



The Value of Census Statistics in England and Wales

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Abstract

Quantifying the benefits of official statistics is complex and difficult. However, it is important in justifying for sufficient funding for official statistics, especially at a time of Austerity. This paper outlines the approach taken by the Office for National Statistics to valuing the benefits from the 2011 Census statistics in Census in England and Wales. It describes criticism of the 2001 Census business case, and the benefits calculation carried out in 2007 to help secure funding for the 2011 Census. It goes on to describe the approach to benefits management, and the actions taken to maximise the benefits from the 2011 Census. The post census revaluation of the value of the 2011 Census benefits is explained, and a range of methods and approaches used for different user sectors are illustrated. The paper concludes by outlining some of the challenges in valuing some uses of census data, especially for policy development by government.

Key Words: Census, Quantified, Benefits

1. Introduction

Following the 2001 Census the House of Commons Treasury Select Committee reviewed the census. One of their recommendations was “ONS were unable to supply us with robust evidence to justify expenditure of over £250 million on the Census. We recommend that a rigorous cost-benefit analysis should be carried out of the 2001 Census and published in time to inform the need for, and timing of, any future Census. *We consider that any future Census should also be justified in cost-benefit terms.*”

The development of the 2011 Census business case started in 2006. The business case focused on comparing the census option with a do-nothing option and described the benefits of the census data arising from six main uses: resource allocation; targeting investment; service planning; policy making and monitoring; academic and market research, and as a benchmark for other National Statistics.

The benefits from the census (and other official statistics) arise when users in government, the commercial sector, charities etc use census information to make better decisions than they would do in the absence of that census data. Whilst it is easy to describe the uses of census information, the challenge comes in seeking to quantify those benefits in cash terms. Many users find it difficult to envisage not having census data, and thus find it difficult to describe how they would make decisions in its absence.

The approach taken by the ONS was to identify a range of users and to work intensively with them to seek to agree quantified benefits. The 2005 census topic consultation had asked what use was made of census information (e.g. for policy development; resource allocation, etc). The 2,000 or so responses to the consultation provided a good starting point to prioritise the work on quantification. Whilst a range of benefits were described, only a subset were quantified. These included the use of census data by central government to local health bodies and local government in England and Wales, as well as a small number of private sector uses.

2. Section 2 Quantifying the 2011 Census benefits for England and Wales

For the allocation of health expenditure to local areas the allocation formula was re-run using the ‘next best’ dataset (lists of patients registered with general practitioners). Comparing these gave a first year error of £800m. For the allocation to local government the alternative used was 2001 census data updated annually by births, deaths, and migration. The local government allocations were re-run based



on adding an extra 100,000 people into each authority to test the marginal effect of changes to the client groups; this gave an estimated first year error of £125m (taking account of “floors and ceilings”).

The allocations are of a fixed pot of money, so if some areas ‘gain’ then other areas ‘lose’ to an equal and opposite amount in total. However ‘utility theory’ suggests that for a given sum of money, the benefit from being allocated more money than is ‘needed’ is lower than the ‘dis-benefit’ from being allocated the same amount less than is ‘needed’. The difference between these benefits and dis-benefits is the net efficiency loss associated with the misallocation. This efficiency loss was calculated at about £70m a year, and assumed to decay as the census data became older. Other departments also use small area population statistics to allocate funds; but these were of an order of magnitude smaller and no account was made for these benefits.

Discussions were held with a number of private sector organisations to find quantifiable areas of benefit from using Census data. Five specific examples were quantified: resellers of demographic services; market research; Retail & Financial Services location analysis; targeted marketing; and Financial Services product design. These amounted to quantified benefits of £70m a year.

The quantified public and private sector benefits combined over the ten year period 2012/13 to 2021/22 amount to an estimated £945m (£720m after discounting). It was acknowledged that the quantified discounted benefit of £720m was a very significant under-estimate. The costs of the 2011 Census were £482m. Given that the two quantified benefits exceeded the costs and there were the four un-quantified set of benefits the cost-benefit case was accepted. The funding for the bulk of the 2011 Census was granted during the 2007 comprehensive spending review.

