national STATISTICS

WINTER 2007/08

3MOONS

METHODOLOGY DIRECTORATE
LEADING THE DEVELOPMENT OF STATISTICAL METHODS

WINTER 2007/08

This is the tenth issue of Methodology Directorate's (MD's) quarterly overview of methodological issues in the ONS. The ninth issue covered aspects such as: secondments in Canada and from New Zealand, an actress in our midst, the latest MD organisation chart, thirty years of the Survey Methodology Bulletin, and an introduction to Index Numbers. Read on for the latest news from MD.

In this issue:

NEWS

Advisory committee meetings

MD hosted the 13th meeting of the National Statistics Methodology Advisory Committee on 27 November in London. Topics discussed were: response burden in business surveys, revisions in time series estimates, census overcount, the Port Survey Review and Winsorisation of estimates of level and change. Contact denise.e.williams@ons.gsi.gov.uk or see www.statistics.gov.uk/methods_quality/nsmac.asp for further details.

The next UK Census Design & Methodology Advisory Committee (UKCDMAC) meeting planned for March 2008 will discuss: population output bases and definitions, coverage assessment methods and quality assurance strategies. Contact peter.benton@ons.gsi.gov.uk for further details.

MD – Government Statistical Service (GSS) forum meeting

The next meeting of the National Statistics Quality and Methodology Programme Board (hosted by MD) will be held on 18 March in London. Please send suggestions for potential future agenda items to: david.matthewson@ons.gsi.gov.uk

Secondments

MD welcomes applicants from UK government departments and other National Statistics Institutes for short and long-term secondments. Both organisations benefit from the knowledge-sharing and training elements these arrangements offer. Please contact: peter.gittins@ons.gsi.gov.uk for more information. To see all current jobs in ONS, please visit www.statistics.gov.uk/recruitment

Promotion

Jane Longhurst now heads Statistical Disclosure Control and Social and Demographic Analysis on a permanent basis after success at her Grade 6 assessment.

News continued on page 2

Upcoming conferences:GSSM13 and YSM

The thirteenth Government Statistical Service (GSS) annual Methodology Conference, 23 June 2008 at the Congress Centre London, is a good chance to meet people, promote your work across the GSS, share experiences and findings with others and get feedback from peers. We are seeking speakers (generally from the GSS and National Statistical Institutes) to share their completed work, work in progress and plans for future work. Presentations are expected to last about 20 minutes. Abstracts should be 100-250 words and contain up to three key words, as well as contact details. We are also seeking Session Organisers to suggest themes and organise speakers. Please submit abstracts and session proposals by email to methodology@ons.gsi.gov.uk by 29 February. For more information see www.statistics.gov.uk/events/gss2008/default.asp

The annual Young Statisticians Meeting (YSM), being held from 18-19 March at the ONS in Newport, is specifically designed by young statisticians for young statisticians. Open to all those in the early years of their career, from both academia and the business world, YSM provides an excellent opportunity for young statisticians to network and present research. Please submit abstracts to ysm2008@ons.gsi.gov.uk by 13 February – successful abstracts will be announced on 15 February. If you would like further details please visit www.statistics.gov.uk/events/YSM2008 or contact us at ysm2008@ons.gsi.gov.uk

Time to Revise?

Background

Time Series Analysis Branch (TSAB) in MD are transforming the reporting of movements and revisions, with the dual aims of providing more information to the public and creating a sound platform for future research. Their ideas have been well received at international conferences and internal ONS advisory committees. Now, 3MOONS reports.

"ONS time series estimates are used for economic and social decision making and policy setting, and there is always considerable media interest - mainly negative - when revisions to series occur", Duncan Elliott ruefully comments. "We need to increase the depth of the information we provide for revisions (and movements) - both for customers and to support internal analysis. Although movements can occur for many reasons, revisions occur for three basic reasons: revised data, new data, or model changes. However, both movements and revisions are currently reported as a single value."

Decomposition

By breaking down time series into constituent parts - Trend (underlying movement), Seasonal Factors (sub-annual pattern), and Irregular (sampling variability), TSAB are able to report movements and revisions in a very different way. The single value is 'decomposed' into three main (first order) components: Trend, Seasonal and Irregular. (Survey specific adjustments may also appear as first order components.) Second and third order interactions between main components are of lesser importance, and are reported as a single Interaction term.

