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Short-Term Economic Statistics and the Current Crisis – A national statistics office perspective

Statistical methods in a rapid recession

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STESEG members are invited to provide comments to the author on the general approach outlined in this paper and any potential gaps in the analysis.

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Note

This brief paper draws on work undertaken within the ONS and papers developed for both internal committees and prepared for the 2009 European Establishment Statistics Workshop – EESW09, which will take place in Stockholm, Sweden, on 7-9 September 2009. I acknowledge the contribution made by colleagues in the Office for National Statistics (ONS), particularly Aileen Simkins and Martin Brand.

Introduction

The current world recession reflects the most serious global economic turmoil for over 60 years and economic management is a critical issue for the UK. While the levels or trend in many statistics are affected by the recession, this paper examines the potential effects on the quality of the primary outputs produced by ONS.

The speed of the recession and its impact on businesses has implications for ONS business survey methodology, processes and analysis, including for published estimates of index of production, index of services, retail sales and GDP. There are also issues for work on financial institutions and annual indicators covering both the financial sector and more generally in terms of structural measures of employment and earnings and production.

The current economic climate is changing at an unprecedented pace amid conditions in the financial system that break new ground. This led ONS to reassess the way in which it conducts its business surveys, processes data and delivers analyses of the information obtained. It raises risks to ONS's reputation if it is unable to react in an effective and timely fashion to maintain quality. In response, ONS has established a group of staff from across the Office involved with business surveys to assess whether systems, processes and /or methodology need to change.

There is a spectrum of issues here - from very short term such as the correct and consistent handling of the failure of a large business to more fundamental issues such as the mechanisms for updating the business register and sampling frames, which require significant study and testing. While ONS needs to react to soluble short term problems, it equally needs to guard against any hasty short term changes to fundamental methods that could be counterproductive and injure its reputation. Methods will need to be made robust to, rather than tuned to cope with, recession.

ONS has assessed what changes might be feasible in the business register and data collection areas to provide more timely indicators of the downturn. A 'recession flag' has been added to data collection systems, and initial analyses have confirmed that other immediate changes in the business register are not required.

The ONS group has discussed the type of issues that might impede the capacity of the current business survey system to generate fit-for-purpose statistics. These include the way in which the business register, and hence population frame, keeps pace with change in the economy; the samples and weights used in estimating both short-term and structural statistics; response chasing strategies; non-response adjustment methods; imputation techniques; business intelligence; and, the need to keep users informed about any deterioration in quality of outputs as a consequence.

Having identified the issues the next steps are to bring forward any proposals for immediate change where necessary and feasible; in other cases to scope issues for methodological study and research; to produce notes on issues, solutions and plans for sharing with colleagues across the Government Statistical Service and for publication more widely, in order that the user community is aware of the implications of the downturn for business survey outputs and the ONS's response to them.

In looking at the recession's potential for impact ONS has evaluated the challenges faced at each stage of the Statistical Value Chain (SVC). Following this initial scoping, ONS has identified its priorities for methodological work to ensure that the quality of UK economic statistics is maintained at this critical time.

Initial scoping analysis using the Statistical Value Chain

ONS generally describes the process of statistical production in terms of the SVC. This is a simple sequential list, starting with the decision to undertake a statistical collection or statistical analysis through to end of the cycle, which is archiving.

Table 1 below briefly sets out the 15 stages of the SVC and ONS's assessment of potential effects due to the recession. These are largely related to business surveys and economic statistics, but not exclusively.

Potential work programme

ONS had already been considering the likely implications of the recession for its outputs some time in advance of the general fall in GDP. For example, the intervention in 2008 of the UK Government in taking large shares of struggling banks had direct consequences for their classification as private/public owned. The failure of several large UK retailers in 2008 required careful and consistent handling, although such issues had been handled before and procedures existed.

By considering the full scope of the SVC, ONS was able to consider and prioritise the work needed, identifying 13 important tasks for maintaining quality:

Task 1: Consider what the methodology research programme into producing statistics during rapid and major economic change should involve

ONS has produced a scoping paper setting out the research it feels is necessary and how it might be taken forward. This task has been completed. Essentially this is the content of this paper.

Task 2. Develop proposals for handling large scale reclassifications of UK banks and also business failures

ONS set up an internal group to agree (and document) a consistent approach across the office to the reclassifications. This will also maintain its capacity to include public sector units in outputs that 'need' them. This covers issues of timing, backcasting (including discontinuity measurement), disclosure, and consultation with primary stakeholders. The group has also reinforced existing procedures relating to business failures. This work is largely complete and has seen the employment of publicly funded banks included in outputs for the public sector. Further work to assess the impact on financial statistics is ongoing.

Task 3. Analyse the impact of the annual (January) update of the business register for classification and other changes

Most ONS business surveys experience register changes at the January update. ONS aims to ensure early warning of potential large scale changes in the register that have the potential to introduce disturbances in survey outputs.

Task 4. Review automated imputation, editing and outlier identification parameters

ONS is reviewing its imputation and editing methodology in the light of expected changes (response rates and period on period change etc.) and also re-examining outlier parameters. The initial analysis shows that response rates are holding up well and that current methods are fairly robust.

Task 5. Analyse the assumptions underpinning standard estimation (particularly deaths and births) and their potential impact on survey outputs

Because of lags in the register relating to births and deaths, a short-term assumption of births = deaths is made until the register adjusts itself. ONS is considering whether to amend or retain such estimation parameters. ONS is also considering how estimating for non-responders in the weighting by assuming that there is no difference between non-responders and responders might introduce bias. Problems may arise when there is correlation between responses and the likelihood of response (for example businesses experiencing financial difficulties may be less likely to respond) AND there is a relatively high non-response rate.

