United Nations International Seminar
on Population and Housing Censuses:
Beyond the 2010 Round
27-29 November 2012
Seoul, Republic of Korea

SESSION 6: Strategies for managing the cost of the census

MANAGING THE COST OF THE UK CENSUS

Prepared by

Mr. Ian White

The Office for National Statistics (UK)

* This document is being reproduced without formal editing.

Managing the cost of the UK Census

Office for National Statistics

Summary

National governments are always concerned about the ever-rising costs of carrying out a periodic census of population and housing, particularly in those countries still adopting the traditional full field enumeration approach to data collection. For such countries (including the UK) population censuses are the largest statistical operation undertaken in the context of any official statistical system. They are, consequently, the most expensive one, and since the bulk of census expenditure is usually concentrated during a short period of time, census costs may appear to be greater than if they were spread evenly over time.

The main reasons for the relatively high cost of censuses are that they require information from everyone in the country and, for those with a field operation, are labour-intensive, particularly in the collection stage during which a large temporary workforce is trained and employed for a relatively short period of time, varying from several days or weeks to a few months. Furthermore, information, communication and data processing systems are often unique and, again, only deployed for a short period, and the cost of these, therefore, cannot be written off over time.

This paper describes how the Office for National Statistics (ONS) (the authority in the UK responsible for carrying out the decennial census in England and Wales) budgeted for the 2011 Census, conducted out at a time of severe economic crisis and significant socio-demographic change, and how it was able to manage the costs so that a successful census was delivered on time and within that budget. The total cost of the 2011 Census is put into an historical and international context.

Although, in recent years, the use computer-assisted data capture and coding and automated tabulation programmes have enabled significant reductions in data processing and output production costs, there has, at the same time, been a growing need to improve data quality and for more effective census publicity to increase public awareness and so improve coverage amongst ever-increasingly non-compliant societies - and this has incurred additional costs.

However, the ever-increasing pressure on ONS to improve value for the tax payers' money means that it is now investigating alternative ways of collecting demographic information in order to produce statistics that are more regular and up-to-date but yet can still meet users' needs for high quality data. The paper makes reference to the UK's *Beyond 2011* programme of work that is described in more detail in the seminar paper *The future of population statistics in the UK?*

(Note: Although references in this paper are generally to England and Wales only, similar issues are also common through out the rest of the UK, in Scotland and Northern Ireland, where the costs are proportionately lower by factors of approximately one fifth and one tenth respectively.)

Historical background

The UK has been carrying out decennial censuses for over 200 years, and as far back as 1851 the government has been concerned about the cost of doing so. Table 1 shows the cost of each the census in England and Wales since then and reveals that a more or less steady *per capita* cost during the latter half of the 19th century only increased significantly, in proportionate terms, in the period since 1921. For every subsequent census, Parliament and Ministers have been concerned over the ever-rising cost of the operation (but ultimately persuaded by its cost-effectiveness) - a concern which is certainly no less acute today.

But the reader should note that these increases, particularly steep since 1961 (and, in the view of some politicians, alarmingly so since the turn of the new century), mask hidden costs that do not make direct comparisons between censuses entirely valid. The costs underlying the figures Table 1, for example, take account of neither rates of inflation between censuses nor any new or additional processes, such as the adopting of new data processing technologies, the requirement to carry out a post-enumeration Coverage Survey, or the provision for online responses, that may significantly affect the total spend in any one census. Nor do they reflect the varying time periods over which the completed census operations – from early planning to final evaluation – took place. For the 2011 Census (which would seem, on the evidence of these bare figures alone, to be particularly costly), it has been estimated that the *per capita* cost *per year* amounts to less than 1 pound sterling (currently around 1.62 US$).

