

Article

Impact on turnover and gross value added of expenditure on performing research and development by UK-owned and foreign-owned UK businesses

Analysing the impact of research and development (R&D) expenditure by UK-owned and foreign-owned UK business on turnover and approximate gross value added.

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1 . Main points

- New analysis of businesses that perform research and development (R&D) and are part of the Annual Business Survey shows that the number of foreign-owned UK businesses performing in-House R&D in the UK has more than doubled since 2003.
- The analysis from the merged dataset highlights that the contribution to total turnover by foreign-owned UK businesses performing R&D in the UK rose from 42% to a majority share of 59%.
- Results from the dataset show that approximate gross value added (aGVA) for foreign-owned UK businesses that undertake R&D in the UK is higher than for domestically-owned businesses.
- The analysis further indicates that high-revenue generating businesses that are foreign-owned and undertaking R&D contribute a sizeable proportion of total turnover and aGVA, despite representing less than 1% of total businesses within the dataset.

2 . Overview

Research and development (R&D) is seen by governments around the world as an important driver of innovation and economic growth. The UK government through the Industrial Strategy announced its desire to increase the proportion of gross domestic product (GDP) spent on R&D to 2.4% by 2027 and to increase the R&D tax credit rate to 12%.

The analysis in this article focuses upon the ownership type of businesses conducting in-house R&D within a merged dataset between R&D business data and Annual Business Survey data; looking at the number of businesses and their associated turnover and approximate gross value added (aGVA) over time.

3 . Methodology

Office for National Statistics (ONS) carries out the Business Expenditure on Research and Development (BERD) Survey in accordance with the [Organisation for Economic Co-operation and Development \(OECD\) Frascati manual](#). It is an annual survey with a sample of 5,500 businesses in the UK. This is our primary source of data on research and development (R&D) and is used widely by the media, research organisations, other government departments and the public.

The Annual Business Survey (ABS) is the main structural business survey conducted by ONS. The ABS publish financial information from businesses representing the UK non-financial business economy (about two-thirds of the UK economy). The financial variables covered include turnover, purchases, employment costs, capital expenditure and stocks. More information on [approximate gross value added \(aGVA\) is available](#).

For this analysis, we wanted to see whether there were any changes in business performance over time. A dataset was developed by linking individual company (at reporting unit level) records from the BERD survey to the ABS. The BERD dataset for each year between 2003 and 2016 was merged and we kept records for companies that contained at least 10 years' worth of data. These were merged with variables from the ABS.

The BERD survey comprises 5,500 businesses per year, with the sample changing year-on-year. To get as full a dataset as possible, we used the full BERD survey including imputed data for non-responders and unsampled smaller businesses.

Non-responding larger businesses (who receive the longer, more detailed form) are estimated for using matched pair methodology. This is using the previous two years' returned data to estimate the missing period. Smaller businesses identified as R&D performers are sampled using sampling fractions. The totals for the non-responding or un-sampled businesses are estimated using ratio estimation with business employment as the auxiliary variable, a variable held on the Inter-Departmental Business Register (IDBR).

Overall, the matching process resulted in 121,000 observations for 10,300 unique company references over the 13-year period. The data for the matched businesses were then analysed to produce the data used in the rest of this article. The dataset contained a range of variables such as in-house (also known as intramural) R&D from the BERD survey alongside ABS data such as total turnover and aGVA.

Users should note that ABS and BERD data used in this article for 2015 and 2016 are subject to revisions, data prior to 2015 is final.

Users may also note that, due to the unique nature of the dataset, foreign ownership analysis will vary to that carried out in [Business enterprise research and development, UK: 2016 analysis](#).

4 . Considerable growth in the number of foreign-owned UK businesses conducting in-house R&D

Figure 1 indicates that between 2003 and 2016 a growing number of businesses conducting in-house research and development (R&D) within the UK were foreign-owned. A foreign-owned UK business is defined as having an ultimate parent company registered outside the UK. In-house R&D refers to the total cost of R&D conducted by a business, regardless of the source of funds or their treatment within their own business' accounts.

