

Minutes of the 32nd Meeting of the GSS Methodology Advisory Committee

24th November 2016

Drummond Gate, London

Hosted by the Office for National Statistics

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1.0 List of Attendees

Committee members present

Martin Axelson	Statistics Sweden
David Best	Office for National Statistics
Pete Brodie (Chair)	Office for National Statistics
Marie Cruddas	Office for National Statistics
David Firth	Warwick University
James Gillan	Northern Ireland Statistics and Research Agency
Jouni Kuha	London School of Economics
Denise Lievesley	Green Templeton College, Oxford
Denise Osborn	University of Manchester
Jeff Ralph	Office for National Statistics
Peter Smith	University of Southampton
Patrick Sturgis	University of Southampton

Presenters

Markus Sova	Office for National Statistics
Gary Brown	Office for National Statistics
Jennifer Davies	Office for National Statistics
Emma Drever	Department for Transport

Apologies

Brian Francis	Lancaster University
John Pullinger	UK Statistics Authority
Adrian Smith	UK Statistics Authority
Richard Smith	University of Cambridge

Others present

Daisy Hamer	Office for National Statistics
James Macey	Office for National Statistics
Atanaska Nikolova	Office for National Statistics
Emma Timm (Secretary)	Office for National Statistics

2.0 Administration

Pete Brodie (chair) welcomed everyone to the 32nd GSS Methodology Advisory Committee meeting (including new member, Marie Cruddas) and gave apologies for those who could not attend the meeting. Pete thanked Peter Smith for his significant contributions to the MAC for over 5 years and explained that this was his last meeting. Siobhan Carey has moved on to a new post, and has stepped down from membership of the MAC. Dr Rob O'Neill will be joining as a member of the MAC from the next meeting in May 2017. Attendees introduced themselves, briefly providing their background for the benefit of new members.

2.1 ONS and GSS news

Pete provided the following ONS and wider GSS news;

- There has been a Garrett review into methodology within ONS (published on 29/09/16). This will be discussed as a separate paper later in the meeting.
- GSS Methodology Symposium is on 12 July 2017 at BEIS Conference Centre. Looking for contributions from across GSS.
- National Statistics Quality Reviews. In July, the NSQR of Foreign Direct Investment and International Trading Services was published. Draft list of NSQRs are ready to go forward, but we are awaiting the outcome of ONS Methodology Transformation before launching into the programme. Bean Review included a view on the number of NSQRs that should be conducted, and scope of the reviews. The National Statistician's view was that we should be looking wider into migration statistics, etc. to feed into the NSQRs.
- Upcoming conferences:
 - International Association of Official Statistics (IAOS), Abu Dhabi, 5-8 Dec '16 (staff from Methodology Department will be making presentations)
 - New Technologies and Techniques in Statistics Conference (NTTS), Brussels, 14-16 Mar '17
 - ISI World Statistics Congress, Marrakesh, 16-21 Jul '17
- David Fry has recently moved from DCLG to BEIS, is the new chair of Statistical Policy and Standards Committee (SPSC), replacing Tricia Dodd. David is the first non-ONS chair. Prior to his first meeting, David commissioned a survey to canvass members on the effectiveness of the committee. Pete expressed his desire to take the opportunity to run a similar exercise for MAC, given the opportunity afforded by the review and restructure of methodology in ONS.
- Tom Smith is the Managing Director of the Data Science Campus in ONS, and will officially take up post in early 2017.
- Memoranda of understanding are currently being set up between Data Science Campus and a number of universities; the detail of which will become clearer in due course.
- Bill Oates, Chief Data Scientist, has moved on from ONS. Jane Naylor is currently filling Bill's post as Head of Population Methodology and Statistical Infrastructure.
- Pete Brodie is filling in for Tricia Dodd's post as Head of Survey Methodology and Statistical Computing.
- David Best highlighted that ONS are also recruiting for a Chief Data Architect, who will be in post in January 2017.

