PORTSMOUTH BUSINESS SCHOOL

MBA

Title: Research and Development Tax Relief for Small Companies – A good thing?

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Research and Development Tax Relief for Small Companies – A good thing?

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Abstract

The UK government, in 2000, introduced a Research and Development tax incentive to address the identified gap between the level of the UK's innovative activity and growth of intellectual property and the level in other European and OECD nations.

Two schemes were introduced, one for large companies and a similar, more generous scheme for SMEs.

There have been many studies undertaken concerning the effectiveness of the scheme however, most have been focused on the large scheme, as it accounts for the majority of innovative activity undertaken and tax relief paid.

Of the studies of the SME scheme, most have focused on medium sized companies and on the input additionality of the relief ie the amount of extra investment that takes place for every additional unit of tax saved.

Also, many studies have focused on what drives investment behaviour with regard to innovative decisions however, the literature linking the two was seemingly lacking.

Through the analysis of quantitative and qualitative data, this research project attempts to determine if there is any evidence to suggest that R&D tax relief has influenced key decision makers in small companies with regard to their innovative activities and expenditure, and also whether it is possible to show any tangible benefits for either the Treasury or UK plc as a whole.

The quantitative data shows evidence that small companies undertaking R&D have increased their levels of R&D staff more than industry average levels and that their turnover has also risen at a faster rate.

The qualitative data suggests that as part of the decision making process, the financial benefit gained through R&D tax relief encourages more intensive research, a deeper level of development and therefore, better products, services, systems and processes. The data also shows that the relief facilitates these enhancements being brought to market in a timelier fashion.

This report concludes that the original aim of the relief, to encourage innovative activities, is being achieved and that this fiscal measure should continue in operation for the foreseeable future.

Background

In 2000, the UK introduced a tax incentive similar to a scheme which had been introduced in Canada over 50 years ago and is currently in operation, in different formats, in the majority of OECD countries.

The following except from HMRC's website provides a good background.

"CIRD80200 - R&D tax relief: background

Historically, UK spending on R&D, as a proportion of Gross Domestic Product, has lagged behind that of many other countries. Between 1981 and 1999 it actually fell as a proportion of Gross Domestic Product, while in most comparable countries it was rising.

The Government, as part of its agenda to build a modern knowledge based economy, and improve productivity, wishes to increase the amount spent on R&D by companies. To that end it has introduced two reliefs for companies incurring revenue expenditure in this way. One is for large companies and one for companies that are small or medium enterprises (SMEs)."

The mechanism that the UK has adopted for SMEs, is to allow qualifying R&D costs as an additional expense in the company's tax computations, the result of which reduces taxable profit or increases a taxable loss.

In a profit situation, this will reduce the amount of corporation tax to be paid and in a loss situation, the company can choose whether to carry the additional loss forward, to set against future profits or alternatively, they can surrender the loss for an immediate tax credit (albeit at a lower rate), if their cashflow dictates or their profit forecasts show that the future benefit will not be received for many years.

I am a Consultant working in a niche tax practice called RandDTax and we specialise exclusively on providing advice and guidance on this one tax relief. We are 27 Consultants spread around the UK and we have over 600 clients.

As over 95% of our clients are SMEs and I believe this sector requires further research, this project is focused on the SME scheme.

Research aims

The aim of this research project, through the analysis of anonymised quantitative and qualitative data, is an attempt to determine if there is any evidence to suggest that R&D tax relief has influenced key decision makers in small companies with regard to their innovative activities and expenditure, and also whether it is possible to show any tangible benefits for either the Treasury or UK plc as a whole.

RandDTax is a member of HMRC's R&D Tax Consultative Committee and one of the roles is to provide feedback on the application of the relief and consequently a secondary aim of this work is to identify how the scheme could have more influence on key decision makers and be more accessible to companies with limited human resources.

Personally, as an active consultant in this field, gaining a deeper understanding of what key decision makers think about the tax relief and what influences their decision making process, would be advantageous in guiding business development strategies.

Literature review

Whilst there has been research focused on innovative investment decision making and separate research into the mechanics and potential effectiveness of increasing the monetary benefit received from R&D tax incentives, there has been insufficient research linking the two and this paper seeks to bridge this gap.

Decisions need to be made when there are risks created by uncertainty and from the formal and behavioural decision theories, Lipshitz and Strauss (1997) coined the heuristic R.Q.P. "Reduce uncertainty by a thorough information search (Janis & Mann, 1977), Quantify the residue that cannot be reduced, and Plug the result into some formal scheme that incorporates uncertainty as a factor in the selection of a preferred course of action

(Cohen, Schum, Freeling & Chinnis, 1985; Hogarth, 1987; Raiffa, 1968; Smithson, 1989)."

Further to this, Macmillan (2000), notes that "standard decision analysis can be summarised as a series of steps (Simpson et al., 1999; Lamb et al., 1999; Newendorp, 1996; Goodwin and Wright, 1991; Morgan and Henrion, 1990; French, 1989; Thomas and Samson, 1986):

1. Define possible outcomes that could occur for each of the available decision choices, or alternatives.
2. Evaluate the profit or loss (or any other measure of value or worth) for each outcome.
3. Determine or estimate the probability of occurrence of each possible outcome.
4. Compute a weighted average value (profit, preference or utility) for each decision choice."