Table 1 The rising cost of the census, England and Wales, 1851-2011

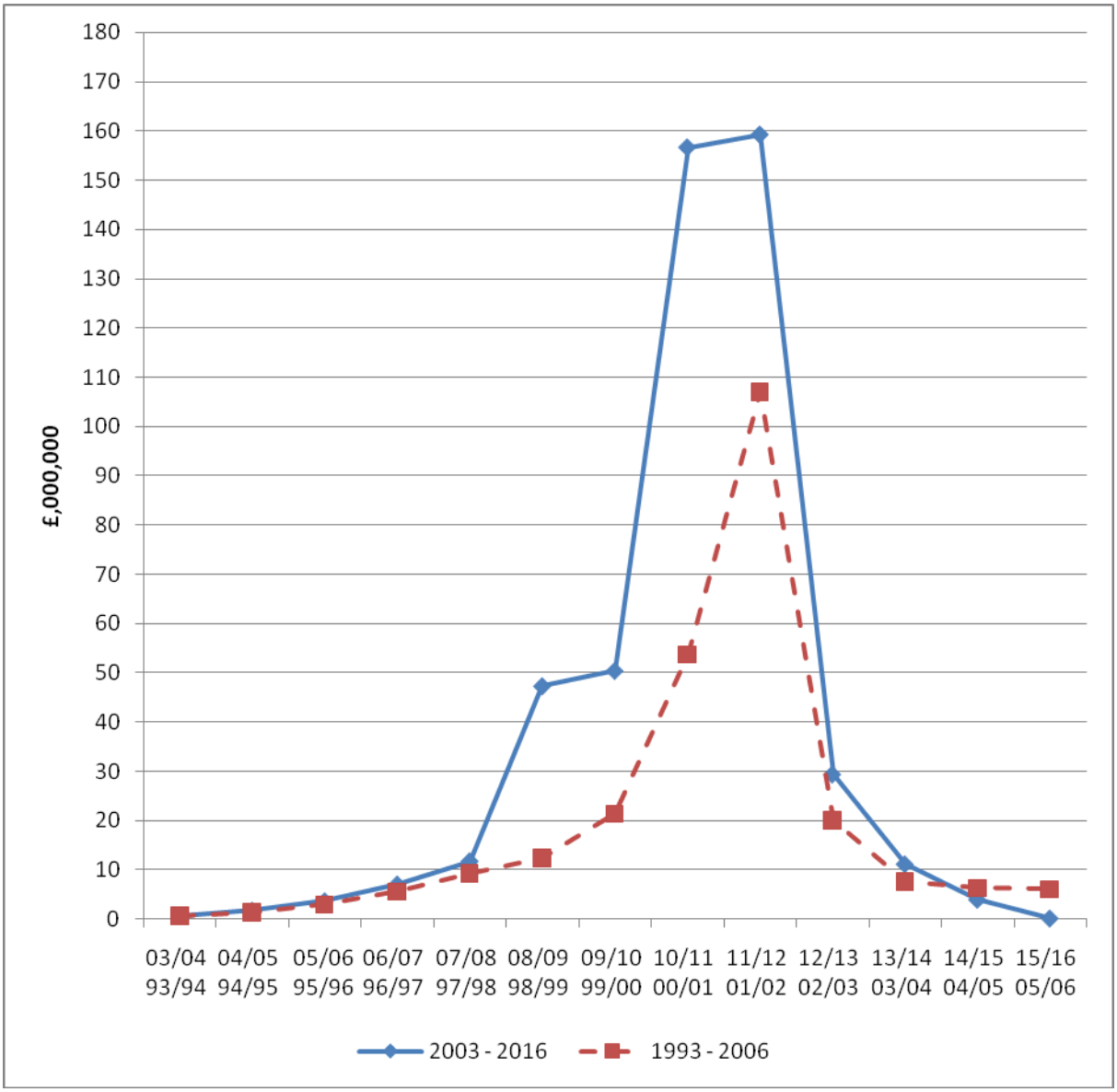
Census	Cost (£000s)*	Population (000s)	Cost per 1,000 population	
			Actual cost (£)	Percentage increase
1851	93.1	17,927	5.19	-
1861	95.7	20,066	4.77	- 8.1
1871	120.0	22,712	5.28	10.7
1881	122.9	25,974	4.73	- 10.4
1891	120.6	29,003	4.16	- 12.1
1901	148.9	32,528	4.58	10.1
1911	161.5	36,070	4.48	- 2.2
1921	351.3	37,887	9.27	106.9
1931	299.7	39,952	7.50	- 19.1
1951	1,263.0	43,758	28.9	285.3
1961	4,950,0	46,105	107.3	271.3
1971	13,499.0	48,750	275.9	157.1
1981	45,978.0	49,155	917.1	232.4
1991	117,000.0	49,890	2,345,1	155.8
2001	207,000.0	52,042	3,977.6	69.6
2011	483,000.0	56,076	8,707.5	118.9