2.2 Minutes and progress from GSS MAC 31

Pete referred to the progress since GSS MAC 31 noted in the meeting booklet, and the minutes of the 31st GSS MAC meeting were agreed.

3.0 Papers presented

3.1 Paper 1: A method for using administrative VAT data to get a more detailed industrial breakdown of monthly turnover estimates

Author	Markus G Šova	Office for National Statistics
Presented by	Markus G Šova	Office for National Statistics
Discussant	Peter Smith	University of Southampton

Presentation

Markus stated that there is demand for monthly business turnover estimates by 4 digit SIC class. This is currently difficult using the Monthly Business Survey (MBS) as much of the data is at a higher level of classification than desired and the number of reporting units sampled from an SIC class is random and can possibly be zero.

Markus discussed the possibility of using administrative VAT data to get data at 4 digit SIC class without the need to expand or de-optimize the MBS.

Markus stated issues that can occur in VAT data before going on to propose some methodology for the data. Issues with VAT data included:

- Timeliness: there is often no turnover data until 2 months later, response varies with timeliness
- There is no way of verifying “surprising figures”
- Coverage: it is only compulsory to report turnover if it is over a certain threshold
- The data needs a lot of cleaning

Markus then went on to give a proposed methodology. This method involved aggregating MBS responses to class level then using VAT data to apportion the stratum estimates to classes. IDBR data can be used to adjust for VAT undercoverage and late returns. To make the data timelier, Markus suggested using VAT returns from earlier periods, if class turnover proportions are stable over time.

Markus gave some examples of estimated class turnover based on this. He stated that most of the estimates produced broadly similar results and had similar patterns. He questioned whether it mattered whether proportions are stable over time and concluded that proportions are a means to an end and cared more about monthly turnover estimates.

Further examples highlighted a spike in VAT data and this was thought to be an issue with data quality; VAT returns cover 3 months and so cause changes for 3 months worth of estimates.

Markus then went on to highlight a few final issues. This included that when the data just contains information from those who report early, the mean is higher than when adding those who report after 3 months. He also highlighted the undercoverage in VAT data (which does not include turnover for

businesses if it is under a certain amount), and stated that register data could be used to scale up for undercoverage.

The main questions posed in the paper were:

Question 1: Is the proposed methodology a sensible approach for estimating class turnover totals?

Question 2: Do these results suggest that the proposed methodology is sufficiently sound for estimating class turnover totals?

Question 3: What further analysis of the proposed methodology would the committee recommend?

Question 4: What changes to the proposed methodology would the committee recommend?

Discussant response

Peter Smith summarised the presentations and the methods put forward; then went on to give his thoughts.

Peter stated that the presentation lacked measures of uncertainty and thought it would be useful to include this in the future.

He also highlighted the problem that VAT returns are often incomplete. He stated that this should be corrected with weighting, or not using VAT data, but going straight to auxiliary data.

Peter mentioned that the results obtained depended on what methods are used. He stated that we should be cautious about saying that the methods that produce similar results are the right methods and the methods that produced different results are wrong. Here, again, using measures of uncertainty would be helpful.

Overall, the approach seemed like a reasonable approach and was similar to that used in migration estimates. However, there needs to be some measure of uncertainty of admin data. Here, census data could be used to build a model for errors in admin data.

Finally, Peter gave some suggestions for other things to consider doing:

- Consider how to assess uncertainty if a gold standard cannot be found
- Talk to experts for assistance
- Investigate whether there is a rule of thumb for the amount of error in admin data – maybe a sensitivity analysis
- Do further work investigating the results

Open discussion

Jouni Kuha questioned whether census strata could be used as a gold standard.

David Firth expanded on this, asking whether census strata could be used to calculate uncertainty. He stated that this has been done before, but is not sure how it works.

Markus Šova said this is done by finding certain examples of industries that are similar and at 4 digit SIC level, and doing apportionment. However, this could end up measuring something different.

David Best highlighted the fact that ONS wants to receive every VAT data point at some point in the future.