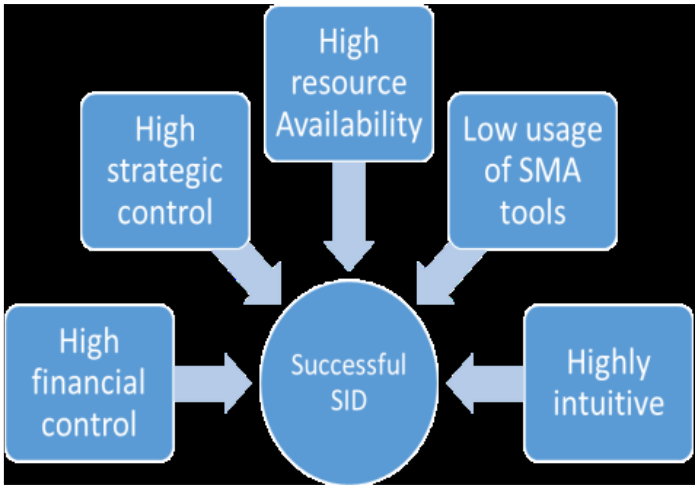
The decision rule is to choose the alternative with highest expected value.

The management accounting tools of rate of return, net present value, payback or internal rate of return are often used to calculate the value or utility.

These theories would indicate a very structured approach however, according to Laforet and Tann (2006), "the drivers of innovation in small manufacturing firms are: culture, leadership, process innovation and company strategic orientation" also "they have a risk-taking attitude and welcome change in particular in relation to new ways of working".

This would seem to concur with Soh et al. (2015) that "qualitative decision making techniques such as management sense-making, emotions, intuition, politics and rationality," play a very important role in successful decision making.

They rationalise their starting mix of 10 strategic management accounting (SMA) and non-accounting factors down to the following 5 that are influential in making successful strategic investment decisions (SIDs):



Sharma (2016), would suggest that innovation has changed and it is now much more customer oriented and "is no longer driven by some individuals alone, rather there are many occasions when it is market-driven".

R&D investment decisions and management in family firms is explored by Kotler et al (2014) with a consideration for both economic goals (mainly profitability) and the non-economic goals of "maintaining family control and influence, family bonds and emotional attachments".
They show that once profitability goals have been attained, increasing "external obstruction to their managerial control" drives family managers to seek to develop new technological knowledge, through increasing R&D investments, in order to regain control over the decision-making process.

Turning to R&D tax relief, according to Mohnen (2015) "the economic justification behind introducing these tax incentives rests on the existence of market failures: spillovers, asymmetric information, inappropriability of R&D benefits, uncertainty and incomplete capital markets, indivisibility of large projects and coordination problems". In a nutshell, as a company is likely to recoup less than they invest, a financial stimulus is necessary to encourage research and development and innovation which, by all counts, are key drivers of economic growth and prosperity.

James Dyson's 2010 report entitled 'Ingenious Britain – Making the UK the leading high tech exporter in Europe' explains how wide reaching the relief is, ie non-industry specific.

"R&D tax credits have the advantage that they seek to help companies that are themselves prepared to invest in R&D. Government does not need to choose sectors or companies, with the result that R&D can be encouraged in the widest possible range of sectors, taking advantage of businesses' own insights into likely breakthroughs."

Whilst the report highlights the importance of R&D tax relief to create the right support to encourage increasing levels of investment in R&D, it also shows that there are many other important pieces of the puzzle to stimulate innovation including, culture, education, exploiting knowledge and financing.

The report also attempts to demonstrate the link between a company's R&D investment, its own success and the positive effects for wider economic growth.

A 2011 PwC report entitled 'R&D tax reform – an economics study' is mainly focused on the Large company scheme however, it gives an interesting 'consultancy' bias or perspective on the relief and offers insights into Board level decision making processes and concerns.

They also demonstrate how (in the best case scenario) for every £1 spent on R&D tax relief or credit, the treasury will earn (or save) an extra £14, through the creation of extra jobs and therefore employment taxes (and the corresponding reduction in benefits), the increase in profits and therefore corporation tax, and the increase in exports and therefore export duty. A specialist R&D Tax Inspector also recently mentioned the same statistics that had been presented to a group of Inspectors at a central HMRC meeting.

Ientile & Mairesse (2009) in their paper 'A policy to boost R&D: Does the R&D tax credit work?' explore the differences in design and the related effectiveness of the 2 main variations, the volume based and incremental based R&D tax relief systems and also explore other lesser evaluated variations for example cooperative research and carry forward and back rules employed by different EU countries.

They show the relationship between the structural econometric approach and the user cost of capital and the BFTB (bang for the buck) principles in terms of measurement approaches to evaluate the effectiveness of fiscal incentives.

As it is difficult to accurately measure the effects of the relief, they do not come to any firm conclusions however, their criticisms are that the incremental based scheme encourages 'stop & go investment' and outsourcing policies and the volume based scheme provides benefit for R&D that would have taken place anyway without the incentive.

In Bond & Guceri's (2012) paper entitled 'Trends in UK BERD (Business Expenditure on R&D) after the introduction of R&D Tax Credits', they explain the complexities and the development of the tax relief over its life and then dive into complex formulae to measure the effect of the tax relief and to model trends in R&D intensity.

The paper concludes that the increase in BERD was both greater and faster than was predicted, however, this could have been caused by numerous reasons and the graphical evidence that is presented only shows very minimal differences.

In most evaluations, including Bond & Guceri (2012), Köhler et al (2012) & Oxera (2006), the effect of the relief is shown by the input additionality or user cost ie the amount of extra investment that takes place for every additional unit of tax saved. This is derived by first estimating "R&D demand equations using a dummy variable for the tax credit or R&D price elasticity" and then applying a complex formula with further estimations and an error factor.

It is therefore not surprising that in the Oxera (2006) study, there was a very wide range of possible results for the user cost of R&D, which was calculated, "depending on the techniques employed, to show that £1 of foregone tax revenue stimulates between £0.41 and £3.37 of R&D investment". The list of reasons they provide for the lack of accuracy include, "causality, instrumental variables, high adjustment costs, choice of control group and relabelling of expenditure".