Duncan has already put the theory into practice. "We're just trialling the approach at present, but have already provided an interesting new slant on results from the Index of Production".

		Main components				
	Overall movement	Trend	Seasonal	Irregular	Other	Interaction terms
Original series	-5.17	-0.15	-3.87	0.27	-1.47	0.05
SA series	0.12	-0.15		0.27		0.00

Table 1: August-September 2006 movement decomposition

Table 1 quantifies movements in a time series in terms of movements in components. "The downward movement in the original time series is now seen to be due to similar movements in the seasonal factor and 'other' factor (in this case a prior adjustment for the number of working days in a month). Also, the small (upward) movement in the seasonally adjusted (SA) series (by definition without seasonal factors and prior adjustments) is actually due to the irregular and trend movements cancelling."

Figures 2 and 3 illustrate the decomposition approach over time.

- The blue box shows the middle 50% of values (the inter-quartile range)
- The light blue line in the blue box is the median
- The dotted lines extend to non-extreme outlying values (viz those within 1.5 times the inter-quartile range of the blue box)
- Single points outside the blue dotted bars are extreme outliers
- The red dots show the most recent data point and its decomposition

"Firstly, the negative movement in the original series in Figure 2 is shown to be unusually large. The explanation is also clear - it is due to the unusually large negative movement in the prior adjustment (caused by a leap year). The positive revision to the growth in the seasonally adjusted series in Figure 3 is an extreme outlier, and is entirely due to an outlying revision."

The work is not finished yet, but results look promising. "We're hopeful this approach will change the way we report our revisions to the press", Duncan says with a smile, "and the way the press report our revisions!"

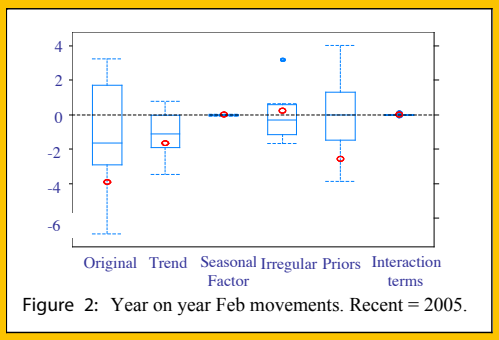


Figure 2: Year on year Feb movements. Recent = 2005.

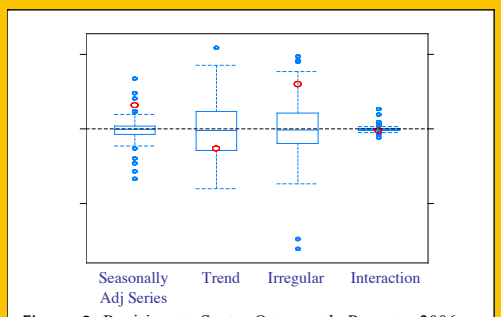


Figure 3: Revisions to Sept - Oct growth. Recent = 2006.

NEWS continued

Recent MD conference presentations (presenters only)

2007 FCSM Conference (5-7 November)	
Improving the Efficiency of Data Editing and Imputation for a Large-Scale British Annual Business Survey	Rob Bucknall
Microdata Risk Assessment in an NSI Context	Gary Brown
UNECE Conference on Confidentiality (17-19 November)	
Microdata Risk Assessment in an NSI Context	Jane Longhurst
The Review of the Dissemination of Health Statistics in England	Carole Abrahams
Statistical Disclosure Control for the 2011 UK Census	Caroline Young

Your questions answered

In this issue, we respond to queries about the moon pictured on the third page of the Autumn 2007 issue of 3MOONS. In a departure from previous photos of Earth's moon, we featured Saturn's moon Mimas as a "guest moon". Mimas has many large craters, but its Herschel crater dwarfs all the rest. This large crater, 130 kilometres (80 miles) wide, has a prominent central peak. The crater is the moon's most prominent feature, and the impact that formed it probably nearly destroyed it. What scary sc-fi spacecraft does it remind you of? Thanks again for all your queries, from home and abroad.