Markus responded that there is already undercoverage in VAT data from those who do fill out tax returns. The data that is then sent on to ONS is not classified by HMRC as they would like, but it can be reclassified by ONS. **Markus** also stated that they are using register data to make up for incompleteness. If they get more timely data into ONS then less scaling up is needed, but it will still need to happen.

Denise Lievesley asked Markus to discuss the mismatch between the VAT reporting unit and the survey unit, and asked what problem it causes.

Markus responded that we have to make assumptions when allocating VAT data to reporting unit. The current method is to use apportionment to turn quarterly data into monthly data; however this could change with calendarisation.

Peter Smith suggested looking at where the errors are to see where things are going wrong.

Jouni Kuha suggested that data that is not covered could be very different to that which is covered and this could be a possible source of bias.

Markus agreed with this, stating that coverage varies between industries considerably. Lots of the service industry will not be covered, for example, while this is not a problem for manufacturing industries. This means that there is more incompleteness to measure and compensate for, and this is not going to be easy.

Marie Cruddas stated that they use a similar method in population methods and it may be useful for Markus to come and look at what they do; they use census data as a benchmark. She also stated that small area estimation uses structure preserving methods and she is happy to share any information she has.

Pete Brodie stated that we also need to consider the balance between burden from HMRC and burden from surveys on businesses. We need to consider whether it is worth increasing the burden from HMRC (by getting them to collect more information from businesses) in order to remove the burden of surveys.

Martin Axelson asked whether if VAT data was timelier, ONS would be willing to use it. He stated that Sweden use it and have found it to be a more correct figure.

Markus responded that if we had the right frequency and timeliness then we could move in this direction. However, businesses often put incorrect figures for the first 3 quarters when reporting to HMRC, then the correct figure at the end of the financial year.

James Gillan asked if there was a difference between early responders and late responders, and there was more information about the distribution of lag time.

Markus responded that means get lower when adding those who reported after 3 months and we need to use data that is 6-12 months old to avoid volatility.

Jeff Ralph stated that for corporation tax data, undercoverage must be higher than for VAT data.

3.2 Paper 2: Transforming the Methodology Function in ONS

Author	Gary Brown ¹ , John D. Lewis ¹ , Douglas Cameron ² & Andy Garrett ³	¹ Office for National Statistics; ² UK Statistics Authority; ³ The Pi Factori, Kew Gardens
Presented by	Pete Brodie	Office for National Statistics
Discussant	N/A	

Presentation

Pete Brodie explained that the paper did not have a specific discussant, but encouraged discussion and comment from all MAC members.

Pete gave background to the review, explaining that John Pullinger commissioned an independent review of methodology in ONS, conducted by Andy Garrett. An expert group was convened, including members from other NSIs, etc., and an internal ONS team helped to run the exercise.

The aims of the review were:

- To take a step back from what we do currently in terms of methodology
- Examine existing skills and future needs that we may have, bearing in mind the move towards big data, admin data, and other future challenges

During the review, data were collected from:

- a survey of all staff
- longer interviews with a sub-sample of staff
- workshops with key stakeholders within ONS
- semi-structured interviews with senior stakeholders (incl. stakeholders across the GSS)
- key people from other NSIs (New Zealand and Sweden)

Denise Lievesley reported being interviewed. **Peter Smith** was approached by Garrett, as part of the review, but not interviewed.

David Best highlighted that commercial representatives and devolved administrations were also involved in the initial review.

Gary Brown explained that the 3-month timescale enforced limitations on the scope and level of engagement. Moving into the transformation phase, there is now an opportunity to increase engagement in certain areas if appropriate. Pete Brodie reiterated ONS' desire to engage with MAC members.

Particular emphasis was placed on analysis of qualitative information (including questions requiring an open-ended response in the survey). A number of analysis approaches were taken.

Topics which arose from analysis included:

- Innovation
- How ONS methodology functions are organised
- What roles and functions are needed in the future
- How we influence data providers, policy makers, business areas within our own organisation
- Method of working

Of particular relevance to engagement with MAC members is discussion around opportunities for 2-way secondments; and how we collaborate with other NSIs and academia. Pete Brodie also pointed members to the main paper, to consider recommendations that may be of particular relevance to themselves.