This lack of accuracy is further compounded by the fact that the amount of relief received is not solely dependent on the level of expenditure, but also on the profit/loss position of the company.

The following example shows the variation of financial benefit received as a company's profit/loss position changes, with an R&D spend of £10,000.

Company year end 31 March 2015 & R&D spend is £10k					
Pre R&D tax adjustment Profit/loss	Tax relief	Tax credit	Future tax relief		Total
£20,000	£2,500.0				£2,500.0
£2,000	£400.0	£1,522.5			£1,922.5
£2,000	£400.0		£2,100.0		£2,500.0
£0	£0.0	£1,812.5			£1,812.5
£0	£0.0		£2,500.0		£2,500.0
-£2,000	£0.0	£2,102.5			£2,102.5
-£2,000	£0.0		£2,500.0		£2,500.0
-£10,000	£0.0	£3,262.5			£3,262.5
-£10,000	£0.0		£2,500.0		£2,500.0

The amount of relief is even more uncertain than this table shows, as the benefit derived from the future tax relief is dependent on future profits, and therefore may occur the following year, or potentially never! Furthermore, the future tax relief is calculated at the current rate of 20% however, this will fall to 19% from 1 April 2017 and to 18% by 2020.

At a recent HMRC presentation, their role in interpreting and applying the relief was described as not an easy task, as the specialist R&D Tax Inspectors have been tasked with the dual role of both policing and promoting the relief.

Policing the scheme means attempting to restrict the benefit of the relief so that only qualifying companies are claiming for the correct amount of expenditure.

Promoting the scheme means raising its awareness and making the process not overly arduous.

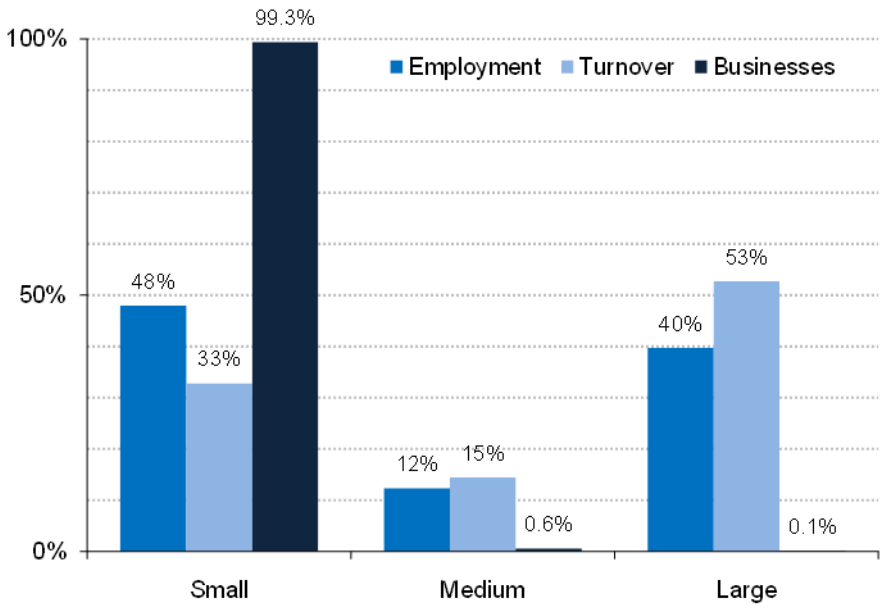
Methodology

Target population and sample size

As at least 80% of all UK R&D tax relief has been claimed by large companies ie those with over 500 employees, it is not surprising that most of the studies conducted so far have been focused on these companies. Also, the studies that have been based on SMEs have focused on those with 100 or more employees.

The majority of clients of RandDTax have less than 50 employees and are deemed 'Small' companies, as per Companies House definition (see appendix 1), and these have formed the basis of my research.

From the Department of Business, Innovation & Skills, Business Population Estimates for the UK and Regions, the share of enterprises in the UK private sector in 2015 is shown on the graph below and demonstrates how important this sector is to the economy:



I spoke with Terry Toms, the MD of RandDTax, and he agreed to firstly allow me to contact all of our clients in order to obtain qualitative data and secondly to look at all the information held on the server concerning R&D tax claims for qualitative data.

I contacted 100% of RandDTax's clients with less than 50 employees and, as we form a close relationship with the MD of our clients, I was hopeful of getting the agreement / cooperation of at least 50%, resulting in over 250 participating companies and believed this was a realistic target.

There are over 5,000,000 UK companies with 50 employees or less and according to unofficial R&D tax industry estimates, about 2% (or around 100,000 companies) are undertaking R&D activities. With a sample size of 250, my results would achieve a 95% confidence level with a 6.2% confidence interval.

Measurables

Q. Is there any evidence to suggest that R&D tax relief has influenced key decision makers in small companies with regard to innovative activities and expenditure?

The tangible measurables I chose to examine for this are whether actual R&D expenditure has risen over the period that the companies have been aware of the relief and whether it has risen more than industry average.

The subjective measure is to ascertain whether any increase has been stimulated by the awareness of the available relief and what opinions are held about the influence and operation / implementation of the scheme.

Q. Is it possible to show any tangible benefits from the participation of 'Small' companies in the R&D tax relief scheme for either the treasury or UK plc as a whole?

The tangible measurables I chose to examine are whether there have been any increases in profit levels (and hence tax income), turnover (a growth indicator), or employment levels

(which reduce benefit payments). I compared the data collected with industry data sourced from the Office of National (ONS).