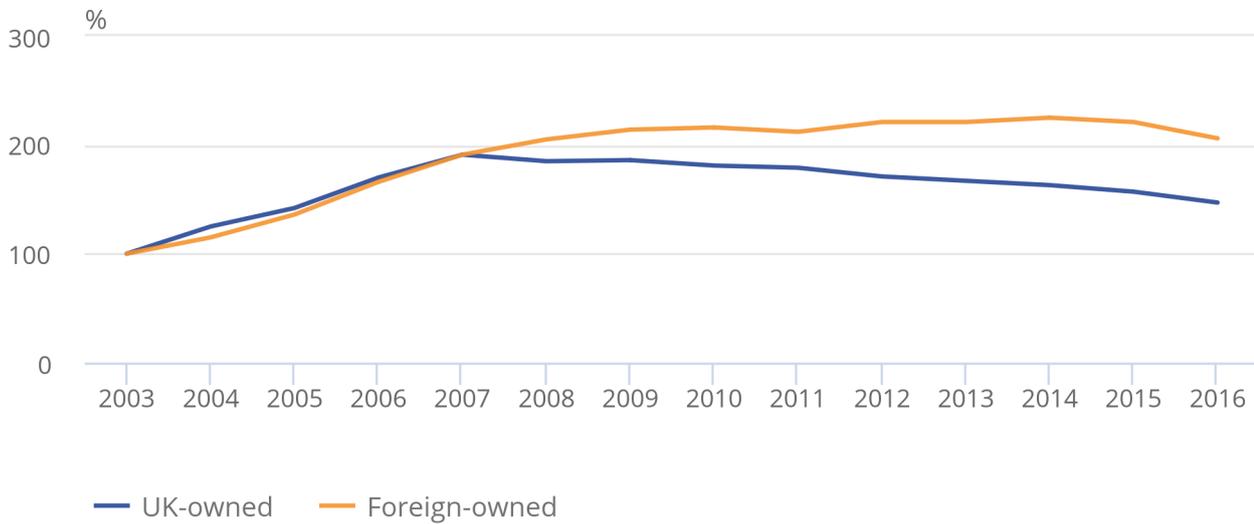
Within the merged dataset, the number of foreign-owned UK businesses has increased by 106% during the 13-year span. In 2003, there were 709 foreign-owned UK businesses compared with 1,458 in 2016. This has outstripped growth within UK-owned businesses, which has risen by 47% over the same period.

These differences are most noticeable from 2007 onwards, with the number of foreign-owned UK businesses growing in most years compared with UK-owned businesses, which were declining. Figure 1 also highlights that between 2007 and 2016, UK-owned businesses in the merged dataset fell by 23%. This can be in part attributed to domestically-owned businesses being taken over by foreign-owned firms, however, it remains that, most businesses (82% in 2016) conducting in-house R&D are still UK-owned.

The evidence is indicative of changing company behaviour. The dataset is constrained to those that are conducting in-house R&D over a lengthy period, so we can expect that these companies had been stable and were using R&D to continue to maintain their future business performance. The decline in UK companies in the dataset may be because some of those companies stopped performing R&D, or were removed from the business register due to mergers and acquisitions between UK firms, or being bought by foreign companies.

Figure 1: Change in number of businesses conducting research and development by ownership type, UK, 2003 to 2016

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Source: Office for National Statistics

Notes:

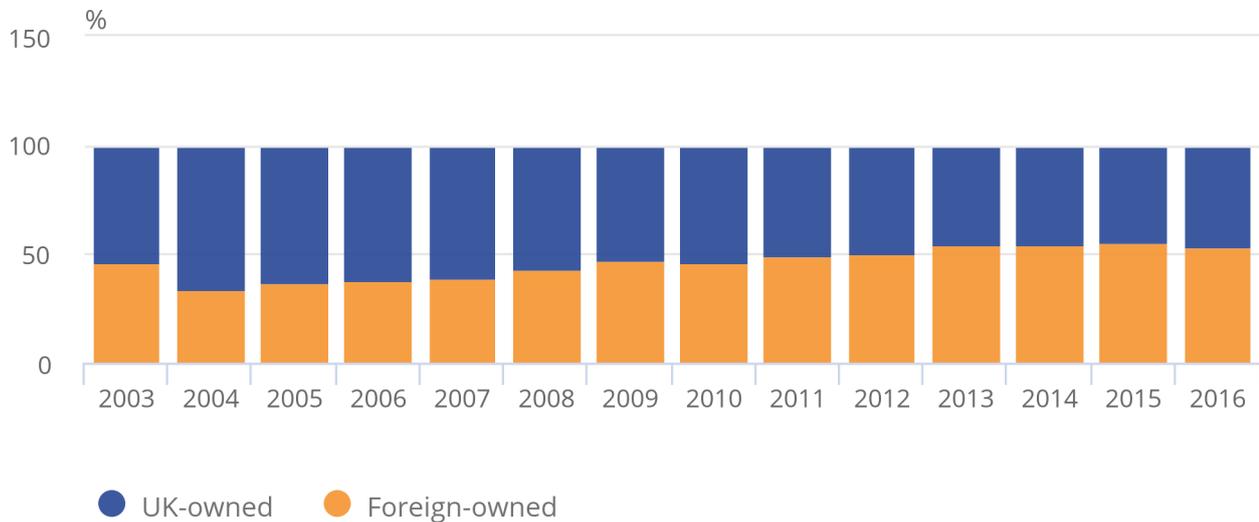
1. Index base year equals 2003.