In the next stage of consultation, those involved in the initial review will be re-consulted.

The main questions posed in the paper were:

Question 1: Are there any other key drivers for a review of methodology in ONS?

Question 2: Did the Garrett review miss any important sources of evidence?

Question 3: What cultural and structural changes are implied by the strategic recommendations?

Question 4: What part can the GSS MAC play in implementing the recommendations?

Question 5: What approaches to continuous methodological improvement should ONS consider?

Open Discussion

Pete Brodie clarified that question 1 was asking about whether there were things which should have been driving us to review methodology functions before the Bean Review.

Denise Lievesley felt that given ONS involvement in international official statistics, ONS could have been driven earlier by asking other NSIs their opinion of British statistics, in relation to methodology. Denise believes that the UK is not seen as innovative, methodologically.

Peter Smith explained that, there's an issue with the structure of 'career methodologists' in ONS, where they cannot remain in an area to become expert (as in academia); promoted on technical expertise. It's still important for methodologists to be able to move around, but a career ladder is needed. There is a need to maintain expertise and stimulate staff to become expert and progress. Currently staff demonstrate skill, and they're promoted and then moved on.

Pete Brodie emphasised that some staff (particularly younger or graduate staff) may want to move around.

Jouni Kuha believes that methodology division is not the place for a 'jack of all trades'.

Denise Lievesley reported on other NSIs who chose to move away from specialists and quality suffered as a result. Denise also highlighted that leadership and confidence are key elements which are missing from slides regarding 'influence'. She also felt that secondments were a good proposal, advocating 'the more the better' as an approach. Staff should be rewarded for taking secondments and should not be treated as inferior if they decide not to move onto a major management role.

Denise also emphasised that accountability is driving out risk-taking. Some statistics offices do it well (e.g., Netherlands have a scheme where staff can apply for funding to 'buy-out' their time for experimentation). Younger staff have tended to have driven this approach and been the ones to take on the opportunities (e.g., use Friday afternoons to 'do something innovative/different').

Pete Brodie reiterated that we need to make sure that this time for innovation does not get squeezed out; a proper framework is required.

Martin Axelson reported that a strong driver is being able to influence your own work. Much innovative work happens ‘under the radar’, and not as part of a strategic decision. Give these people a greater say in where work should be headed next. If those driving innovation don’t have a say, it will have negative consequences. People are motivated by impact (e.g., impact on statistics and cost).

Patrick Sturgis reported that ONS has a risk-averse reputation which goes with the view that it’s not very innovative. Patrick feels that this is not true. When Patrick attended QDET2 in Miami (November 2016), he saw numerous presentations from ONS staff, and had not realised that ONS were working on the items presented (despite being a MAC member). For Patrick, this emphasised the need for a cultural shift in ONS to bring the innovative work of ONS to greater prominence. ONS should be submitting work to conferences *and* taking the lead for setting up events (with academics). Incentivizing people to publish in journals will, again raise the profile of ONS work. Given the work required to publish in journals, incentivization is needed.

David Best highlighted an observation made by Andy Garrett, that staff who are keen to accelerate development of work, are also responsible for ensuring quality is maximised and risk is minimised, which disincentivizes them.

Pete Brodie announced that ONS are recruiting for a new director of the new Statistical Methods, Research & Innovation (SMRI) Directorate. ‘Data’ and ‘Methods’ will be brought together as a service. This covers the ONS ambition to both collect and bring data into the organisation (big data/admin data), and develop the methods in a core methodology. Interviews will be completed before Christmas, with the aim of having the new director take up post as soon as possible in the New Year. This is a result of a key recommendation of the review, to enhance leadership for methodology.

Denise Lievesley emphasised the importance of recruiting a director who is or has been a methodologist. David Best confirmed that of the applications that had been received, all were strong methodologically.