Primary data

For all companies on the RandDTax server for which there were 4 years of continuous data, I analysed the R&D tax claims and extracted the income, profit, R&D expenditure and the number of people employed who are undertaking R&D activities – see appendix 2.

In order to assess any correlation in the quantitative data collected, I calculated the % difference between the figures from year 4 and year 1 for each company and for staff numbers, staff costs, total R&D spend, turnover and profit and used SPSS assist in the identification of any significant relationships – see appendix 3.

I undertook qualitative research in the form of a questionnaire to all participating companies asking questions concerning their decision making processes in relation to investment decisions and whether the introduction (or knowledge) of R&D tax relief has influenced their behaviour.

I sent a first questionnaire as a pilot exercise to 5 respondents and from the feedback I received, I amended the questions and sent the new form to all the respondents. The questionnaire, responses and summary is in appendix 4.

I also conducted in-depth interviews with the MD, FD and/or Technical Directors of 9 companies to further probe the effect of R&D tax relief on their decision making process, exploring what factors are taken into consideration and how and why the decisions were made.

The results from the questionnaire and interviews were summarised to highlight significant trends – see appendix 5.

I attempted to obtain copies of minutes of board meetings which show indications of how and why R&D related decisions were made.

Secondary data

The ONS was extracted for the 4-year period ended 31 December 2015 and specifically from the ICT and Manufacturing industries.

To compare changes in employed staff levels data from the 'Employee jobs by industry (seasonally adjusted), June 2016' table was used and to compare turnover, data from the 'TOPSI (Turnover and Orders in the Production and Services Industries, April 2016' table – see appendix 6.

Critique

Whilst I was able to obtain data from a reasonable % of our clients, a larger sample size analysed over a longer period of time would make any analysis more robust.

It is possible that increases in expenditure on R&D could merely be the re-labelling of ordinary expenditure as R&D for the purpose of, or driven by, the tax incentive, as opposed to the true effect of the policy.

Whilst it is possible that, with more experience of the tax relief, a company may recognise that more of its expenditure could qualify as R&D expenditure year on year, as the data I analysed is only from the years that an experienced RandDTax consultant had been advising the company, the claims should (in theory) have incorporated all qualifying R&D expenditure in each year. Thereby nullifying the re-labelling effect.

The comparisons made are to data from the ONS and are total industry figures and therefore include companies of all sizes and both those undertaking and not undertaking R&D. In order to know whether any positive effect was the result of the tax relief or of the general improvement in the economy, a comparison would need to be made between the results of the sample firms and those of another (control) group of firms that did not get tax relief.

The ONS figures are taken at the end of each calendar year from 2012 to 2015 and the RandDTax data covers the latest 4 years of claims, with the last year end being between 30 June 2014 & 31 May 2015. The periods therefore do not match entirely however; they are the closest possible.

With regard to the qualitative research, it was evident that many of the top management of our clients were not able to allocate sufficient time resulting in less than 50% responding to offer their support and fewer actually completing the questionnaire that was sent to them.

Many of the positive respondents indicated that their support would be contingent on the questionnaire being short and not too time consuming, and as a result I limited the number of questions to 10.

This lack of time also affected the level of depth that could be explored / reached in my face to face meetings / interviews.

Through these meetings, it was clear that any minutes of board meetings only noted the result of any decision making process as opposed to the reasons behind the decisions, thereby removing this source of information.

It is possible that some of the responses were ‘overly’ favourable towards the relief due to the fact that the questioner was an RandDTax consultant.

Data analysis

For both sets of data, I split the companies into 2 categories – **Manufacturing**, including products, machinery and engineering, and **ICT**, including software developers and those companies whose R&D has been in the area of ICT.

Please note that the results are based on a small sample size and 'outliers' have not been accounted for ie they are still included and play a part in the results.

Quantitative data

R&D staff

From the RandDTax data, the % of companies that have more R&D staff in year 4 than year 1 is in table 1 below and shows that across the board, but especially in the ICT companies, these companies have been expanding their R&D capacity:

Table 1

	% of companies with more R&D staff in year 4 than in year 1
Combined data	65%
ICT	71%
Manufacturing	57%

The two tables below show how the average number of R&D staff employed for all the companies over the recorded period and the ONS data for the corresponding period.

Table 2

R&D staff - RandDTax data – all companies				
	Year 1	Year 2	Year 3	Year 4
Average	5.75	7.06	8.10	8.81
% annual increase	0.00%	22.93%	14.61%	8.82%
% increase from yr 1	0.00%	22.93%	40.88%	53.31%