Table 1: Potential impact of recession on statistical methodology, by SVC

(Note: lines in **bold** (red font) are highest priority)

SVC Step	Potential impact of recession
1. Decision to undertake a collection or analysis	• no impacts identified here
2. Collection design	• no impacts identified here
3. Accessing administrative data	• administrative data may be more out-of-date than under normal conditions (bias)
4. Sample design	• sample designs less optimal (variance)
5. Implementing design	• more deaths and fewer births • treatment of large companies in administration (bias, coherence) Task 2 • more frequent changes in industry classification or size-band Task 3 • more changes of stratum when register "frozen" fields are updated in January Task 3
6. Implementing collection	• higher rates of unit non-response (bias, variance) Task 12 • higher rates of item non-response for some items (bias, variance) • poorer quality of responses (bias) • increased respondent burden to maintain sample sizes (cost) • increased 'churn' of samples to maintain sample sizes (variance of change)
7. Editing and validation, derivation and coding	• imputation and construction assumptions not valid (bias) Task 4 • fewer units in imputation classes (variance) • non-response problems exacerbated (bias, variance) • higher rate of violating validation rules (cost) • ad hoc changes to editing and validation rules • ad hoc, temporary changes to systems
8. Weighting and estimation	• need to adjust for fewer births and more deaths (bias) Task 5 • poor relationship between response variables and auxiliary variables (variance) • potential for more or more extreme outliers (bias, variance) • smaller stratum sample sizes from reduced response or population (bias, variance) • effect of changed migration patterns on population counts (bias)
9. Analysis of primary outputs	• more unusual movements or comparisons • comparisons against similar statistics may be less reliable (coherence) • bigger differences between surveys and administrative sources (coherence)
10. Index number construction	• major revisions to index when rebasing to or from a recession year (bias) • effect of major business failures or reclassifications on weights (bias) Task 7
11. Time series analysis	• change in seasonality, trend or level (bias, variance) Task 8 • forecasting goes awry (bias) Task 8 • more outliers occur (variance) • benchmarking less effective (variance)
12. Further analysis (across datasets etc)	• reduced accuracy of short-term output indicators as measures of GVA (bias) Task 13 • product breakdowns from previous years' PRODCOMs no longer valid (bias) • major revisions to GDP when supply-use balancing applied for a recession year (bias) • major changes in inputs (eg. migration) may impact on accuracy of analytical outputs (eg. population estimates). Task 6
13. Confidentiality and disclosure	• smaller achieved samples means more disclosive cells
14. Dissemination of data and metadata	• need to consult with or inform users on changes to methods • reported changes past a turning point may be misleading Task 9
15. Data archiving and ongoing management	• need to justify and document ad hoc changes to methods Task 11 • ad hoc changes to systems may not be documented

Task 6. Review population estimation methodology to assess the potential for changes in migration patterns as a result of rapid economic decline to impact on population estimation and thus household survey weights

The recession is clearly having an effect on migration. ONS needs to ensure that this does not cause difficulties with the population estimates. This is under review.

Before the recession began, ONS was already leading a large programme of work improving migration estimates. Elements of this programme are associated with improving methods, sources and timeliness of the statistics to ensure they are appropriate and capable of detecting and measuring changes in patterns quickly.

Task 7. Check outputs to identify where estimation is based on fixed population parameters (such as the Index of Production)

ONS has identified outputs that do not immediately react to large scale business failures and reclassifications in their population frames and which might therefore be subject to large changes at annual adjustment or criticism for inappropriate methodology. Our preliminary analysis of the effect on weights for some key series indicates that this may not be a problem. However, ONS is working to ensure primary users are aware of the nature of the population parameters where these are fixed.

Task 8. Review seasonal adjustment

Seasonal adjustment methods are based to some extent on assumptions of a degree of stability in seasonal patterns and trend growth; these can break down during extreme times. ONS's Methodology Directorate is providing guidance for survey output areas on checks to apply to seasonally adjusted series so that irregular components are identified and dealt with appropriately. ONS is also investigating how best to handle sharp turning points. In advance of the completion of these investigations, survey output areas are being given guidance regarding a sensible balance of mathematical and judgmental forecasts.

Task 9. Produce the 'economic story'

ONS has reviewed its existing ways of providing economic context to our key indicators, using specialist economist skills. The aim is to have better background and scene setting intelligence (eg. drawing on analysis of notified redundancy information, BBC's recession tracker).

Task 10. Consult other National Statistical Institutions

ONS has consulted several NSIs and is attempting to identify areas of best practice; this paper is a stage in this task.

Task 11. Document methods and systems

ONS will ensure it creates up-to-date internal documentation on any changes to methods or systems applied as a response to effects caused by the recession.

Task 12. Consider effect on non-response

ONS is monitoring closely the impact of the recession on non-response. To date this has not been a major concern.

Task 13. Analyse assumptions underlying short-term GDP statistics

ONS's short-term early estimates for GDP necessarily involve a range of assumptions. For example that turnover is a good proxy for value added. ONS is assessing the effect of the recession on the validity of these assumptions.

Conclusion

ONS is taking forward the tasks listed above, which it views as its current priorities. However, as the recession and its effects progress, this is constantly kept under review. A number of urgent tasks have already been completed and those remaining are all under way and are expected to be complete in the first half of 2010.

The risk of not taking forward work to address the statistical issues arising from the recession is that ONS outputs may be inaccurate or misleading in the current context; cannot be defended quickly against queries from stakeholders and critics and may be more prone to retrospective revisions than they need be, if methods are adapted quickly to attempt the best possible estimates. ONS is trying to avoid having to deal with issues in very tight time gaps, with stress and risks of poor decision making, rather than planning ahead for a more considered basis for methods review, and the documentation required to defend it publicly.

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