Similarly, in-house R&D spending has grown for foreign-owned UK businesses within the merged dataset. Between 2003 and 2016, in-house R&D has more than doubled from £3.2 billion to £7.3 billion for foreign-owned UK businesses. This again outstripped growth in UK-owned businesses over the 13-year span. Within the merged dataset, these businesses grew by 73% from £3.7 billion in 2003 to £6.4 billion in 2016.

Figure 2 shows the percentage contribution of in-house R&D spending by ownership type. As suggested by this analysis, Figure 2 indicates the percentage contribution of foreign-owned UK businesses within the merged dataset has risen from 46% in 2003 to a majority share of 53% in 2016.

Figure 2: In-house research and development spending by ownership type, UK, 2003 to 2016

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Source: Office for National Statistics

5. Turnover and aGVA contributions by foreign-owned UK businesses performing in-house R&D in the UK have also grown

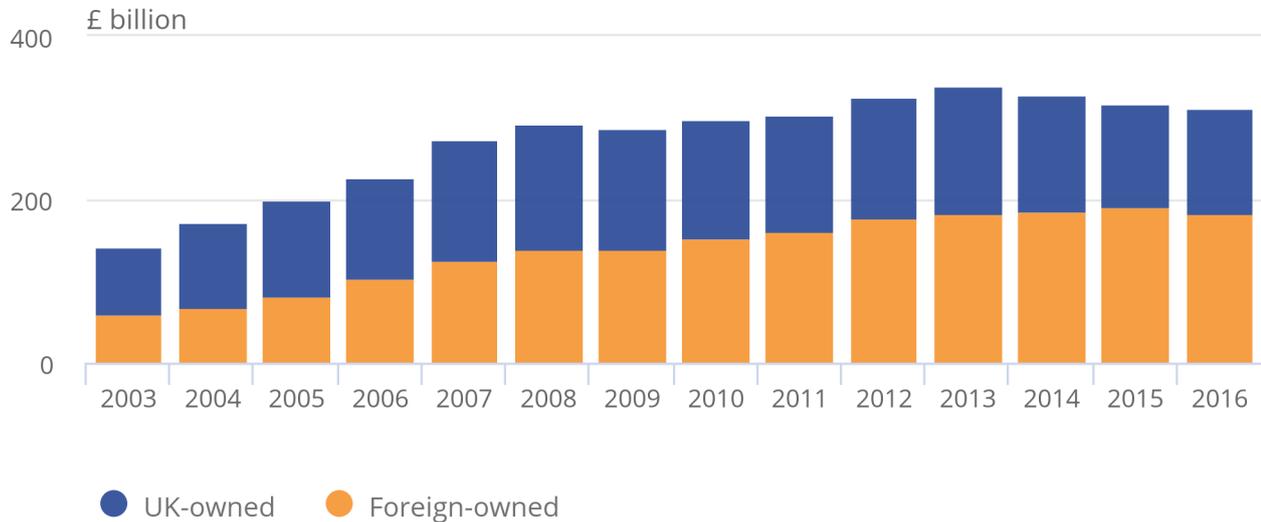
Figure 3 shows total turnover by ownership type from the merged dataset. Total turnover has been taken from the Annual Business Survey (ABS).

Within the merged dataset, there is a trend between the growth in the number of foreign-owned UK businesses (Figure 1) performing in-house research and development (R&D) in the UK and turnover contribution of those businesses (Figure 3). In general, as the number of foreign-owned UK businesses rose so did the contribution of those businesses to total turnover. Between 2003 and 2016, foreign-owned UK businesses' contribution to total turnover rose from 42% (£60 billion) to 59% (£184 billion). This tripling of turnover within the merged dataset for foreign-owned UK businesses further outstrips that seen by growth in domestically-owned businesses (55%). From 2003, UK-owned businesses rose from £83 billion to £128 billion in 2016.

The large contribution by foreign-owned UK businesses relative to their numbers (18% of total businesses within the dataset) suggests there are a small number of high-revenue generating businesses. As shown by Table 1, in 2016, foreign-owned UK businesses earning over £500 million in turnover who perform in-house R&D contributed 37% to total turnover, compared with UK businesses that only contributed 20% to that figure.