Table 3

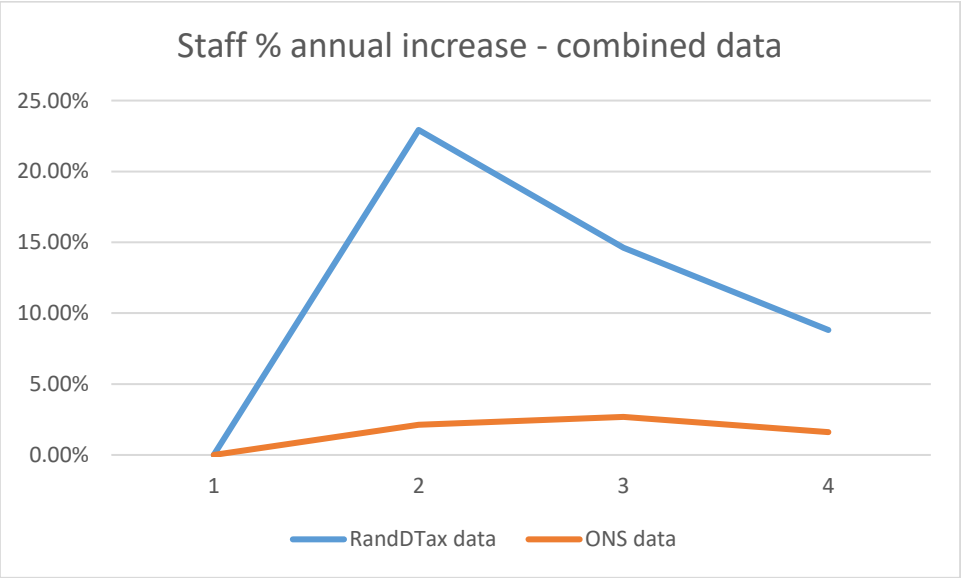
Employees - ONS data from 31 Dec 2012 to 31 Dec 2015				
	Year 1	Year 2	Year 3	Year 4
Total (000's)	3,429	3,502	3,596	3,654
% annual increase	0.00%	2.13%	2.68%	1.61%
% increase from yr 1	0.00%	2.13%	4.87%	6.56%

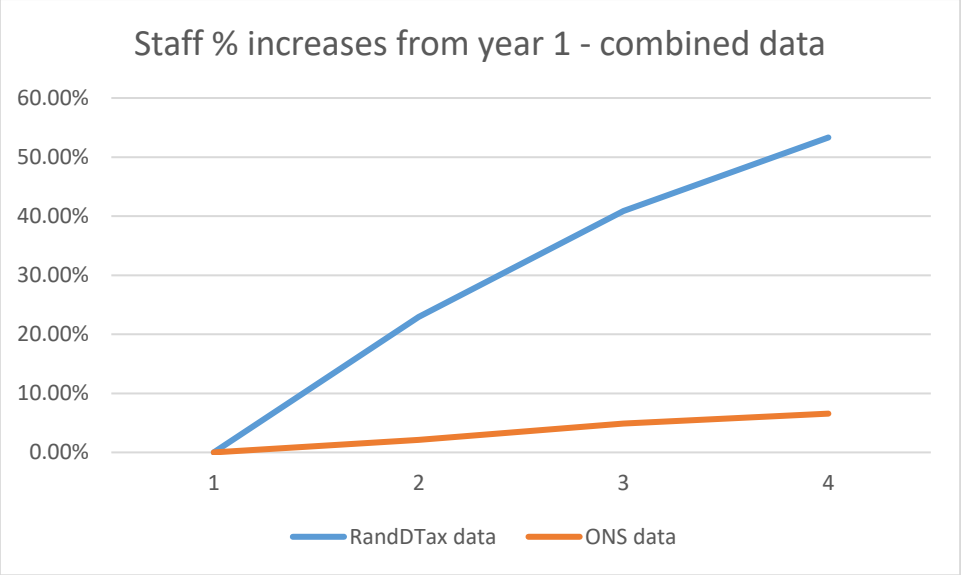
The range of % annual increase from the ONS data is between 1.61% & 2.68%, which is significantly less than the RandDTax data which ranges from 8.82% up to 22.93%.

Whilst for the RandDTax data there may be additional reasons why the first % annual increase is very high, the fact that the following 2 years also show increases in R&D staff numbers far in excess of the industry ONS data is an indication the companies undertaking R&D increase their staff levels more than the national average staff increase.

It therefore follows that the % increases from year 1 will also be significantly higher for the RandDTax data than the ONS data and show a 46.75% difference (53.31% - 6.56%) by year 4.

Graphically, the % differences are:





When this is split into the 2 categories of Manufacturing and ICT the corresponding results are:

Manufacturing

Table 4

R&D staff - RandDTax data - Manufacturing				
	Year 1	Year 2	Year 3	Year 4
Average	7.32	8.21	8.57	9.14
% annual increase	0.00%	12.20%	4.35%	6.67%
% increase from yr 1	0.00%	12.20%	17.07%	24.88%