Pete Brodie raised the question of what approaches to continuous improvement ONS should consider.

James Gillan reinforced the idea that innovation isn’t an end in itself; it’s about achieving strategic objectives. There needs to be a way of prioritising the innovation activity with the biggest impact, leverage and spread. It is important for people to develop expertise, but the more you are exposed to other ideas, the more likely it is for cross-fertilisation to occur. James also discussed a link to data warehousing and the approach of moving people around quickly to develop expertise. It’s important to apply project management principles and assess performance against strategic objectives: How much did we do? How well did we do it? Did anybody benefit?

David Best reiterated the need for creating space to enable innovation.

Denise Osborn supported James’ view about the need to link innovation activity to strategic objectives. She advocated publicising the key objectives publicly, to enable staff in ONS to realise the common goal, but also academics. This would enable opportunities for collaboration.

Jouni Kuha raised the issue of organisational memory. Given the scale and breadth of work undertaken by ONS, how long would it take to assimilate all evidence on a particular subject? How many people have knowledge on any particular subject? To know what ONS expertise is, is a key to methodological progression.

Denise Lievesley highlighted that one of the challenges will be the changing relationship with Eurostat. To what extent will we decide to replace what Eurostat currently does? For example, peer reviews (by international friends of ONS) could be used to benchmark ONS and visit on a regular basis to make recommendations and give a general sense of where progress is being made. Denise also highlighted a concern as a user of statistics that government could decide not to produce some statistics in the future. Statistics Canada has a good reputation in this area.

David Firth raised the point that people with graduate qualifications will be hugely in demand everywhere. It will force ONS to up its game and potentially seize the opportunity to become a globally recognised research centre, to attract the people that we need.

Peter Smith stated that Statistics Norway has joint appointments with universities. Peter also expressed his recognition that there is a lack of risk appetite in ONS. ONS staff need to have confidence that, as a methodological expert, when they speak, they are speaking on behalf of ONS and not expressing a personal opinion.

Patrick Sturgis reiterated the importance of reviewing the MAC, taking advice from other advisory committees.

Gary Brown suggested taking work/ideas raised within the MAC outside of the meeting, to form working groups, as and when appropriate.

James Gillan raised the rhetorical question: If you were going to design a statistical system from scratch, what would it look like? The grand unified theory is that everything should be focussed around data collection, but that doesn't seem to be at the heart of what's driving the organisation. Giving the opportunity for blue-sky thinking, where it could be explored how methodologists can drive change and respond requests for change is important.

3.3 Paper 3: Anticipating Brexit effects in time series analysis

Authors	Tariq Aziz, Jennifer Davies, Duncan Elliott, Charlotte Gaughan, James Macey, Atanaska Nikolova, Bethan Russ	Office for National Statistics
Presented by	Jennifer Davies	Office for National Statistics
Discussant	Denise Osborne	University of Manchester

Presentation

Jennifer Davies outlined the motivation behind the research, pointing out that the process of leaving the EU ('Brexit'), following the referendum last June, might have widespread effects on the various economic time series produced by the ONS. Importantly, while the magnitude, direction and timing of this impact is unknown, it is essential that when seasonal adjustment is performed, potential outliers and level shifts associated with this economic shock are appropriately accounted for. Failing to account for such effects can lead to large revisions of the published seasonally adjusted series and forecasts. In order to avoid revisions, it is important to consider methods for dealing with anticipated unknown shocks, which is particularly challenging towards the end of the time series.

Jennifer explained that at the ONS thousands of series are being analysed, which involves annual seasonal adjustment reviews and also forecasting, e.g. predicting values of GDP for the following quarter before data become available. This process is done using the software X-13ARIMA-SEATS, which adopts the regARIMA model for prior adjustment and cleaning the series of the distorting effect of outliers, followed by the X11 method of iterative moving averages (symmetric filters) to identify and remove the seasonal component.

