Methodology of the Monthly Index of Services

Research and Development Industry Review

Introduction

At the launch of the experimental Index of Services (IoS) in December 2000, a commitment was made to review and improve where practical, the sources and methods used to measure the service sector. This paper outlines the findings of the Research and Development (R&D) Industry Review.

Summary

The industry review for Research and Development has recommended:

- splitting this industry into market R&D, and non-market plus own-account R&D.
- introducing a more specific Average Earnings Index (AEI) deflator to measure the market sector R&D.

Although the methodology will be changed all the way back to 1994, only the open period from 2005 will be revised.

How important is the Research and Development industry?

In terms of Gross Value Added (GVA) weights in 2003, Research and Development (SIC[1] Division 73) represents:

- 0.6% of the IoS
- 0.4 of Total GVA

[1] The SIC is the Standard Industrial Classification, and this is the classification system used in the UK to define industrial groupings. The 4-digit refers to the level of detail and is generally the level at which data is collected and aggregated from within GDP(O) and IoS. More detail on this can be found in the IoS Methodology documentation

Methodology

Previous methodology[2]

Within Division 73 there are two 4-digit SIC[3], although currently these are not used, and are combined into one group. Below are details of the groups as well as the methodology that was previously used:

Table 1

SIC	Description	Output indicator	Source	Deflator	Weight in 2003 (GDP=1000)	% of division
73.10 & 73.20	Research and experimental development on natural sciences and engineering and, Research and experimental development on social sciences and humanities.	Deflated gross turnover	MIDSS	AEI for Other Services, adjusted for productivity, plus RPIY	0.4	100%
MIDSS – ONS Monthly Inquiry into the Distribution and Services Sector, AEI – ONS Average Earnings Index, RPIY – ONS inflation rate, excluding mortgage payments and indirect taxes						

Reasons for review

The main reasons for reviewing the Research and Development industry were as follows:

- the current method provides an inappropriate measure of non-market R&D
- the deflator isn't particularly specific to this industry

What should we be doing?

In October 2001, Eurostat (European Union's Statistical Office) published the 'Handbook on Price and Volume Measures in National Accounts'. The handbook provides guidance by product, on what price and volume methods should ideally be used (A methods), are acceptable methods (B methods) and those methods that should not be used (C methods). The handbook has been written in the context of annual data but the same rules apply to sub-annual data.

The handbook gives limited guidance in this industry due to the unique nature of Research and Development, i.e. the length of an R&D project differs greatly, and therefore not even 'model prices' is possible because you can't meaningfully price the same R&D output in two successive periods. Another complication is that an R&D project could well be unsuccessful, but even this counts as output.

It is suggested though that this type of activity should be separated out into market and non-market sectors. Charge-out rates and hourly fees are suggested as acceptable methods of

[2] In this report, the previous methodology refers to the methodology used prior to Blue Book 2004, and the new methodology to the methodology taken on at Blue Book 2006

[3] See SIC 2003 documentation for details of the full breakdown of division 73 in the UK SIC - http://www.statistics.gov.uk/sic2003

measuring the market sector. Whereas non-market R&D is production of collective services, so cost of inputs, such as number of employees is a suitable option for this sector.

In addition to the guidance provided in the Price and Volume Handbook, the SNA also states "*that research and development is not an ancillary activity like purchasing, book-keeping, storage and maintenance. When research and development is carried out on a significant scale within an enterprise, it would be desirable to identify a separate establishment for it so that the relevant inputs and outputs could be distinguished for analytical purposes. Because of the difficulty of obtaining price data, the output will usually have to be valued by total costs of production, as in the case of most other own-account production. The output produced has then to be treated as being delivered to the establishment, or establishments, which make up the rest of the enterprise and included in their intermediate consumption. When there are several other establishments, the amounts of research and development delivered can be distributed in proportion to their total costs or other indicator, in much the same way that the output of head offices or other central facilities has to be allocated*."[4]

Issues faced by the industry review

This section provides details of the changes that are recommended for Division 73 – Research and Development.

Key features

Research and Development (R&D) is different from most other activities because it is a unique activity, and only takes place once. This is because once a project has been completed, if it were to be done again by definition it wouldn't be R&D. Because of this, and the fact that there is no set timescale for R&D projects, this industry is difficult to measure accurately.

Much of the activity in this division is conducted by units providing R&D services to their parent company. As noted above, this is known as own-account R&D. Many companies have a separate unit which is dedicated to R&D, these units are financed by the parent unit, and the results of any R&D are used to produce goods or services which are sold on the market. Even though the companies that produce own-account R&D are by definition market producers, because they are profit seeking, the R&D itself is classed as non-market because it has no value on the market.

R&D is also carried out in universities, hospitals, enterprises (companies), as well as research institutes.

Overall, this means that ideally this industry should be split all R&D into three distinct groups:

- market R&D - units who provide R&D services for other units
- non-market R&D - units who provide R&D services in the government or Non-profit Institutions Serving Households (NPISH) sectors
- own-account R&D - separate units who provide R&D services to another part of the same company

[4] SNA (1993) – Paragraph 6.164

Although, non-market R&D and own-account R&D should be both measured in the same way – i.e. using input methods.

