



**Innovate
UK**



Accuracy of Headquartering Adjustments

An investigation into the effectiveness of our current approaches to headquartering for Innovate UK grants

Introduction

Discovering where innovation funded by Innovate UK (IUK) actually happens is becoming more important as new place-based strategies for innovation take form.

Identifying regional innovation systems and clusters will become more important to regional actors, and IUK has one of the most comprehensive databases of innovation funding of businesses.

Identifying locations for innovation presents some challenges, including working out where innovation happens in a project involving multiple partners with different roles.

This paper examines one specific challenge related to “headquartering” effects, where the data shows a company’s registered address (headquarters)

but innovation activities take place somewhere else.

This issue is a challenge and affects all statistics including those from ONS.[1]

IUK already acknowledges this as an issue and has taken steps to mitigate it. Applicants are asked for the actual address of execution of a project as well as the registered address, and adjustments are made for those who do not fill this in, as well as for historic data.

As part of continuous improvement, this paper examines how appropriate IUK’s adjustments are and shows that, while the adjustments are appropriate in scale and direction and have increased the accuracy of the data, they may underestimate the degree of headquartering in London and therefore the need for additional adjustments to the database when it is used for regional data.

[1] See section 6 of the ONS report on [“Measuring UK public-funded gross regional capital and non-capital expenditure on research and development”](#).

Executive summary

In trying to find the true locations where innovation (and work funded by IUK) happens, headquartering, where data is attributed to the registered office of a company rather than actual work address, is a serious issue.

To compensate for the deficiencies of the transparency data, we have developed an approach based on using work addresses (where available on applications) coupled with a very limited number of manual changes. This shows a significant change, but we are not sure whether this is sufficient. Manual checking suggests that it works well for larger companies and grants, but we are unsure how appropriate it is for smaller projects.

This paper shows the results of matching IUK data for smaller grants (taken as less than £4 million to avoid ones which relate primarily to innovation infrastructure) with the Business Structure Database using the ONS Secure Research Service. This allows an indirect comparison between the results of IUK's current headquartering approach and estimations based on the UK Innovation Survey regarding where innovation most probably takes place.

This shows:

1

Headquartering has a real effect on overall figures.

Looking specifically at the percentage of grants spent outside the Greater South East (GSE), this could be in the range of 4-8% in addition to the 3% created by the existing method. Allowing for larger grants, this could still make a likely difference in the figures reported by UKRI of the order of 2%.

2

A significant number of grants **less than £4 million** are given to companies with significant numbers of local units and, in the case of the GSE, significant numbers of local units outside the region where the main activity takes place. A true picture is therefore likely to result in a greater reallocation of locations outside the GSE, particularly from London.

3

Our current method almost certainly **underestimates the headquartering effect**, suggesting that we should do more investigation of real work locations for smaller companies.

Background



The question of how much of Innovate UK’s funding is spent outside the Greater South East is an important issue and is related to current government strategies[1].

This is not a simple question to answer for IUK, since firms often have multiple sites and do not perform their innovation activities at their registered address. Various approaches have been used to determine the degree to which this “headquartering” affects final figures, primarily through examining work addresses declared at the application stage. Manual checking shows that this works well for larger companies and grants[2], for example reallocating projects related to Rolls-Royce from the City of London to Derby. However, it is not clear how well this works for smaller companies and grants. There is an assumption that this will be less significant – because smaller companies tend to

be less likely to have multiple sites and more likely to have their registered office at a site where innovation activities happen.

This paper considers smaller grants (defined as less than £4 million to a single company within a project) and uses data from the UK Innovation Survey to make an estimate of how well the current approach accounts for headquartering effects for these grants.

This work was undertaken in the Office for National Statistics Secure Research Service using data from ONS and other owners and does not imply the endorsement of the ONS or other data owners.

[1] Specifically the levelling up white paper states that “BEIS will aim to invest at least 55% of its R&D funding outside the Greater South East by 2024–25.” While the new government may change the detail, it seems likely that addressing regional inequality will remain important.

[2] Although there is still work to be done regarding the allocation of Catapult funding.

Approach to Analysis

The UK Innovation Survey (UKIS) records the location where innovation happens and can to some degree be used to determine whether locations used by IUK are coincident.

This has some issues, in particular:



Only a minority of IUK grant recipients are likely to be surveyed by UKIS, so matching the two would cause problems.