*At today's rate of exchange £1 = 1.62US$

Profile and elements of the total census cost

The census is, by its nature, a cyclical activity, with resource requirements peaking at key periods, particularly during field enumeration (for countries that conduct a traditional census) and the data processing phases. This reflects the wage bill for the significant numbers of temporary staff employed to carry out these necessary functions. Figure 1 shows the profiles of the estimated costs for the 2011 Census in England and Wales spread over a 13-year cycle from 2003/04 to 2015/16 compared with the profile of actual spend over a similar 13-year period for the 2001 Census. (Details of actual spend for each year for 2011 are not yet available.)

Figure 1 **Profiles of costs of the 2001 and 2011 Censuses in England and Wales, 1993/94-2005/06 and 2003/04- 2015/16 respectively**



Apart from the effects of inflation (which accounts for an increase in total cost of around 38 per cent), there were innovative elements of the 2011 Census that accounted for an overall increase of around 30 per cent in real terms compared with the total cost for 2001. An additional page of questions, coupled with a redesign of the questionnaire to make it easier the complete, provision for an additional household member (a sixth) to be included on the form, and an additional page of questions for visitors and of instructions, meant that the length of the questionnaire increased by 60 per cent. That together with the need to print a greater number of forms because of an increase in the number of smaller households and an increased take up of requests for individual questionnaires meant that the total print run was proportionately much greater than in 2001.

Also, though the introduction of mail out as well as mail back (adopted in 2001) meant that there was the opportunity to reduce the total size of the field force (and thus the wage costs), the need to develop and test a purposes-built national address register for the first time in the census (no such single comprehensive address register had previously existed in the UK), and the provision of an secure internet response system to enable people to make their returns online, added significantly to the data collection costs. The distinctive bulge in the cost profile for the year 2008/09 in Figure 1 reflects the development and testing of the address register and internet system, together with a field management information system that provided for the tracking of individual questionnaires in the field in real time, that was carried out during that period and for which the was no equivalent expenditure ten years earlier.