Please send your questions to: 3moons@ons.gsi.gov.uk

Two and a half years down under

In July 2007 Alan Bentley returned to Methodology Directorate from his international secondment at Statistics New Zealand. 3MOONS editor Gary Brown was keen to find out more.

So what did you learn?

In two words: "Statistical Thinking". I learnt of this phrase and discovered it's what I do all day. I was lucky enough to work on a very wide range of projects, requiring a diverse range of statistical skills, from sample design and time series analysis to disclosure control and statistical training. What all these projects had in common was statistical thinking: evaluating methods critically, analysing variation, presenting results and putting things in context.

The biggest difference?

Most things are surprisingly similar between Stats NZ and the ONS. However, I'd say Stats NZ is more informal; the organisational structure is much flatter. You really do feel you can talk to anyone in the office. I even played indoor football for the same team as the new Government Statistician.

The relationship between the ONS and Stats NZ has really taken off recently with lots of secondments in both directions – How did you do it?

(Alan laughs). I don't think I can take all the credit! I've answered plenty of questions from interested parties though. I think it is more a reflection of how 'international' official statistics have become. Countries want to compare themselves to their peers and, of course, keep up to date with the best methods. Secondments can play an important part in this.

Your greatest achievement?

Not statistical I'm afraid. In March 2007 I qualified as a Day Skipper with Yachting New Zealand. This was the culmination of several training courses with the Royal Port Nicholson Yacht Club based in Wellington, one of the windiest cities in the world!

E-learning

When HRD announced a new project last year to install e-learning across the ONS, the Quality Centre (QC) in MD volunteered to develop modules in both quality and risk management. Quality management in a National Statistics Institute fulfils a particularly important role in ensuring statistical outputs are robust enough to support complex decision-making. Central to success is the understanding and implementation of quality by ONS staff. QC believes e-learning will help to facilitate greater awareness and consistency in the approach to quality.

Who is involved?

Since quality is essentially defined by the customer, QC began by conducting customer research to find out what people require from e-learning modules. To assist with content development, volunteers participated in focus groups to discuss ONS staff's understanding of the concepts of 'quality' and 'risk' and also to consider a list of proposed topics. The findings of the focus groups are currently being analysed to determine the final structure and content of each module, but proposed topics are likely to include: personal responsibility for quality, process quality tools, risk management, quality in practice and quality measurement and reporting.

The intention is that each module will be 'bite sized', taking around 25 minutes to complete (the optimum length for this type of learning according to research). The modules will be based on 'how things are done in ONS', not on theory. This is a deliberate attempt to encourage staff to examine their current work practices and question them. Such self-analysis conditions foster greater creativity and innovation.

In addition it is the intention of QC to supplement e-learning with seminars, to which staff who have completed the modules will be invited. The seminars will provide an open forum for discussion and further exploration of the subject.

When and how will it be delivered?

All staff will be able to access e-learning via their desktop computers and it is hoped that the first module will be available in Spring 2008.

For further information please contact David Matthewson or Karen Williams.

The Data Visualisation Centre

The Data Visualisation Centre (DVC) is a newly-established part of MD's Census & Survey Methodology Division. Based in Titchfield, the DVC is currently staffed by Alan Smith, with plans to expand during its first full year. So what has prompted the creation of this Centre, and why now?

Well, according to a recent report, up to 15 million adults in the UK have maths skills equivalent to a G or below at GCSE level. This presents key challenges for producers of statistics.

1. How do you present numbers to people who might not be numerate (but who nevertheless need to understand your data)?

2. How do you speed up interpretation for those that are?

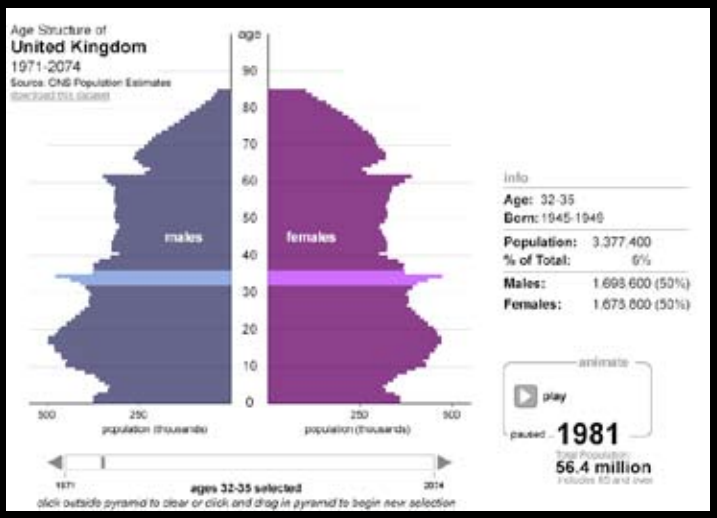
In responding to these challenges, it is clear that producing data alone is not enough – communicating them effectively represents a cognitive challenge to help users recognise important underlying patterns or trends.