While we can suppose that innovation activities generally occur repeatedly in the same places, it is not necessarily the case that the location is the same for companies which match between IUK grant recipients and UKIS respondents.



UKIS data can only be matched at a level which prevents disclosure of data on individual firms, so it is not possible to check specific cases to determine differences.

To produce a better estimate the following two stage approach was used:



Using UKIS data to see if there are approaches using Business Structure Database (BSD) data which would produce the same (or similar) breakdown. Approaches used were:

- Using the main location for the company as being the location for innovation (NB the main location is not the same as the registered address).
 - Assuming that innovation takes place in all locations of the company in proportion to the number of people employed in each location.
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Using these substitute approaches and matching IUK transparency data to BSD data to estimate what effect correcting for headquartering would have, as well as comparing this with data from IUK directly (both using registered addresses and with existing headquartering adjustments).

Stage 1 – Identifying other approaches

Using UKIS, data we can compare the division into the nine English regions and three Devolved Administrations as follows – showing what is reported in UKIS and the results of using the two different approaches to correction (allocating everything to the main location, and allocating to all local units in proportion to the number of staff employed there).

Table 1: Comparison of different approaches to estimating regional spread

Region or devolved administration	UKIS	Based on main location	Based on all locations
East Midlands	7.0%	7.0%	7.2%
East of England	10.5%	10.5%	10.5%
London	15.5%	16.1%	15.8%
North East	2.7%	2.7%	2.8%
North West	10.7%	10.5%	10.6%
Northern Ireland	2.6%	2.5%	2.6%
Scotland	6.4%	6.4%	6.5%
South East	14.6%	14.3%	13.9%
South West	9.1%	9.1%	9.1%
Wales	3.8%	3.7%	3.7%
West Midlands	8.8%	8.7%	8.8%
Yorkshire and The Humber	8.3%	8.6%	8.5%

These figures do show variation between the methods (and more specifically between the methods and the “real” figures) but using the Fisher Test these are similar at a 95% confidence level. This shows that it is reasonable to use these substitute methods to determine the location of innovation activities.

Stage 2 – Comparison with IUK data and headquartering approach

Using the two methods, it is possible to compare, for grants less than £4 million, the regional distribution based on these approaches with both the raw transparency data and the further adjustments currently put in place.

In the following two tables, for numbers and for funding, cells with a difference of more than 1% are highlighted. Yellow cells are ones where HQ adjustments mean there should be a greater percentage in the region. Blue cells are ones where there should be less.

Table 2: estimates for number of grants by region using various methods

Region or devolved administration	Transparency Data	With HQ Adjustment	Difference	Based on main location	Based on all locations	<i>Difference relative to existing adjustment</i>	
East Midlands	6.5%	6.8%	-0.3%	7.9%	7.5%	-1.1%	-0.7%
East of England	10.8%	10.9%	-0.1%	11.8%	9.6%	-1.0%	1.2%
London	21.2%	20.2%	0.9%	14.5%	12.5%	5.8%	7.7%
North East	3.2%	3.3%	-0.1%	2.9%	4.3%	0.4%	-1.0%
North West	8.4%	8.5%	-0.2%	9.8%	10.6%	-1.2%	-2.1%
Northern Ireland	1.5%	1.5%	0.0%	1.4%	1.9%	0.2%	-0.3%
Scotland	6.8%	6.9%	-0.1%	7.0%	10.0%	-0.1%	-3.2%
South East	16.9%	16.9%	0.0%	18.2%	14.2%	-1.3%	2.8%
South West	8.9%	8.8%	0.0%	8.9%	9.7%	-0.1%	-0.8%
Wales	3.3%	3.4%	-0.1%	3.2%	4.6%	0.2%	-1.2%
West Midlands	7.1%	7.2%	-0.1%	7.6%	8.0%	-0.4%	-0.8%
Yorkshire and The Humber	5.5%	5.5%	-0.1%	6.9%	7.2%	-1.3%	-1.7%
Not GSE	51.1%	52.0%	-0.8%	55.5%	63.7%	-3.6%	-11.7%

Stage 2 – Comparison with IUK data and headquartering approach (cont)

