Cost versus Benefit Analysis for Surveys

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1. Introduction
The UK Code of Practice for Official Statistics requires all producers of National and Official Statistics to: “Analyse the costs of proposed new data requirements (to data suppliers) against the potential benefits”. (Principle 6(4))

Cost versus Benefit Analysis (CBA) assesses the costs against the benefits to determine the best course of action. CBA can be applied to many different types of decisions, but within Government it is most commonly used for assessing different policy options. The full CBA process is rarely used when deciding whether or not to run a survey, due to the difficult task of measuring benefits. But parts of the process are often used, in some form or other, in the decision making process.

In the current climate, CBA will become more appropriate as a tool for assessing whether or not to run, change or stop a survey, as justifying expenditure is increasingly important. Therefore, this document has been produced to give statisticians, survey managers and other professionals some advice and guidance on CBA of surveys.

This document does not provide a definitive methodology, but rather points people in the direction of the guidance and methods already available.

Note: UK Statistics Authority assessments do not require full CBA to be carried out. Assessors look for narrative descriptions of uses and users of the statistics. More information on this is available from the UK Statistics Authority Monitoring and Assessment team.

2. Key Messages
There is no right or wrong way to do CBA. The methodology you use depends on the situation and the information available.
CBA in practice is very different to theoretical methods, for example:

**Textbook CBA**
- a. All (relevant) impacts are known and covered.
- b. All impacts are equally certain.
- c. All impacts are quantified in monetary terms.
- d. All costs and benefits are properly discounted.
- e. The most beneficial option can be identified.

**CBA in Practice**
- a. Some impacts are in verbal-qualitative terms only.
- b. Some impacts are uncertain.
- c. Some impacts are quantified, but not monetised.
- d. Few impacts are monetised.
- e. There is a trade-off to be resolved by decision makers.

The benefits of surveys can be very different to the benefits that are assessed under traditional CBA. The intangible benefits of a survey (such as improvements to accuracy or timeliness) result in an unquantifiable gain. But these un-measurable benefits still have to be evaluated.

### 3. Hints and Tips

When measuring benefits, consider those not directly associated with the survey (e.g. benefits to OGDs, future benefits).

One option when doing CBA is to stop calculating benefits as soon as they exceed costs, because at this point the survey becomes justifiable.

You may want to take into account the different significances of each benefit. *(See item 2 below on Margin.)*

### 4. What’s Out There?

There are various forms of information available on CBA. Below are the pieces of literature, guidance, methodology, examples and best practice we have found most useful; although you may find something else more suitable for your needs. This is especially true with the literature, as there are many books available; we have only focused on the two that have been referenced by ONS.

If you have any sources you think should be added to the list, please let the GSS Statistical Policy and Standards Committee (GSS SPSC) Secretariat know *(via NSOffice.Enquiries@statistics.gov.uk)*

#### 4.1 Literature

**Prest and Turvey** define the CBA process as ‘maximising the present value of all benefits less that of all costs, subject to specified constraints’. Their cost-benefit model is based on modern economic theory and outlines four key issues to address for successful CBA:
- Which costs and which benefits are to be included?
- How are the costs and benefits to be evaluated?
- Discounting of future benefits and costs over time to obtain a present day value. *(See item 6 below on HMT’s Green Book supplementary guidance.)*
- What are the relevant constraints?

The drawback to this model is that it does not help to identify ways of measuring intangible benefits.

4.1.2 **Marglin** developed a model for CBA for use in a social context. This was broken down into two main components:

- A measurement of economic efficiency (*as per the four factors described in Prest and Turvey’s model, item 1 above*).
- A redistribution component (this is an important addition).

The redistribution component was designed to take into account different social significances. In effect, this is the application of unequal weights to the figures generated by the CBA, so that the social importance of proposed changes can be adjusted as appropriate when weighing up the costs and benefits.

**Marglin SA (1968).** The Discount Rate in Public Investment Evaluation *in* The Discount Rate in Public Investment Evaluation, Conference Proceedings, *Western Agricultural Economics Research Council, Denver*

### 4.2 Guidance and Methodology

4.2.1 The **2006 ONS paper: ‘A methodology for valuing statistical benefits’** (Wallis, 2006) details the methodology for calculating non cash-releasing efficiency gains from improvements to ONS’s key statistical outputs. The methodology provides a monitoring and assessment framework that ONS use to track progress towards the efficiency targets set following the Gershon Review.

The Wallis paper proposes a **benefit-to-cost ratio methodology** to value improvements to key statistical outputs. This methodology is based on calculating the baseline value of key statistical outputs and then applying a predefined ratio to this to obtain a monetary sum that ‘represents’ the value of improvements. The underlying principle is that the value of an improvement project to an output is a percentage of the output’s total cost. Such a one-to-one relationship between costs and benefits could be seen to have limitations but, in terms of the use of this model, Wallis states that: ‘clearly the assumption that cost equals value can be challenged, but for the purposes of calculating a baseline, using costs seems a sensible approach and avoids the need for the development of much more complicated techniques or extensive consultation with users of our key statistical outputs’.