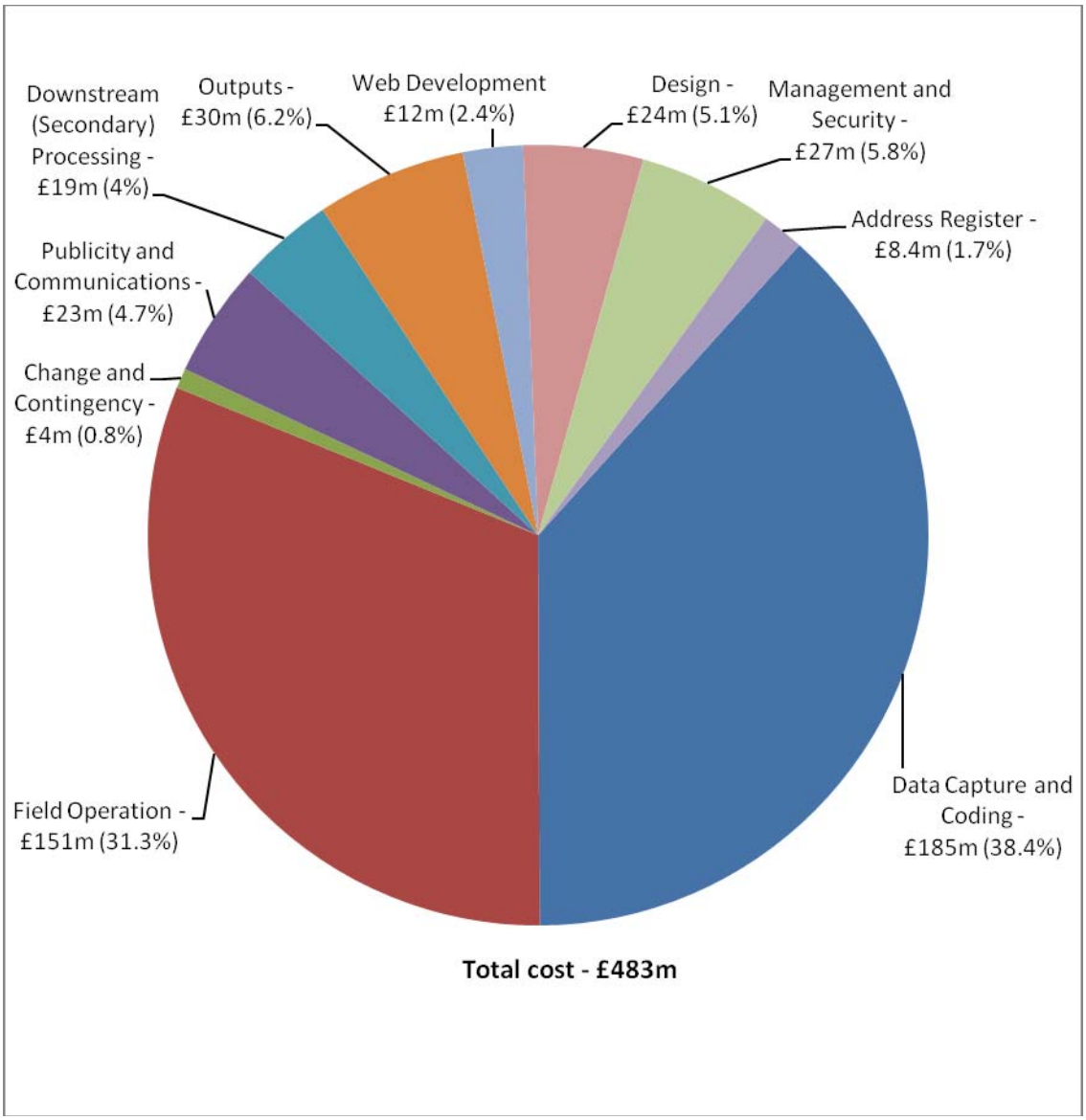
Furthermore, as part of a major initiative to halt the decline in responses rates that had been experienced in recent censuses – and even to try to improve them in areas where the response was expected to be lowest – far more resources were put into marketing, developing the community liaison (outreach) programme and using social networking and ethnic minority media than had been the case in the previous census. Indeed, the publicity and communications costs, at around £23 million, were more than double the budget in 2001. But the extra spend proved effective, as responses rates increased overall and significantly so in central London and other inner city areas.

More effort was put into improving the methodology to adjust the census figures to take account of under-coverage and over-coverage at the local area level, and to assign census characteristics to all those persons known to have been missed in the enumeration, by using information collected from an improved separate and independent Census Coverage Survey. More attention was given to ensuring the protection of data, both from a physical security aspect and to improve the methodology to avoid statistical disclosure in small area data.

And finally, in order to make all the census outputs as readily and freely available as possible to all, a flexible web data access system is being developed to replace the more traditional means of disseminating outputs through printed reports and/or electronic media such as CD-ROMs.

Figure 2 shows how the estimated spend on the 2011 Census has been apportioned to the various component activities.

Figure 2 Estimated 2011 Census costs (England and Wales) by component activity, 2003-2016



Outsourcing and managing the expenditure

But the costs could have been much higher still. Many of the design features and processes adopted in the 2011 Census were aimed at minimising and even reducing costs as well as improving response and data quality. The use of mail out as the prime means of delivering questionnaire as well as mail back has already been referred to, and this enabled field staff numbers to be reduced and for attention to be given to focusing resources on following-up non-response, particularly in those areas known to be hard to enumerate.