Issues

- can we provide a more accurate measure of non-market R&D?
- can we find a more specific deflator to measure market R&D?

Non-market R&D

The current method of measuring R&D activity uses deflated turnover. This provides an inappropriate measure of non-market R&D, because non-market activities are not carried out for the purpose of profit. Non-market R&D is carried out by research councils, hospitals and universities in order to increase knowledge on a particular subject. Therefore it was essential that another data source were sought to measure this type of R&D. As a result of the review, employment for division 73, adjusted for changes in productivity was recommended for measuring the output of non-market and own-account producers.

Recommendation

1. Create two groups within division 73:

- **73.01 – measuring market R&D, using deflated turnover**
- **73.02 – measuring non-market and own-account R&D, using productivity adjusted employment**

Deflators

The current deflator (AEI for Other Services) that is used to measure this industry isn't particularly specific to this type of activity; this covers a broad range of service activities.

Recommendation

2. Replace the existing deflator with the AEI for Research and Development, adjusted for changes in productivity, plus RPIY.

Who was consulted as part of the Industry Review process?

Within the ONS, there was comprehensive consultation with relevant teams both within National Accounts, the survey areas and methodologists. In terms of external consultations, we are grateful for the assistance received from lecturers from the University of Wales Aberystwyth (UWA), The Patent Office (now called UK Intellectual Property Office) and the Department of Trade and Industry.

New methodology

In summary, the industry review for division 73 has made the following recommendations that were implemented at Blue Book 2007:

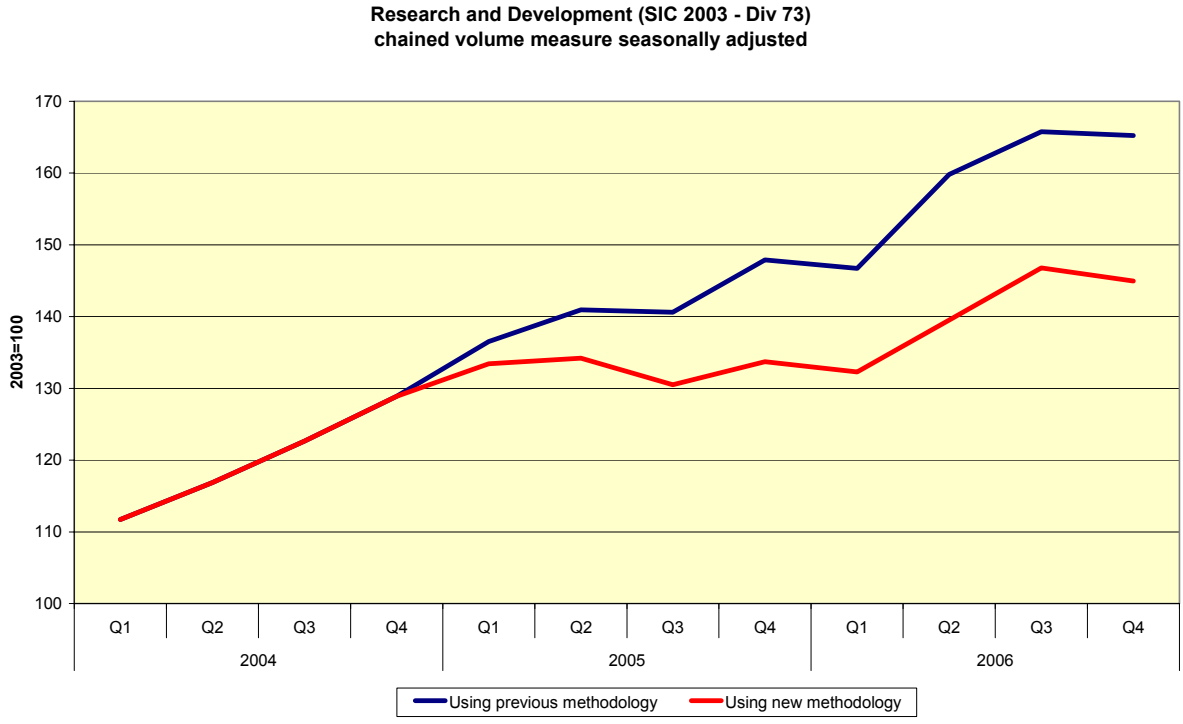
- to replace the existing one group within division 73, with two groups, and to combine these groups using equal weights.
- to introduce a more specific research and development deflator.

Benefits and issues of new methodology

Benefits		Assumptions
Both market and non-market R&D activities will now be measured.	V	We are assuming that the production of own-account R&D follows a similar path to that of other non-market R&D activities.
The turnover data will now be measured using a much more relevant deflator		We are also assuming that market and non-market activities have equal weighting within this industry.

Impact of new methodology

The graph below shows the impact of the new methodology on division 73. The data has been revised back to January 2005. This in line with the open period for revisions set-out in the National Accounts Revisions Policy for Blue Book 2007.



Contact Information

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