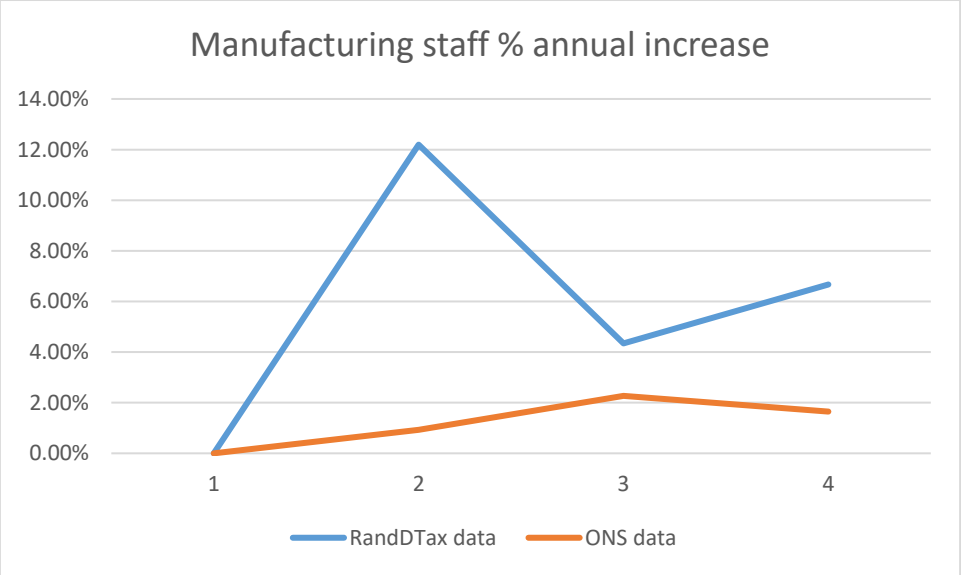
Table 5

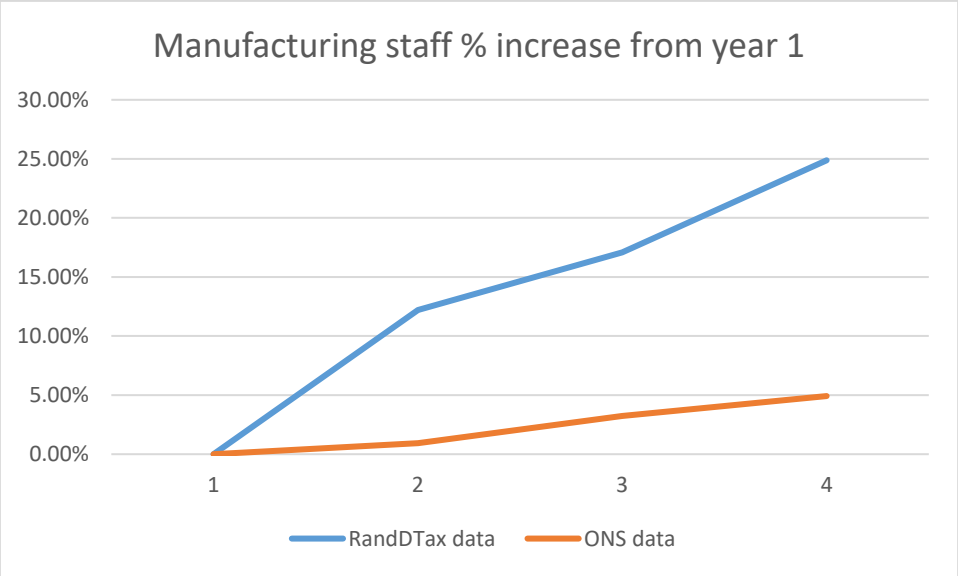
R&D staff - ONS data from 31 Dec 2012 to 31 Dec 2015 - Manufacturing				
	Year 1	Year 2	Year 3	Year 4
Total (000's)	2,357	2,379	2,433	2,473
% annual increase	0.00%	0.93%	2.27%	1.64%
% increase from yr 1	0.00%	0.93%	3.22%	4.92%

Whilst the differences in the % annual increase are less than the combined data figures shown previously, the increases in the RandDTax data are still significantly larger than the ONS data, with the smallest gap still almost double (4.35% compared to 2.27%).

The % annual increases from year 1 are also much larger for the RandDTax data with a difference by year 4 of 19.96%.

Graphically, the % differences are:





ICT

Table 6

R&D staff - RandDTax data - ICT				
	Year 1	Year 2	Year 3	Year 4
Average	4.49	6.14	7.71	8.54
% annual increase	0.00%	36.94%	25.58%	10.74%
% increase from yr 1	0.00%	36.94%	71.97%	90.45%