But in addition to using the Royal Mail postal service to deliver and collect questionnaires, more operational activities and services were outsourced to external specialist service providers. Generally it is the case that external suppliers bring with them considerable technical experience and expertise which would otherwise be unavailable to census takers. Utilizing this resource in the 2011 allowed ONS to focus on its main task of carrying out the census rather than developing in-house procedures and skills that are not part of its core

competencies. Furthermore, given the ten-year cycle for the census and the relatively short processing timetable – requiring a large temporary workforce – it was not appropriate for ONS to recruit and train such personnel itself. That would have required significant additional resource to manage these in-house.

But outsourcing, as a general strategy, was not a new; the UK Census has traditionally engaged the services of persons or agents, not part of the permanent staff of ONS, to undertake parts of the census operation. For the 2001 Census, for example, areas of work that had been contracted out included: the administration of the payment of field staff payment; the management of a call centre to run a Census helpline; the collection of completed census forms via a postal service; the capture and coding of census data in electronic format; and the production of the archival records. For 2011, in addition to all of these services, contracts with external suppliers also covered: the recruitment and training of field staff; the development and provision of questionnaire-tracking system; the translation, printing and distribution of non-questionnaire material; the provision of online response facilities for form completion and a public self-help facility; the management of the publicity and advertising campaign; and the development of the web data access system referred to above.

The cost of all the outsourced activities amounted to some 57 per cent of the total census costs compared with 37 per cent in 2001. So, in order to manage costs effectively it was important for ONS have much tighter contract management, training and budgetary controls of the procurement processes than had been the case for the 2001 Census, and to have these subjected to rigorous external scrutiny and assurance at key decision points through the UK's Office of the Government Commerce's Gateway Review procedures.

The Census operation stood up well to such scrutiny. ONS undertook an options analysis to understand how it might bundle similar outsourced services together to ensure cost effectiveness, and a market analysis to narrow the options to those services that established organisations could easily bid for and, by using economies of scale, reduce costs. Fixed-price contracts with a clearly defined scope were established.

Building on the lessons learned from its experience in the 2001 Census and on the recommendations from a Government Committee review of that Census, ONS identified a number of elements and practices that proved important to adopt. These included:

- the need to ensure that all outsourced suppliers were selected through a rigorous tendering and procurement procedure that was fully compliant with European Union law, and which was early enough to enable all systems to be fully tested before the Census;
- adopting a financial modelling approach to assessing tenders and insisting that bidders were transparent in their quotes of actual cost and prices;
- the establishment of a Procurement Assurance Group to assess quality and value for money prior to contracts;
- the need to ensure that all ONS staff involved in the procurement processes were adequately trained to do so;
- the establishment of a strong governance process, including project delivery boards through which the suppliers were directly involved in decision making;
- being prepared to own risks and not pass them all on to the contracted suppliers;
- using service level and credit recovery processes to keep suppliers focused and motivated;

- offering incentives on cost reduction opportunities;
- maintaining commercial and financial reviews of the suppliers and parent companies;
- planning for the best, but preparing for the worst, scenarios; and
- having a contingency should things go wrong.

To manage census costs more generally across the board, internal assurance combined with meticulous planning, a strong governance of all the census processes and clear project management and accounting procedures were also key for ensuring that 2011 Census budgets were adhered to. In particular, throughout the whole of the census planning and operational phases, ONS established a programme of regular and frequent meetings and critical assurance with individual budget holders to track monthly spend and use of contingency. In this way the risk of unbudgeted expenditure on unplanned scenarios was minimised. And even in incidences where some unscheduled expenditure became necessary – such as:

(a) to meet the requirement to include an additional page of questions in order to meet the needs of key users;
(b) to reflect the uncertainty as to which financial year spend on certain elements of the field operation would fall (because of the proximity of the date of the Census to the end of the financial year 2010/11;
(c) to account for higher levels of data capture from paper forms (because of the lower than anticipated level of take-up of the online response option); and
(d) to overcome difficulties in the development of the web data access technology,

ONS's management and accounting process was flexible enough to ensure that the overall spend on the Census – some £483 million (equivalent to around US$782 at today's rate of exchange) fell within its budget.