3. Section 3

The Office of Government Commerce, states¹ that, ‘Deficiencies in benefits capture bedevil nearly 50% of government projects and 30-40% of systems to support business change deliver no benefits whatsoever’. The National Audit Office state² that, ‘...evidence shows that two-thirds of public sector projects are completed late, over budget or do not deliver outcomes expected’. ONS, therefore, did not want to leave the realisation of the 2011 Census benefits to chance and set out to ensure that benefits were realised and evidenced. We started by carrying out a ‘benefits mapping’ exercise; this links the ‘end benefits’ to the ‘enablers’ which had to be in place to make this possible.

The end benefits arise when users make use of the published outputs to make decisions that help make peoples’ lives better. For this to happen ‘enablers’ include: running a high quality census; users who are confident in the quality of the census data; users who know what the data are and where to find it; data made available in easy to access ways; support available to users; clear metadata that helps users to understand the outputs and to use them appropriately; and outputs that are available in time for the key uses to which they will be put. The census programme started with the end benefit in mind; and planned backwards to ensure that they were delivered.

To achieve quality statistics, the 2011 Census had to maximise overall response rates and minimise differences in response rates within and between local authorities. The census therefore set quality targets including an overall response rate of 94 per cent and no local authority area or key population group to have a response rate below 80 per cent. To achieve this ONS radically changed its field design, moving to post out and targeting follow-up resources on these areas predicted to have the lowest initial response (e.g. urban centres). The census met the response rate target and significantly improved response in the harder to enumerate areas. This helped users to have full confidence in the quality of the 2011 Census data.



ONS started releasing data from 2011 Census in July 2012- 15 months after Census Day (two months earlier than for the 2001 Census). To date ONS has published over 800 unique data sets with over 8 billion cells of data– this compares to 360 data sets from the 2001 Census. ONS has also provided Eurostat with 60 data cubes and 24 quality cubes- ranging from 30k cells to over 43 million cells of data.

ONS has made census data more accessible to users and the wider general public than ever before. Online publishing (www.ons.gov.uk/census) made the 2011 Census data more accessible to the wider general public and this has helped to widen the census user base. ONS has also presented data in more innovative ways, including info-graphics and data visualisations.

ONS published over 70 detailed articles containing census analysis on topics such as: migration and demography; ethnicity and national identity; health; housing; the labour market; language; religion; and unpaid care. These analytical articles were accessible and focussed on insights and trends; they gave an alternative way into the census information. The sequence of articles generated continuing media coverage throughout the publication process. The 2011 Census results were also promoted regularly via Twitter and YouTube.

ONS hosted three press conferences/media briefings to promote census releases - in July and December 2012 and January 2013. For the first release of data, there were over 300 pieces of coverage in the national media. The 2011 Census also continues to feed the public's insatiable appetite for history and about who we are as a nation. According to BBC Wales "The census is the gift that keeps on giving", and a journalist and academic commented that, "The 2011 Census revealed a treasure-trove of facts we did not know about Britain".

This media coverage all helped to publicise the availability of the 2011 Census data and encourage use of census data. ONS had over 2.3 million page views for 2011 Census data online, over half a million page views of the census analyses and over 600,000 page views of the census data visualisations.

To optimise the benefits from the census, ONS put significant effort into promoting the value of the census to new or potential users, and explaining how they could benefit from 2011 Census data. For instance, examples of applications of census data were collected through a survey sent to all 348 LAs in England and Wales, including:

- Lancashire County Council used 2011 census data to target pilot programmes for their increased broadband access project and also for their Resilience Plan for the Heysham Nuclear Power Station area.
- Bristol City Council provided an example of using census data to develop community learning. Activities were targeted at learners who have few or no qualifications and small area census data was essential in planning these community learning provisions.
- *A number of Local Authorities gave examples of using census data in public health campaigns.*
- *Most local authorities with social services responsibilities use census data for producing plans and strategies, needs assessments and targeting and prioritisation.*
- *Leeds used census data to identify a higher level than average of older people living in villages in an area. This provided evidence for spend of £35,000 on projects that support older people to live independently at home.*

The Metropolitan Police use of census statistics includes deciding where to concentrate crime prevention efforts; potential crime hotspots are mapped. In the London Borough of Bromley, for instance, age and housing statistics showed where pockets of people over 65 years old live. Elderly residents were experiencing a high number of Burglaries by burglars tricking homeowners into letting them in by claiming they were from water/electric companies. Targeted crime prevention efforts have now reduced these incidents.