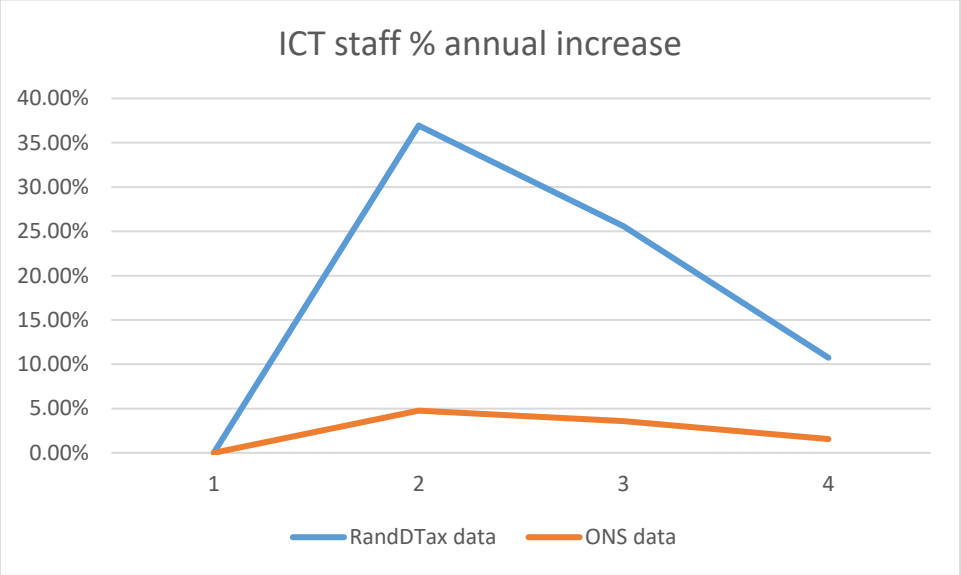
Table 7

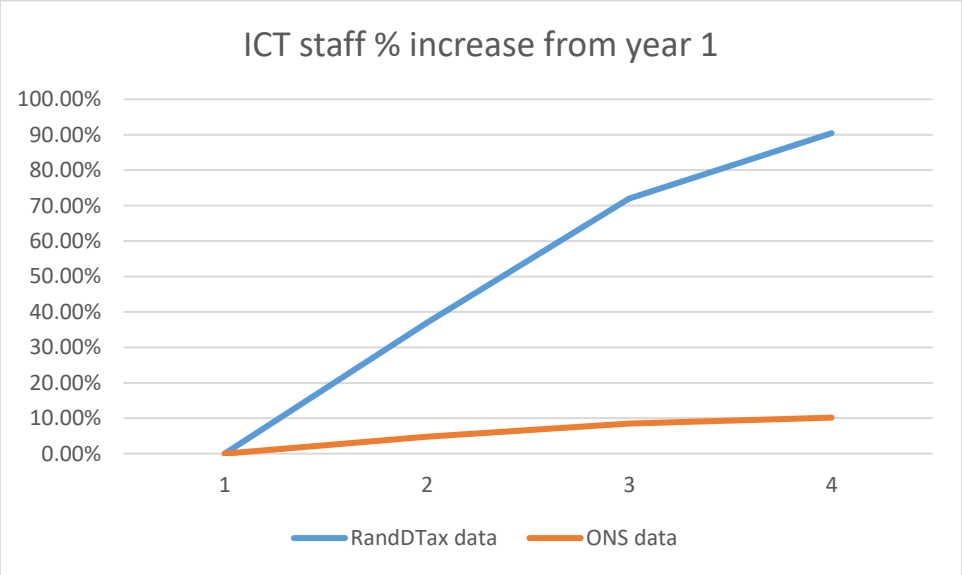
R&D staff - ONS data from 31 Dec 2012 to 31 Dec 2015 - ICT				
	Year 1	Year 2	Year 3	Year 4
Total (000's)	1,072	1,123	1,163	1,181
% annual increase	0.00%	4.76%	3.56%	1.55%
% increase from yr 1	0.00%	4.76%	8.49%	10.17%

The range of % annual increases in the ICT sector is significantly larger for both sets of data however, the RandDTax data once again shows far greater employment growth.

The resulting differences in the % increases between year 1 and year 4 are simply huge, with the RandDTax data showing almost a 9-fold increase.

Graphically, the % differences are:





Turnover

From the RandDTax data, table 8 below shows that across the board, but especially in the ICT companies, the sales figures have been increasing:

Table 8

	% of companies with more turnover in year 4 than in year 1
Combined data	82%
ICT	88%
Manufacturing	75%

Table 9 below shows how the average turnover for all the companies has changed over the recorded period and table 10, the ONS data for the corresponding period.

Table 9

Turnover - RandDTax data – all companies				
	Year 1	Year 2	Year 3	Year 4
Average (£k)	1,285	1,279	1,347	1,473
% annual increase	0.00%	-0.49%	5.35%	9.37%
% increase from yr 1	0.00%	-0.49%	4.83%	14.65%

Table 10

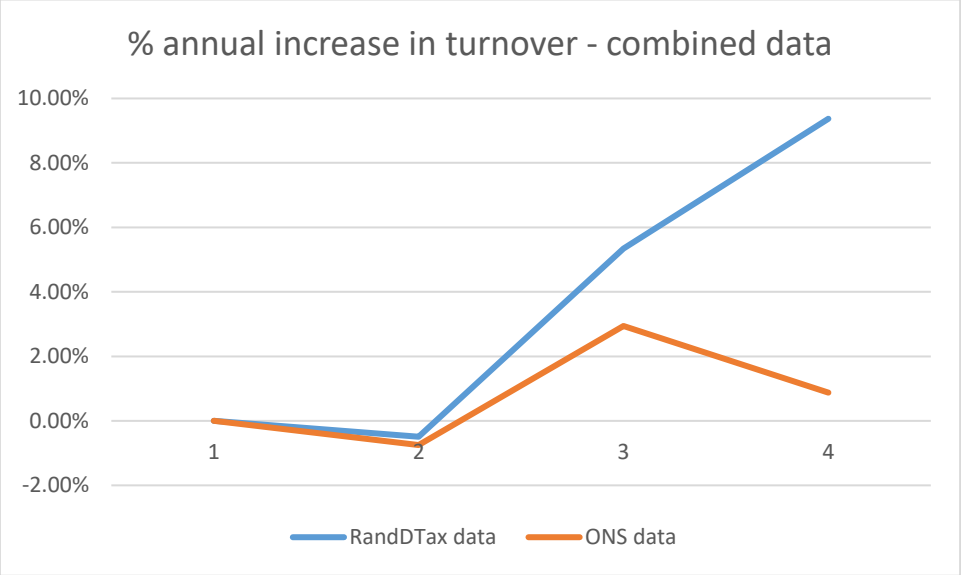
Turnover - ONS data from 31 Dec 2012 to 31 Dec 2015				
	Year 1	Year 2	Year 3	Year 4
Total (£m)	524,265	520,335	535,647	540,364
% annual increase	0.00%	-0.75%	2.94%	0.88%
% increase from yr 1	0.00%	-0.75%	2.17%	3.07%

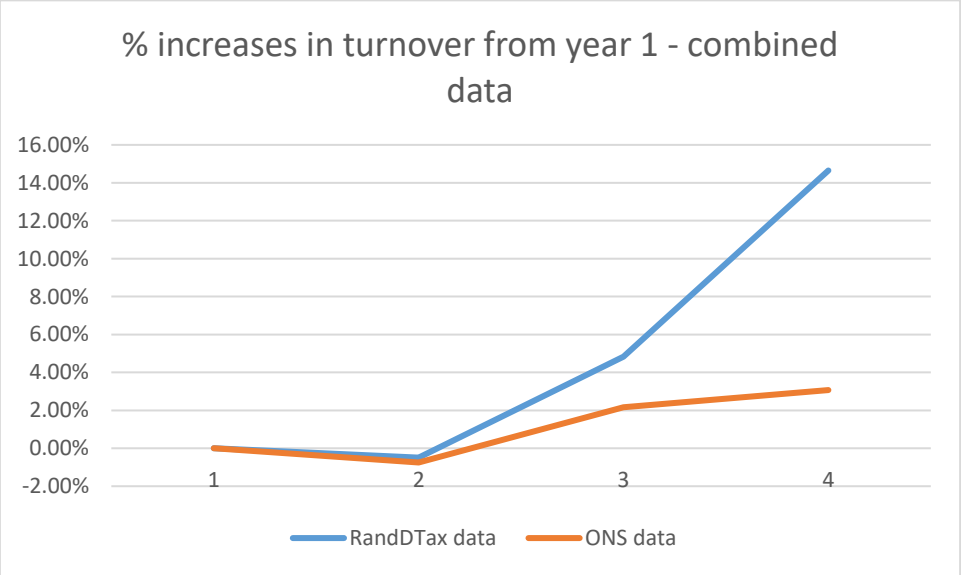
From year 1 to year 2 the turnover of both sets of data fell however, the fall for the RandDTax data was marginally smaller at -0.49% compared to -0.75% of the ONS data.