The presented research involved testing six options of dealing with potential unknown shocks at the end of time series. Each option is to be introduced at the start of the anticipated time when the economic event could have an effect, and then continuously applied until the potential effect can be clearly identified and subsequently adjusted for, or until it is decided that no shock has occurred.

The first two options were based on a method proposed by Kirchner and Mehrhoff (2012), which involves treating every new data point at the end of the series as either an outlier (option 1) or a level shift (option 2). The third option was to apply the software's automatic identification method for outliers and level shifts to each new point. The fourth proposed option was to shorten the trend estimation filter relative to the specified filter length prior to the economic event of interest. This intervention is expected to lead to quicker reflection of level shifts or ramps (a sequence of level shifts) in the trend. In a similar fashion, the fifth option was to lengthen the trend filter, which may result in a smoother trend in the presence of outliers. Finally, the sixth option was to not undertake any intervention until a visible effect can be identified and adjusted for.

The six options were tested on real ONS time series from Index of Production, Index of Services, and Trade in Goods, using the period of the 2008 recession as a realistic event that led to economic shocks. The starting point for interventions was January 2008 until the end of 2009. For each intervention to be applied, the series were split into five groups based on the actual effects exhibited during 2008: level shifts, additive outliers, ramps, seasonal breaks, and no effects.

For forecasting performance, mean and median absolute percent one-step ahead error (based on comparing the forecast for the next data point to the corresponding true value) were presented. Jennifer noted that trend filters are not used in forecast estimation, so results for lengthening or shortening the trend filters were the same as results for no intervention. The outcomes were mixed. Series with ramps benefited mostly by a level shift intervention, otherwise in most cases making no

intervention resulted consistently in the lowest forecast errors, although for series with additive outliers the automatic outlier identification method appeared as the best option.

Seasonal adjustment revisions were assessed as the amount of change between the first seasonally adjusted estimate of a time point and the final estimate when all the data points were available and the effects of the economic shock (if any) were adjusted for. For series with level shifts and ramps the best intervention was using automatic outlier detection, while for seasonal breaks the best intervention was lengthening the trend filter. However, Jennifer noted that which filter length is appropriate may change depending on the span of the series. Series with no effects benefited mainly when no intervention was applied.

In summary, Jennifer noted that there is no option which can be consistently identified as best, and the results differ depending on whether forecasts or seasonal adjustment is assessed. Overall, it appears that using automatic outlier detection or no intervention may be the best approaches, and these are also two of the proposed methods recommended by the EES guidelines on seasonal adjustment.

The main questions posed were:

Question 1: What do you think of the approaches considered?

Question 2: If a generic intervention is to be used, at what point should we start and should we stop using it?

Question 3: What alternative approaches could be used?

Question 4: Should automatic outlier detection be used for future values, or should no automatic interventions be made?

Question 5: What further analysis would help inform which intervention to use?

Discussant response

Denise Osborn gave a brief presentation, starting with a summary of the presented paper, focused on the importance of accounting for economic shocks in time series and the difficulty to do so when the timing and magnitude of these shocks is unknown. Next, Denise gave a more detailed overview of how seasonal adjustment is accomplished with the X11 algorithm, explaining that a time series is decomposed into three components - seasonal, irregular and trend-cycle elements. Subsequently, the seasonal component is removed. Importantly, these components are estimated with iterations of moving averages, and cannot be directly observed. Also, forecasts are embedded into the seasonal adjustment process due to the use of symmetric filters and thus the need to have past and future data points available in order to estimate these components at the start and end of the series. Therefore, abrupt or atypical observations in the series, such as outliers or level shifts, can lead to substantial distortion of the components.

Denise also went into more detail regarding the type of filters (moving averages) used to decompose time series, emphasising that there are trend filters (as the ones lengthened and shortened as part of the interventions proposed by the discussed paper), but there are also seasonal filters which are used to estimate the seasonal component. Subsequently, the discussant referred to a paper by Jonathan Wright (Brookings Papers, 2013) looking at the effects of sharp turning points during the 2008

recession period on seasonally adjusted values of nonfarm payrolls in the USA. The paper concluded that seasonally adjusted payrolls were wrongly estimated by approximately 100 000, and this could be remedied by lengthening the seasonal filter used for estimating the seasonal component of the series. It was noted that this could be an option to consider for the currently discussed research on Brexit effects.