Table 3: estimates for value of grants by region using various methods

Region or devolved administration	Transparency Data	With HQ Adjustment	Difference	Based on main location	Based on all locations	<i>Difference relative to existing adjustment</i>	
East Midlands	5.6%	7.5%	-1.9%	10.4%	9.4%	-2.9%	-1.9%
East of England	11.0%	11.1%	-0.1%	12.4%	12.4%	-1.3%	-1.4%
London	21.2%	18.5%	2.7%	12.8%	10.8%	5.8%	7.8%
North East	3.2%	3.1%	0.1%	3.0%	3.7%	0.1%	-0.6%
North West	6.5%	6.7%	-0.2%	6.0%	7.3%	0.7%	-0.6%
Northern Ireland	2.1%	2.1%	0.0%	1.5%	1.6%	0.6%	0.5%
Scotland	6.2%	6.3%	-0.1%	6.1%	6.6%	0.2%	-0.3%
South East	19.2%	18.9%	0.3%	19.0%	17.5%	-0.1%	1.4%
South West	10.0%	10.1%	-0.1%	10.5%	11.0%	-0.4%	-0.9%
Wales	2.9%	2.9%	-0.1%	2.8%	4.1%	0.1%	-1.2%
West Midlands	7.6%	8.1%	-0.4%	10.9%	10.2%	-2.8%	-2.1%
Yorkshire and The Humber	4.5%	4.7%	-0.2%	4.6%	5.4%	0.1%	-0.7%
Not GSE	48.6%	51.5%	-2.9%	55.9%	59.3%	-4.4%	-7.8%

Stage 2 – Comparison with IUK data and headquartering approach (cont.)

We have no way of knowing which of the methods is better and they are significantly different, so analysis is bound to be indicative.



We can hypothesise that:



Reality probably lies somewhere between the two methods since, based on a priori understanding of firms, innovative activity is quite likely to be placed in locations with significant employment but not the primary location – so we would expect the first method to be insufficient to account for remote activities but the second method to overestimate this. This suggests that the best estimate for the overall effect on the GSE figure is around twice as much (4.4%-7.8%) as the existing correction (2.9%).



Examining numbers of grants is likely to be misleading because it will include many very small grants (related to correspondingly limited activity). Therefore, the amount of funding is likely to give a truer picture of the situation.



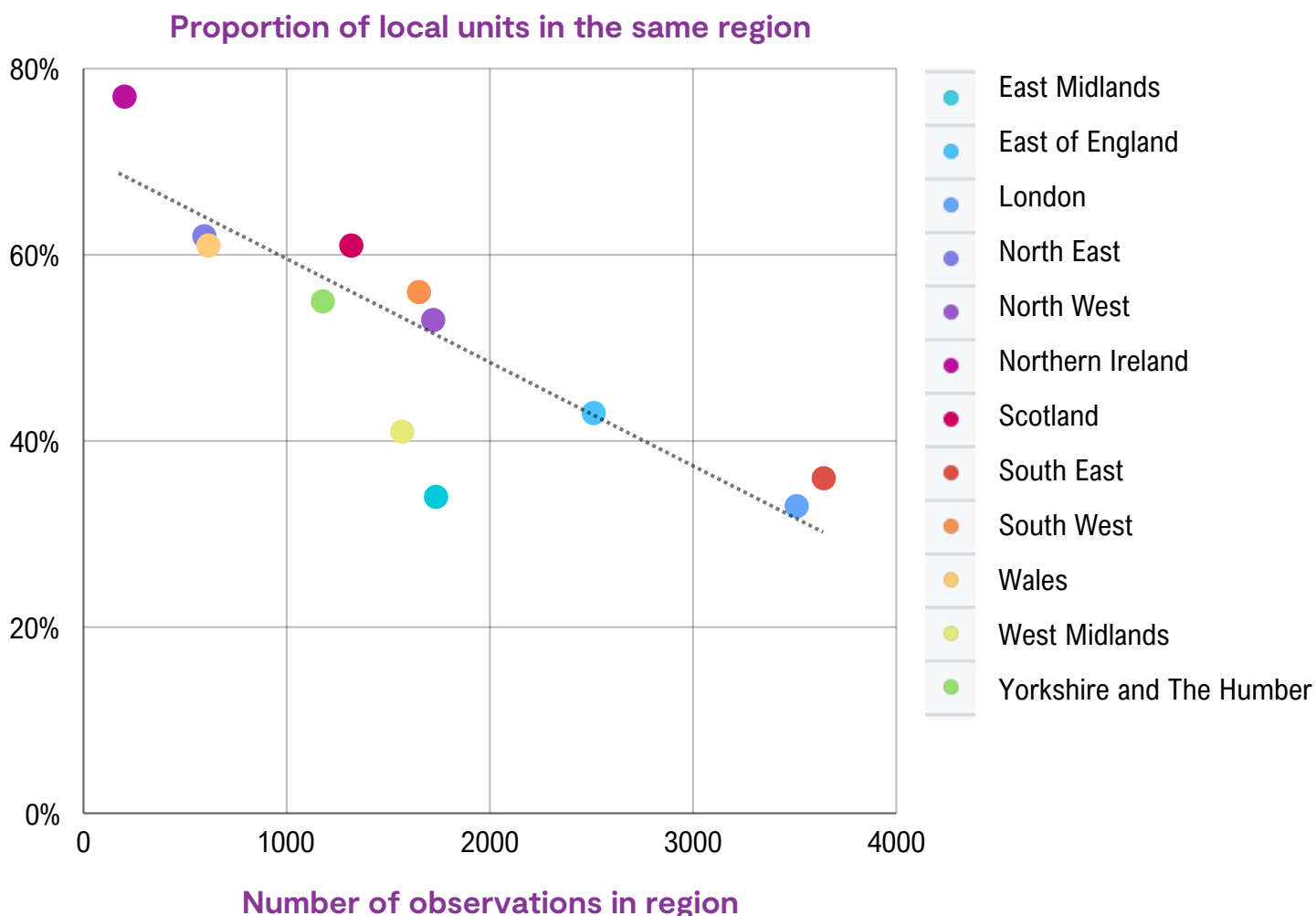
The biggest impact of existing HQ adjustments relates to the overestimation of activity in London, probably an artefact of larger companies with registered addresses in the City of London. This remains the case for possible additional corrections.