Figure 3: Total turnover by ownership type, UK, 2003 to 2016

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Source: Office for National Statistics

Table 1: Breakdown of total turnover by ownership and turnover size

Ownership Type	% of Total Turnover	
	Turnover Above £500 million	Turnover Under £500 million
UK-owned	20	21
Foreign-owned	37	22

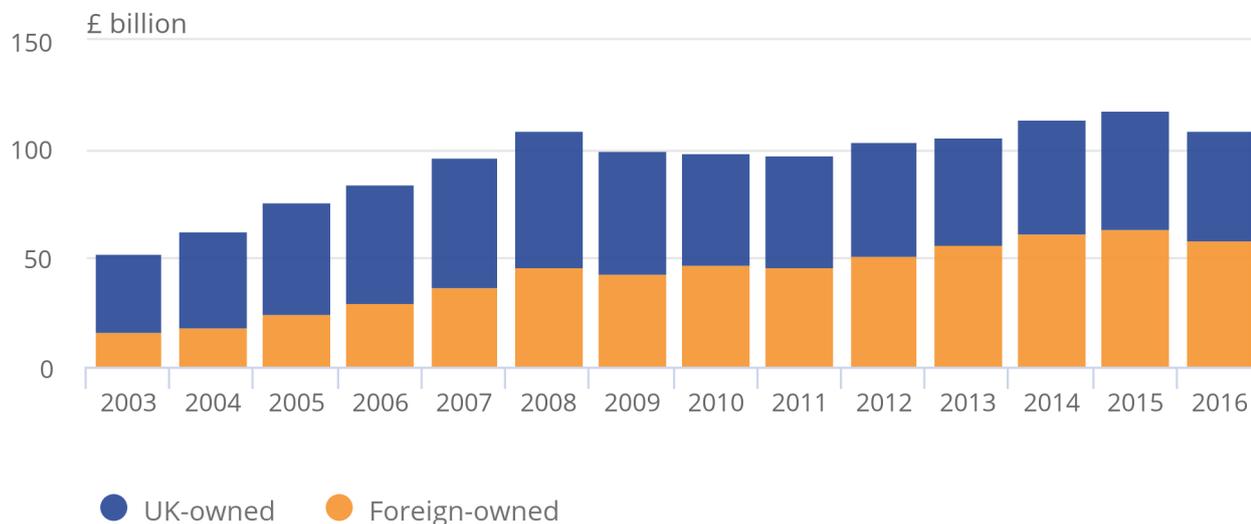
Source: Office for National Statistics

A similar story is seen when approximate gross value added (aGVA) is plotted (Figure 4) for the same businesses performing in-house R&D in the dataset. This figure uses aGVA at basic price. This is a measure of the income generated by businesses, less their expenditure, as estimated by the Annual Business Survey. [More information on aGVA](#) is available.

Figure 4 highlights that foreign-owned UK businesses in 2003 contributed only £16 billion (30% of total aGVA). This is in contrast with 13 years later when in 2016, aGVA generated by this ownership type was £59 billion (54% of total aGVA). Furthermore, in 2016, foreign-owned UK businesses earning over £500 million contributed a similar amount of total aGVA as its turnover equivalent. Within the merged dataset, 31% of total aGVA is generated by these businesses, which represents only 0.73% of the total business population.

Figure 4: Total approximate gross value added at basic prices by ownership type, UK, 2003 to 2016

Figure 4: Total approximate gross value added at basic prices by ownership type, UK, 2003 to 2016



Source: Office for National Statistics

Notes:

1. Basic prices (£ billion).

6 . Conclusion

In summary, the analysis from the merged dataset highlights that an increasing number of businesses conducting in-house research and development (R&D) in the UK are foreign-owned. Additionally, the figures show that this rise in the number of foreign-owned UK businesses can be associated with an increased proportion of both turnover and approximate gross value added (aGVA) for these businesses since 2003. The analysis further indicates that high- revenue generating businesses that are foreign-owned and undertake R&D contribute a sizeable proportion of total turnover and aGVA, despite representing less than 1% of total businesses within the dataset.

This work has provoked a range of questions that could be investigated, including:

- whether the levels of business investment and the funding source are having an impact on R&D spending
- other constraints on R&D spending, including the availability of appropriate staff and facilities
- are all industrial sectors behaving in a similar way to one another

Further understanding of the nature and effectiveness of business spending on R&D is needed to help shape the choices that organisations make when deciding whether to invest.