Representative/membership organisations were important intermediaries to reach individuals from specific industries and professions. Census editorial features in membership magazines and on websites helped to reach professionals with a potential interest in census data. For example ONS placed an article in the Chartered Institute of Linguists membership magazine 'The Linguist' and reached over 7000 members, many of whom had not used census statistics before (a question on languages spoken was new in 2011).

Case studies are an easy and effective way to illustrate how people/organisations can benefit from the 2011 Census by showing them examples of how different organisations from the private, public and voluntary sectors already benefit from census data. Case studies were agreed with the relevant organisations before posting on the census benefits part of the ONS website. The following below is from the website.

"To help us find and help the areas of the community that are most at risk of fire, we use data from the census."

London Fire Brigade uses 2011 Census statistics:

As part of our commitment and service to the community, we work with residents to help reduce and mitigate some of the factors which influence fire risks within London. One way that we do this is through a community education programme, where we visit Londoners in their homes and tell them about fire risks and how they can help prevent a fire.

With over 3.2 million homes in London, this can be quite a task! To help us find and help the areas of the community that are most at risk of fire, we use data from the census. Because we know, for example, that areas with a higher population of elderly residents have a higher risk of injury or death if a fire occurs, we can use census data to identify these areas.

We combine the statistical census evidence with the in-depth community knowledge of our dedicated fire-fighters to successfully reduce the number of fires in London each year. Without census data, we wouldn't be able to 'model' our programme in such an effective way. That really does save lives.

Toolkits, factsheets and instructions to help to get people started with census data were made available to download. <http://www.ons.gov.uk/ons/guide-method/census/2011/2011-census-benefits/index.html>

4. Section 4 Evaluating the actual 2011 Census benefits

ONS decided to evaluate the actual benefits achieved from the 2011 Census – to confirm whether the benefits claimed in the business case had actually been delivered. Building on the work to promote the uses of the census, ONS met during 2012/13 with a wide range of users to (i) document the uses made of census statistics and (ii) to seek the information required to quantify the benefits.

ONS knew that the quantified benefits of the census associated with the allocation by central government to local health bodies and local government in England and Wales would be lower than the estimate included in the 2007 business case. This was because of (i) a reduction in funds allocated to local authorities and (ii) a change in policy in how funds were allocated, which made much less use of census demographic data.

ONS therefore set out to identify and re-quantify the benefits for government departments; the wider public sector; local authorities; businesses; and genealogy/family history. Many examples of uses of



census data were gathered from other sectors but, because of the diverse and fragmented nature of some of these sectors, it was not possible to estimate total benefits for each sector.

The benefits of the 2011 Census were re-quantified using a variety of different approaches:

- Utility theory - e.g. in respect of the benefits of allocating government resources to local areas
- Equating the value of the benefits to the funding for an activity – e.g. public policy research
- Using results from some organisations who were able to quantify benefits to gross up for all (e.g. Local Authorities)
- Alternatively, where respondents (e.g. Local Authorities; retailers) had indicated they used census data, making conservative assumptions about the benefit (e.g. as a percentage of resource/capital spend)
- Estimating the value of a sector (e.g. housing/planning consultancy). From discussions with industry experts, estimating the percentage value attributable to data; and the percentage of the data that was from the census
- Estimating the value of a sector (e.g. consumer advertising) and agreeing with industry experts a percentage representing census benefits.

For some sectors estimates were produced using both ‘top-down’ and ‘bottom-up’ methods. This gave a range, and the mid-point value was chosen.