To produce measures for the model, Wallis uses the six **European Statistical Services (ESS) dimensions of quality** and a measure of risk to give an improvement project a score against a dimension of quality, depending on the impact it is likely to have. The model’s weights favour improvements to an output’s relevance, accuracy, and risk; with the remaining dimensions given a lower weight. The idea of aligning the potential benefits of an improvement project against the ESS dimensions of quality and calculating a baseline value of a statistical output when there are no apparent cash benefits, are the key concepts introduced by Wallis in this model.

**Wallis (2006).** A methodology for valuing statistical benefits. *The Office for National Statistics*

4.2.2 A paper for the **GSS Methodology Advisory Committee (MAC) paper** sets out CBA model that provides an overall picture (which could facilitate informed decision making) of the balance between the costs and benefits for economic surveys. The paper includes
consideration of previous models (also given in this document), key components to include in CBA, and how to disseminate the information to meet the intended aim.

The paper usefully sets out a methodology for a CBA of changes to existing business/LA surveys. It does not cover surveys of individuals or households or development of new surveys; the methodology will need be adapted for these situations.

Note: the methodology in this paper is only a proposal and is not currently used by the ONS.


4.2.3 **HM Treasury's The Green Book** aims to ensure that no policy, programme, or project is adopted by public sector bodies before they have been effectively assessed against whether there are better ways to achieve an objective or better uses for the resources. As such, The Green Book provides invaluable guidance into what is required for successful CBA. The Green Book defines CBA as: ‘analysis which quantifies in monetary terms as many of the costs and benefits of a proposal as feasible, including items for which the market does not provide a satisfactory measure of economic value’.

The Green Book sets out the process for appraisal and evaluation, focusing on the needs to:
- Ensure that there is a clearly identified need and that any proposed intervention is likely to be worth the cost. This overview must include an analysis of the negative consequences of intervention, as well as the results of not intervening, both of which must be outweighed to justify action (risk versus benefits).
- Clearly identify the desired outcomes and objectives of an intervention in order to identify the full range of options that may be available to deliver them.
- Carry out an appraisal of the possible options that may be available to deliver the desired outcomes and objectives. This is the CBA component.
- Use decision criteria and judgment to select the best option or options.
- Ensure that evaluation takes place to ensure that lessons are widely learned, communicated, and applied when assessing new proposals.

http://www.hm-treasury.gov.uk/data_greenbook_index.htm

4.2.4 In addition to the Green Book, there is a wide range of detailed supplementary guidance on particular issues and applying the Green Book in specific contexts. This includes *Stated Preference Techniques* for valuing costs and benefits for which there is no market price, *Discounting* future cost and benefits, and *Optimum Bias* for performing adjustments for project appraisers’ tendency to be overly optimistic about the predicted costs and benefits.

http://www.hm-treasury.gov.uk/data_greenbook_supguidance.htm

4.2.5 **HM Treasury's The Magenta Book: Guidance for Evaluation** is the recommended central government guidance on evaluation that sets out best practice for departments to follow. It is complementary guidance to the HM Treasury Green Book. The Green Book presents the recommended policy process framework; while the Magenta Book provides further guidance on the evaluation stage of this policy process. It focuses on the wider meaning of policy evaluation, as opposed to just economic evaluation, across government. The Magenta Book highlights a variety of analytical tools and methodological procedures.
from a wide range of academic disciplines. It defines evaluation as: ‘objective process of understanding how a policy or other intervention was implemented, what effects it had, for whom, how and why’.

The Magenta Book explains the important issues and questions to consider in designing and managing evaluations; why evaluation improves policy making; how evaluation results and evidence should be interpreted and presented; and, why thinking about evaluation before and during the policy design phase can help to improve the quality of evaluation results without needing to hinder the policy process. It discusses the wide range of evaluation options available (quantitative and qualitative methods, theory based approaches, research synthesis methods, and economic evaluation methods).

http://www.hm-treasury.gov.uk/data_magentabook_index.htm

4.2.6 The Magenta Book will be supported by a range of supplementary guidance containing more detailed guidance on particular issues, such as statistical analysis and sampling. The relevant chapters of the original Magenta Book are available in the meantime.


4.2.7 The BoE guidelines, Cost-benefit analysis of monetary and financial statistics: a practical guide, were developed specifically for CBA of the BoE’s statistics in relation to their statistical code of practice at the time. The guidelines also include a CBA model for assessing requests for changes to existing statistics and requests for new statistical outputs.

It introduces the concept that it is just as important to take into account the costs to respondents as it is to take into account its own costs (i.e. measuring compliance cost – see Respondent Burden Task Force guidance:

http://www.knowledgenetwork.gsi.gov.uk/statnet/statnet.nsf/refDocs/KANN-8CZDYK

The model includes methodology for assessing the benefits arising from any new data requests, although it does not go as far as placing an actual financial value on it.