Moreover, poor data presentations can obscure (or even distort) the real patterns in data – wasting all the good effort that has gone into producing them (there are plenty of examples out there…).

This is where the DVC steps in. Using a variety of presentation techniques (tables, graphs, maps) and technologies (including interactive displays), the DVC aims to help its customers unlock hidden patterns in data and make ONS outputs more appealing, engaging and informative to a wider audience. In addition to the creation of bespoke data graphics, the DVC will also act as a repository of best practice for ONS and the GSS, providing training and advice where required.

An example of the type of visualisations produced by the DVC is the interactive animated Population Pyramid (available online at www.statistics.gov.uk/CCI/nugget.asp?ID=6).

Here, the full time series of ONS Population Estimates and Projections can be viewed and queried interactively. Critically, changes in values between age groups over successive years can be followed by looking at the edges of the pyramid as it animates (the human eye is capable of recognising extremely intricate visual patterns). Contrast this with the presentation of the same data in a table - the cognitive task of comparing data in tables is very different as even extremely numerate users can only read one cell at a time.



The real beauty of this approach is that the graphic is not just a summary of the data (as is often the case with static data graphics) – it acts as a live link to the underlying data. This means users can query individual cell values (and even tabulate across age bands) simply by interacting with the graphic. Furthermore, the graphic provides further information, such as the year a particular group were born, helping users to identify trends (eg the post Second World War baby boom) – quickly. This particular graphic has now been syndicated to over 10 National Statistics Institutes across the world – feedback from users has also been extremely positive. It is intended that further work of this type will form a key part of the DVC over the coming years.

With plans for i-Dissemination and the launch of a re-vitalised NS Online in full swing, effective data presentation has never been a more pressing issue for ONS. It is intended that the work of the new Centre will fit together with these developments in a way that brings ONS data to a wider and better-informed audience than ever before.

Any queries regarding the DVC, please email alan.smith@ons.gsi.gov.uk

Methodology Consultancy Service

MD is realising a long held ambition to increase the support provided to the rest of the Government Statistical Service (GSS). Simon Compton explains.

'Official statistics are only partly centralised in the UK. Much of the statistical work across government is done by statisticians in policy departments, from which a wide range of National Statistics are produced. Forthcoming independence is strengthening ONS' links with this work. To this end, I have been asked to develop and head a Methodology Consultancy Service (MCS), which will undertake projects on a cost recovery basis for the rest of the GSS.'

'This has come at a good time for us. ONS relocation means that many of MD's internal ONS customers are moving out of London. However, we have a critical mass of 10-20 very experienced London-based methodologists that we can't afford to lose and the new service provides a great opportunity.'

Agreed in November 2007 by the Methodology Programme Board, the MCS will gradually replace the day to day work of London methodologists. By 2010 all MD staff in London will work in the MCS. Methodologists on other sites will also have the opportunity to work on MCS projects – providing a greater variety of work to the directorate as a whole.

'Although the MCS is primarily a GSS consultancy service, it will by no means diminish the support MD offers to the rest of ONS. London MD posts are moving to Newport or Titchfield and so the creation of the MCS will increase our overall methodological capacity.'

The support offered by MCS will range from individually agreed projects on a cost recovery basis, to one-off support and training. Quality improvement work following the assessments that form a key part of the new Statistics Board's mandate may also be a source of demand.

Details are currently under development, such as career paths within the MCS, financing, procurement and dealing with the requests for work already in. 'The demand is already there, and staff are moving across. This is an exciting time for staff in MD London – from a position of some uncertainty about our career in ONS we are now embarking on new work, carrying the MD torch further than we have been able to before.'

Watch this space!