Information was gathered in a variety of ways. This included sending a questionnaire to the 348 local authorities in England and Wales; holding meetings with policy makers in government departments; meeting experts in particular fields; speaking at user conferences; running workshops; and direct requests for information. Examples of the methods used are given below:

- For allocating resources from central government to local areas - the benefits were estimated from the difference in utility associated with the ‘misallocation’ that accrues to the ‘gainers’ and that which falls to the ‘losers’ if ‘next-best’ data sources were used. Other benefits to government that were quantified included around £10.8m per year from avoiding delays to major transport schemes.
- Local Authority benefits - A small number of Authorities were able to cost alternative ways of sourcing local area data, which were grossed up £8m pa to represent all LAs. The benefits were expected to at least equal what LAs would be willing to pay for the data – but this would be a lower end estimate. An alternative approach was to focus on the elements of spending where the local authority survey highlighted the value of small area census data. Taking 1% of Capital Expenditure on Pre-primary and primary schools ; Transport (excluding Airports, Ports, Toll Bridges, tunnels and ferries); and Housing gave a figure of £107m pa. Taking 0.1% of Children’s social care; Public Health; Waste Collection and Disposal and Recycling; 0.05% of Planning and Development Services and 0.01% Library services and Adult Social Care gave a figure of £15m pa. Adding the figures for Capital and Revenue, gives a total benefit of £122m pa. The benefits therefore fall in the range of £8-122m pa. Although LAs found it difficult to place a figure on the value of census statistics the approach of collectively agreeing percentages worked well.
- Public policy research benefits – these were valued indirectly on the presumption that the product is worth at least the funding devoted to the research. The major sponsors of policy research are Government Departments and the Economic and Social Research Council – between them they spent close to £50m over the last decade on public policy research which drew on small area census data.
- Private sector benefits from the census – these include geo-demographic resellers and specialist consultants (e.g. specialists in local authority housing/planning issues), who generate value added from census data. Census data helps inform business decisions of a large and disparate set of private sector users including market researchers, retailers and financial service providers. These benefits were estimated by surveying a sample of commercial users and estimates from industry experts as to the value of business dependent on data derived from the census.



- Housing planning consultants - discussions with housing consultancy firms and data on housing starts gave an estimate of the total value of the sector estimated at £100m pa. Of this, about 30% is attributable to data use as opposed to value added by analysis; and about half of this data is estimated to be from the Census. The benefit from census data was thus estimated at £15m pa.
- Retail - this is an industry where location of stores in relation to customers is very important. Using data and advice from Oxford Institute of Retail Management, ONS estimate the total value of the UK retail estate in 2011 was £227bn; turnover of the sector was £311bn and investment in real estate in 2012 was £8.7bn. Assuming the value of census data's contribution to that investment is around 1%, gives a figure of around £87m. An alternative bottom up estimate was provided in discussion with representatives from an individual retail chain; this was then grossed up to give a figure of just under £20m as the value of census data to the retail sector. The benefit of census data probably lies between £20m and £80m pa, with a central estimate of £50m pa.

A conservative approach was taken to census benefits valuation. The estimates were agreed with individual users, companies, or representative bodies.

The reassessment of the 2011 Census benefits was concluded in January 2014. Over a 10 year period, the costs for the 2011 Census were estimated at £482m in cash prices. The re-valued 2011 Census benefits were estimated at £489.5m each year, which equates to a payback period of around 14 months. Despite the reduction, compared to the original business case, in the quantified benefits from allocation of money by government to local areas, the total benefits from the 2011 Census turned out to be *very significantly* higher than the £720m estimated in the 2007 business case.

This increase in the valued benefit was partly because a much wider range of census uses and users had been identified as a spin-off of promoting the value of the census; these uses could then be quantified. It was also because a more in-depth approach was taken to value the full range of census uses; for the original business case only a small number of examples were quantified

5. Conclusions

Understanding the wide range of users and uses of census data is critical to being able to quantify benefits; if you are not aware of a use then it can't be valued. Quantification of benefits of official statistics such as the census is difficult. Users of census information find it hard to put a value on their use. National Statistical Institutes therefore need to work closely with individual users and representative bodies (e.g. trade associations) to understand the use made and to explore what alternative data might be used

ONS believe we have made significant progress in benefits management of the 2011 Census benefits; in helping to ensure that the benefits were realised; and in improving the quantification of benefits. The benefit information has helped underpin the business case for the 2021 Census.

Quantification of the benefits to central government are, however, particularly difficult to quantify – especially in policy development and evaluation. How do you value the benefit to society from census information on ethnicity or religion, for instance, which helps government put in place policies to support social cohesion? There clearly is such a value, but it has not yet been possible to quantify it. ONS believe that our estimated benefits of census data to central government are still significantly underestimated; there is more work to be done.

References

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