Distribution of multiple locations

The figures show that, even for smaller grants, a significant number of companies have multiple locations. However, this does not necessarily mean that there are instant headquartering effects since smaller companies may be more likely to have additional locations in the same region as their main activity location. Analysing the number of local units and whether they are in the same region as the primary location shows that:

- The three GSE regions show only 36% of units in the same region (including within the GSE)
- The other nine regions show 50% of units in the same region

This suggests that any final attempt to put innovation into a single local unit is more likely to affect the grants in the GSE than the rest of the country (so therefore to increase the non-GSE percentage). Perhaps surprisingly, there is a very strong negative correlation ($R^2 > 0.7$) between the number of companies in a region and the tendency to have local units outside the region. While this is understandable for Northern Ireland due to geographic isolation, it seems more notable for the larger regions in the GSE, again showing a likely tendency for “true” locations to move towards the non-GSE.



Figures omit companies with more than 10 local units (typically retail) to avoid bias

Conclusions

By examining the figures, we can conclude:

- Current methods significantly overestimate the amount of activity in London both by number and by funding.
- Although current methods of adjustment for HQ effects move statistics in the right direction, it seems almost certain that there is further to go, making a further difference of perhaps 5% in the GSE percentage for smaller grants – a difference of perhaps 2% overall. This is probably an upper limit of changes to be made, particularly noting improvements in more recent data.
- If we look at individual regions, we can note that there are probably wider swings, in particular from London and to the Midlands (East and West Midlands and East of England). It can be noted that the patterns for numbers and for funding are quite different in detail, suggesting different typical sizes of grants in different regions.
- A significant proportion of recipients of smaller grants have multiple sites. Therefore it cannot be assumed that the registered address is an appropriate substitute for the actual location of innovation activity.

There are some caveats, however. The methodology and the data are likely to cause some bias which may not be present in more current data, noting particularly:

- Companies which have failed are likely to be left as having their (previously) registered address – though this is likely to affect all approaches.
- The figures relate to the whole transparency data, whilst asking applicants for work as well as registered locations is only something which has been enacted recently. It might therefore be supposed that older data is more likely to be poorly served by current approaches to HQ adjustments.

Even if we assume that the current method deals well with the largest grants (perhaps excluding Catapults), this shows that there should at some point be more investigation since a 4% difference in these smaller grants would still make a difference of around 1.5% in the total.

Clearly we cannot use this estimate when specific questions are asked (for example the yearly figures published by UKRI). However, this analysis does give substance to assertions we can make that the actual amount we spend outside the GSE is higher than the figure we report.



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