But was the UK's Census so costly?

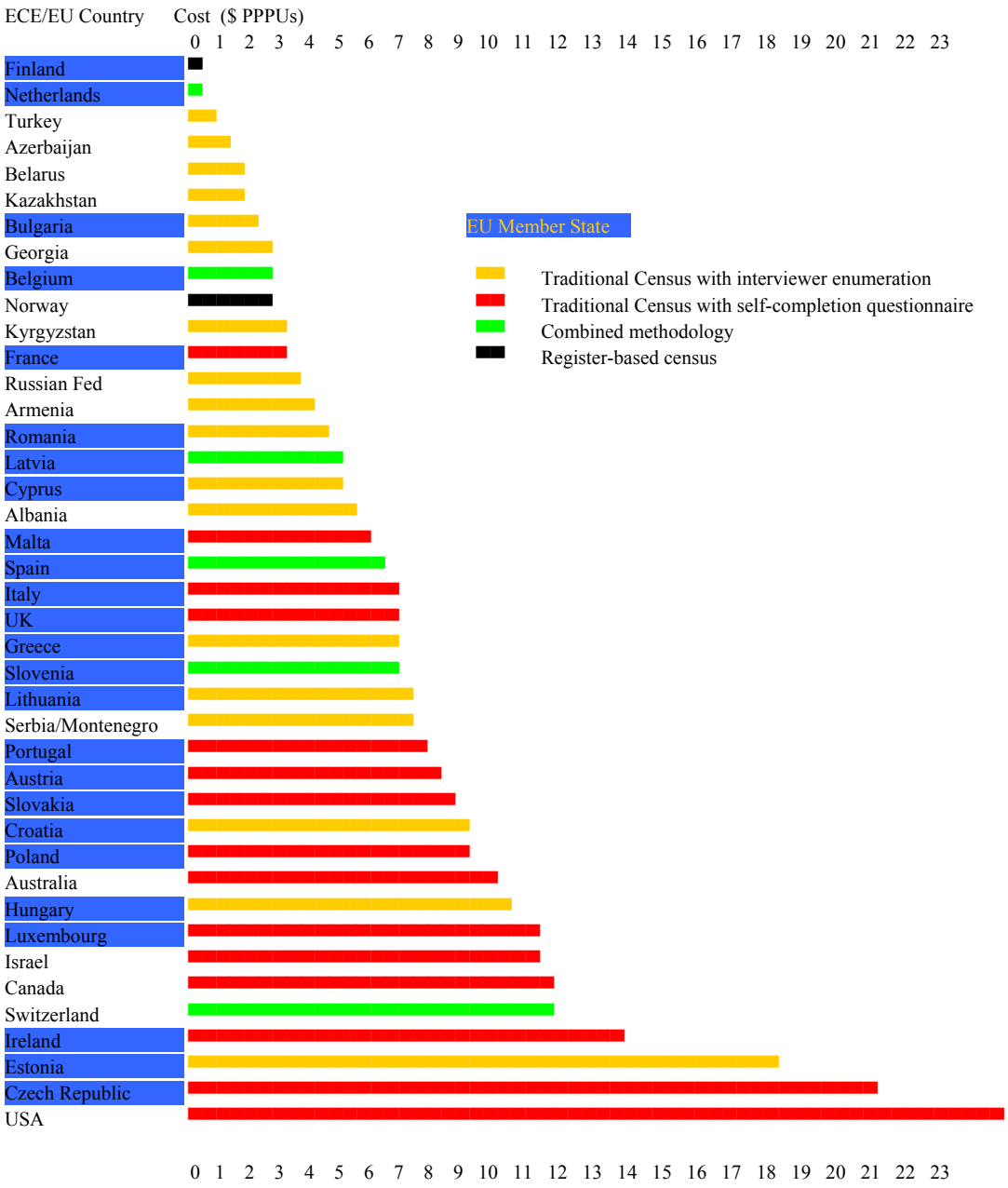
How does the cost of £483 million rate internationally? Although it is too early to assess fully the costs of international censuses in the 2010 round, in its report on a survey carried out in 2004 on practices of the UNECE countries in the 2000 round, UN reported on two measurements to compare such costs across the region. The first measure was the simple conversion of the reported *per capita* costs in local currency, into a common currency (US dollars) calculated at the time of the Census. This measure did not reflect the differences in purchasing power across countries. However, as some international firms provide services, and some components of the census hardware, such as computers, are produced and sold in the international market, it was considered relevant for some purposes.