Unfortunately, because the BoE CBA model was developed to cover requests for new statistical outputs as well as changes to existing ones, it is unable to provide the necessary level of resolution for informed decision-making since its remit is too wide. Furthermore, the BoE model makes the assumption that if an output is required by law, it must be more beneficial than one that is not; although this is not always an accurate or reliable measure of benefits.

www.bankofengland.co.uk/statistics/about/cba.htm

4.2.8 The Department for Communities and Local Government’s Multi Criteria Analysis (MCA) Manual was commissioned in 2000 but remains the principal current central government guidance on the application of MCA techniques. MCA is a method for assessing a mix of both monetary and non-monetary impacts. Where quantities can be valued in monetary terms, MCA is not a substitute for CBA, but it may be a complement. MCA techniques are diverse in the kinds of problem that they address and in the techniques that they employ.
The manual contains techniques that do not rely on monetary valuations and provides practical guidance on applying the techniques. It addresses the issue of costing the 'uncostables' i.e. benefits. The Department for Education has used this type of method at a simple level to identify the cloud of activities that should be taken forward using two dimension costs against scored benefits.

http://www.communities.gov.uk/publications/corporate/multicriteriaanalysismanual

4.2.9 The European Commission has a website dedicated to impact assessments. The impact assessment guidelines, although not specifically about CBA methodology, are useful in giving ideas and pointers. It has many examples to draw on in the 'list of impact assessments' and 'planning of impact assessments' sections.

http://ec.europa.eu/governance/impact/index_en.htm

4.3 Examples and Best Practice

4.3.1 The CBA that was done for the business case supporting the Census is published on the parliament website. There is a section on both costs and benefits. The model that has been used first identifies the purpose of the output and then attempts to quantify elements of this. This could be a starting point to measure benefits of surveys: the need to identify clearly the purpose for which the output is to be used.


4.3.2 DfT’s Transport Analysis Guidance has published a few documents relating to CBA. They have guidance aimed at Project Managers and Experts. The techniques needed for transport appraisal are explained in Cost Benefit Analysis (TAG Unit 3.5.4), which provides background material on a number of aspects of cost benefit analysis:

- the nature of cost benefit analysis (CBA);
- the method of CBA to be employed in transport studies - an explanation of the changes resulting from the adoption of the Sugden approach;
- key elements of the framework for calculation of measures of economic worth, including guidance on the appraisal period; and
- ways of comparing costs and benefits and measures of economic worth.

4.3.3 Transport Appraisal and the New Green Book (TAG Unit 2.7.1) sets out how the New Approach To Appraisal has been changed to reflect the guidance given in the Treasury's new Green Book. The note points out that the Green Book recommends that options should be appraised using CBA, with supplementary techniques to be used for weighing up those costs and benefits that remain unvalued.

4.3.4 Some aspects specific to Major Scheme Appraisal are further explained in MSA: Cost Benefit Analysis (TAG Unit 3.9.2).
4.3.5 The **Department for Work and Pensions** Working Paper No. 86 looks at social CBA: methodologies for estimating and incorporating the **wider social and economic impacts** of work in CBA. The report provides a series of recommendations for the integration of social impacts into the DWP CBA framework, to ensure that the wider impacts on society are considered when evaluating the effectiveness of policies and programmes. The main aims are to:

- provide a review of the main evidence on the social impacts of programmes;
- use this evidence to derive quantitative estimates of the social costs and benefits associated with implementing programmes; and
- integrate these estimates into the existing CBA framework.

This review draws on the relevant academic literature, evaluation evidence, UK and international research.

4.3.6 The Department for Work and Pensions Working Paper No 40 is a **review of the DWP Cost Benefit Framework** and how it has been applied. It sets out a number of key issues and makes recommendations arising from the review.

4.3.7 The **Department of Health** commissioned York Health Economics Consortium to undertake a **CBA of Health Impact Assessment**, with particular regard to:

- Best practice in policy, programme and project decision making
- Indicators about when and what areas HIA should be used to maximise its impact and effectiveness
- Investment made in HIA compared with the outcomes achieved
- Benefits of carrying out HIA compared with incorporating health into other impact assessments
- Recommendations about how HIA can be used most efficiently and effectively

The report shows how they measured the costs and benefits of producing impact assessments, including how they used the ‘willingness to pay’ technique to assess the benefits.

4.3.8 The **Australian Bureau of Statistics (ABS)** have done a lot of work on **Cost v Responses** (not Benefit). They have set up a framework to predict costs, response and non-response bias based on survey follow-up strategies. Unfortunately, this proved to be a very difficult
methodologically, primarily due to insufficient (or in some cases, no) data about survey process; so the work has been put on hold.

Along side this, ABS are concentrating on smaller problems, in particular they are trying out alternative procedures and attempting to measure the impact of a change on cost and responses. In a couple of cases they have run experiments that have resulted in changes, particularly around number, timing and content of reminder letters.

Related work: e.g. use of score functions, etc to determine priorities for follow-up (Statistics New Zealand, ISTAT and ABS have all done some work on this), and alternative measures to response rates such as R-indicators (Statistics Canada).