision, which identified a number of reporting issues and systematic reporting anomalies in some constituencies.

The implementation of almost 12 years of revisions called for the seasonal adjustment settings for the 129 affected series to be reassessed by the Time Series Analysis (TSA) section. This process was further complicated by the work having to be completed in an extremely short time frame between the revised data being loaded and the next publication being created, with TSA analysts having only 4 days to complete the

initial work, and then another 4 days for further data checking and validation.

When reviewing the seasonal adjustment settings for a series, an analyst identifies any 'unusual' behaviour which is adversely affecting the adjustment of the series. The most common unusual behaviour identified in Building Approvals series is the occurrence of extreme values, where the series value for a particular period is significantly larger than the underlying level of the series. This is generally caused by one (or more) very large 'jobs' being approved in that period, where a job is a single building approval application, and very large jobs tend to be large apartment buildings (residential) or major infrastructure such as hospitals (non-residential). Where causes (i.e. specific jobs) have been identified for extreme values, we 'correct' the value by removing the impact of the identified job from the Original data, performing the seasonal adjustment process, and then replacing the identified job back into the Seasonally Adjusted series. This way, the seasonal adjustment process is no longer adversely affected by the extreme value, but the impact of the very large job can still be seen in the published Seasonally Adjusted series.

In the process of reviewing the seasonal adjustment settings for the affected series, TSA analysts took care to review the data from July 2001 onwards to identify any extreme values. Any identified extremes were then investigated to determine if they were:

- a previously identified extreme with an appropriate correction



- a previously identified extreme with an inaccurate correction (i.e. where the value of the job has been revised)
- a previously unidentified extreme.

Analysts also considered if any existing extreme value corrections were no longer deemed necessary, and could therefore be removed.

The process was a collaborative exercise, with TSA staff working closely with the Building & Construction Section to ensure the highest quality Seasonally Adjusted and Trend estimates were produced.

The Building Activity collection was also revised over the same period, as its frame is drawn from the Building Approvals collection. Again, TSA and the Building & Construction Section successfully worked collaboratively to review the seasonal adjustment for the collection.

This project work was both highly complex and very well coordinated, with all TSA staff required to be engaged. The project outcomes were positive, both in technical terms and in terms of the experience gained by key TSA staff.

The revised Building Approvals estimates were released in [ABS cat. no. 8731.0](#) on 4th March 2013 and the revised Building Activity estimates in [ABS cat. no. 8755.0](#) on 29th May 2013 and [ABS cat. no. 8752.0](#) on 17th July 2013.

<sup>1</sup>[Australian Statistical Geography Standard \(ASGS\)](#), 2011 Edition (cat. no. 1270.0.55.001)

<sup>2</sup>[ABS Functional Classification of Buildings 1999 \(Revision 2011\)](#) (cat. no. 1268.0.55.001)

## Further Information

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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 and Data Management 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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