The second measure was the conversion of the *per capita* costs in the Census year into 'purchasing power parity units' (PPPUs) expressed, again, in US dollars. This measure provided a more internationally comparable estimate of costs since it was based on the purchasing power in the different countries standardised into one common measuring unit.

Figure 3 shows the PPPU costs separately identifying those countries adopting:

(a) a traditional approach with field interviewers;
(b) a traditional approach with self-enumeration;
(c) a combined methodological approach; and
(d) a solely register-based approach.

Figure 3 Census costs (per capita - $PPPUs) by type of census, 2000 round, ECE and EU Member States



Responses to the UNECE survey showed that the *per capita* costs in the 2000 round in the UNECE region averaged $4.2 nominal or $6.7 PPPUs. Within the European Union (EU) the average nominal costs were marginally lower ($4.0) and the PPPU costs marginally higher ($7.0). However, the PPPU costs across the UNECE region as a whole showed a large variability, ranging from $0.2 in Finland to $22.7 in the United States. Within the EU this variability was less pronounced: Ireland's nominal costs were the highest (at $10.6), but measured as PPPUs the costs were highest in the Czech Republic ($19.3). In comparison, the cost of the UK's census lay just in the upper quartile of the nominal distribution (at $5.7) but was just around the average figure when taking the PPPU as the measure.

As noted above, however, it is difficult to determine total costs on a comparable basis, and thus it was difficult to draw too many definitive conclusions to the surveys' results. To illustrate this, on average it appeared that those countries which utilised registers had overall census costs that were lower than those who conducted traditional censuses (although information on the costs of the Danish census were not reported at the time of the UNECE survey). However, there were exceptions. In some of the countries that conducted traditional censuses using interviewers (such as Turkey and Azerbaijan), reported both nominal and PPPU *per capita* costs that were less than the average for those countries that used registers. It should also be noted that the costs for the countries that used registers did not include any factor for the annual costs for maintaining the registers.

Among the countries that conducted a traditional census in the 2001 round the average per capita cost overall was $6.8 (PPPUs), but was lower in those censuses carrying out the enumeration through interviewers ($5.2) and almost half the cost in those countries using a self-completion questionnaire ($10.1). Among the latter group, France reported the lowest costs ($ 3.4 PPPUs) while the USA experienced the highest ($22.7). The UK's costs were well below the average for this group.

The way forward

Whether costly or not in relative terms, in terns of delivering a census to time and budget the 2011 Census has been considered generally to be a success to date. But has it been cost effective? The ever-increasing pressure on ONS to improve value for the tax payers' money means that it is now investigating alternative ways of collecting demographic information in order to produce statistics that are more regular and up-to-date but yet can still meet users' needs for high quality data.

Of course, ONS has traditionally carried out, after each census, a thorough evaluation of how things went, together with a review of whether or not there are viable alternative ways to collect the same sort of data to the same level of quality. The 2003 Review concluded that there were not. But, as noted in the UK's other seminar paper *Beyond 2011: the future of population statistics in the UK?*, it is clear that the traditional approach to census taking is becoming increasingly costly, and changes in society are making it more challenging to carry out. A more mobile population and the increasingly complex ways in which people live make the process of taking a Census more difficult – and the concept of a periodic snapshot is, arguably, becoming less relevant. At the same time improvements in technology and the growth of computerised registers and other administrative data sources would seem to suggest an alternative approach may now be not only viable and less costly but more cost-effective.

That paper describes how the UK is assessing alternative methods of carrying out its next Census in 2021 by making better use of existing administrative data sources, in an attempt to produce more timely population data at a reduced overall cost, and comparing such methods with the cost-effectiveness of another traditional census operation.