In response to the first question posed, Denise noted that all of the six approaches presented by the current paper were sensible methods for testing, and enquired whether the significance level for outlier identification was manipulated. Jennifer answered that the default threshold values were adopted, which depend on the length of the series. In response to question 2, Denise suggested that if a generic intervention is to be used, there should be no rigid start and stop dates for applying it, as the timing of Brexit effects may vary widely depending on the series, and also the effects can be continuous. For question 3, Denise recommended lengthening the seasonal filter (based on the paper by Jonathan Wright) in order to produce more stable estimations of the seasonal factors. Shortening was not recommended because it may lead to not picking up potential changes in seasonality. Also, Denise noted that all of the options reviewed by the paper were univariate, while often the effect of economic events is evidenced in a multivariate fashion. It was suggested to focus on key time series and adopt multivariate methods for forecasting, also use nowcasting for the first estimate of GDP. Denise also noted it is important to think about potential relationships between different economic time series. For question 4, the discussant suggested that in the face of uncertainty series should be monitored and some form of automatic detection should be a preferred option relative to no intervention at all. Denise said she could not give a definite response to the last question regarding further analysis.

The chair invited Jennifer to comment on any of Denise's responses. Jennifer noted that changing the seasonal filter was not initially considered as an intervention, as the built-in outlier replacement in the X11 algorithm makes seasonal estimates generally robust, but it is certainly a method worth focusing on. Also, multivariate methods are not traditionally used for seasonal adjustment by the ONS, but it is an area of research interest.

Open Discussion

Denise Lievesley stated that she is not an expert in the area of time series and was not familiar with the statistical and mathematical underpinnings of time series analysis, but she felt that there was too much of a focus on strictly methodological components, while there may be a need for a more substantive component grounded in the current events. Specifically, there should be input from economists who can advise on what specific effects Brexit may have on the time series.

David Best added that there are many developments in mathematical models of micro-economic impacts and discontinuities using methods from the field of physics, so this could be an opportunity to expand and adopt approaches from other areas.

Jouni Kuha noted that while it may be useful and realistic to test the current approaches on the economic impact from 2008, this impact may not necessarily be comparable to the potential Brexit effects. Jouni suggested that the adopted method seemed slightly passive and unguided, and it may be more beneficial to be informed about Brexit-specific outcomes, and then simulate them into artificial time series in order to have more control over the variables.

Pete Brodie agreed that simulating different Brexit outcome scenarios informed by expert views may be a useful method to test the methods.

Patrick Sturgis also noted that he is not a time series expert, and he thinks it is important to understand what Brexit is and how it should be defined for the current purposes. Questions and issues to be considered relate to when effects are to be anticipated and the fact that some are already observable, but it is very difficult to designate start/stop dates. It is also important to consider the causes of these effects as they can be multiple, and this can inform future trends. In addition, some time series may be entirely a product of Brexit due to snowball effects.

James Gillan noted that the aim may be to minimise revisions, but Brexit affects different things in different ways, so one solution would not fit all.

David Firth agreed that anticipating Brexit effects is very challenging and asked what the typical way to minimise and avoid revisions is. It was generally responded (by Pete Brodie) that the best way is to get the estimates 'right' from the first time, and this is to be accomplished by adjusting the data for the appropriate type of effect (which is difficult to anticipate).

Pete Brodie summarised the recommendations from the paper discussion: using multivariate methods, longer seasonal filters, identifying specific informed scenarios to be modelled.

3.4 Paper 4: Quota sampling guidance for government analysts

Authors	Gary Brown ¹ & Emma Drever ² , Ramona Franklyn ³ , Richard German ² , Natalie Low ⁴ , Clare McConnell ⁵ , Peter Newby ⁶	¹ Office for National Statistics; ² Department for Transport; ³ Department for Justice; ⁴ National Audit Office; ⁵ Health and Social Care Information Centre; ⁶ Ministry of Defence
Presented by	Gary Brown ¹ & Emma Drever ²	¹ Office for National Statistics; ² Department for Transport
Discussant	Denise Lievesley	University of Oxford

Presentation

This paper was jointly presented by Emma Drever and Gary Brown. Quota sampling is increasingly being used across the GSS for policy research, but without any government guidance. To address this omission a cross-department working group has been set up to produce some guidance and thereby promote consistency across the GSS. Non-probability sampling was contrasted with probability sampling and a list of pros and cons for each was presented. Five "golden questions" were then presented. These are formulated to help people with a non-statistical background understand the difference between probability and non-probability sampling. The aim is not to stop quota sampling, but to ensure that any decision to use quota sampling is an informed decision. It is planned to turn these "golden questions" into an on-line tool in 2017. Finally, some best practices for quota sampling were listed, and the controversial issue of post-stratification was raised.

The main questions posed were:

Question 1: Are the pros and cons of probability and non-probability sampling useful?

Question 2: Are we asking the right 'golden' questions to self-assess which method to use?

Question 3: Are there any other best practice techniques for quota sampling?

Question 4: What guidance should be given regards the post-stratification issue?

Question 5: What are the pros and cons of launching the guidance as an online collaboration tool?

Discussant response

Denise first noted that the presentation had been different than the paper, then asked how big the problem – i.e., use of quota samples - was in reality. She thought that the use of quota sampling could make the issue of lack of trust in official statistics worse. She also asked whether it was sensible for an organisation to use quota sampling and random sampling techniques at the same time - as interviewers are usually only skilled in one of these approaches, not both. Hence, given these risks, she warned against promoting quota sampling. - *Gary clarified they were trying to control rather than promote quota sampling*

Denise then discussed the points made in the paper in detail:

- the discussion on quota sampling on the ASA website should be reviewed

- pros and cons of quota sampling were complex - the paper over-simplified them
- Leslie Kish's sampling principles should be included - rigour, robustness, replicability
- the paper did not address problems with probability sampling or improvements to non-probability sampling
- good quota sampling might not be much cheaper than random sampling - so cost is not such an issue (non-response is a bigger issue)
- the paper is a little old-fashioned - more should be included on experimenting with different methods, e.g., improvements by using other sources to control quotas

Open Discussion

Patrick Sturgis stated that costs now mean that there needs to be a stronger case for probability sampling. It is good to be trying to raise the standard of quota sampling. It would be useful to audit the extent to which non-probability sampling is done in the GSS. It could be too complicated to boil down all the considerations into a flow chart of decisions. We wish the sample to contain variables related to the propensity to be in the sample and variables correlated with the responses.

Jouni Kuha said that a flow chart is a good idea, more so than a score card.

David Firth added that quota targets should be related to response probability and recommended the creation of a wiki and giving committee members edit permission.

Martin Axelson explained that just as quota sampling is based on a model, so is non-response under probability sampling.

Jouni Kuha stated that under the model, quota cells have a representative sample - i.e., exchangeable people. He added that post-stratification is the same as pre-stratification under the model.

Patrick Sturgis noted that if only point estimates are produced, many people will assume that there is no error.

Jouni Kuha pointed out that Q4 seems to be inviting a "yes" response. He added that where probability sampling is not a crucial issue, quota sampling may be useful, as opposed to convenience sampling.

Charles Lound mentioned that good quota sampling guidance may be available from commercial companies.

5.0 AOB

Pete Brodie thanked Peter Smith, once again, for his outstanding contributions to the MAC since May 2011, as Peter was not present at the start of the meeting.

6.0 Summary of actions

6.1 Chair to explore options for engaging with MAC members on fitness for purpose and future development of the MAC.

6.2 Secretary to contact members with a Doodle Poll to set up the next meeting date.

6.3 Secretary will send out expenses forms for members to complete and submit.