The subsequent increases for the following couple of years were significantly higher for the RandDTax data, recording increases of 5.35% & then 9.37% compared to the ONS data of 2.94% and 0.88%.

These indicate that the growth of the RandDTax companies was far greater than the industry average and the % increases from year 1 were also significantly higher for the RandDTax data than the ONS data and show an 11.75% difference by year 4.

Graphically, the % differences are:





When this is split into the 2 categories of Manufacturing and ICT the corresponding results are:

Manufacturing

Table 11

Turnover - RandDTax data - Manufacturing				
	Year 1	Year 2	Year 3	Year 4
Average (£k)	1,708	1,619	1,776	1,894
% annual increase	0.00%	-5.23%	9.70%	6.67%
% increase from yr 1	0.00%	-5.23%	3.96%	10.89%

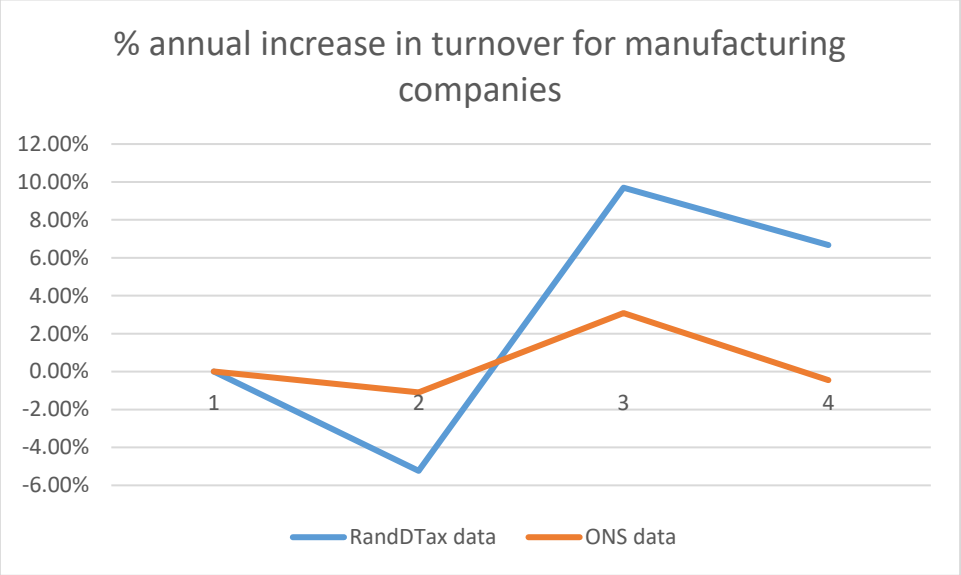
Table 12

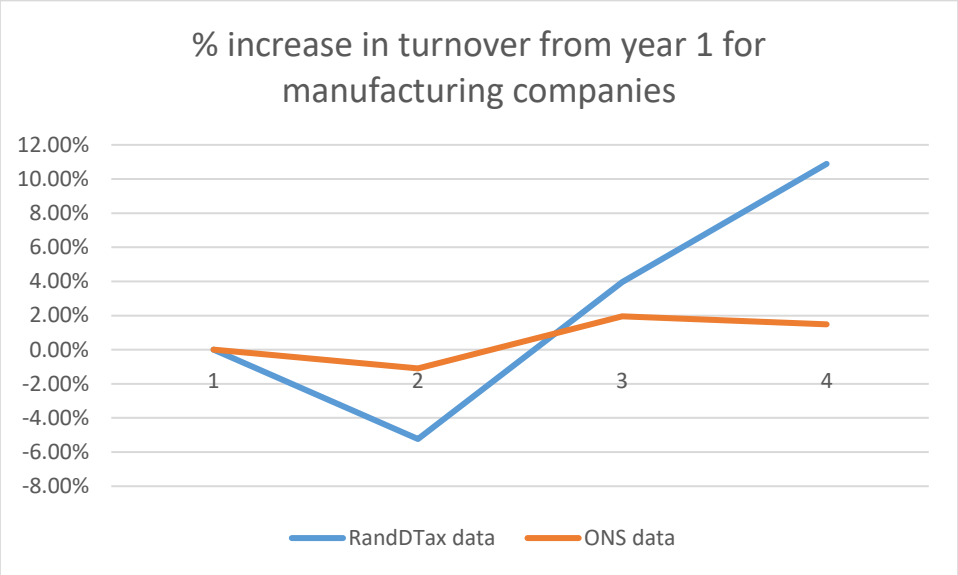
Turnover - ONS data from 31 Dec 2012 to 31 Dec 2015 - Manufacturing				
	Year 1	Year 2	Year 3	Year 4
Total (£m)	393,270	388,954	400,953	399,123
% annual increase	0.00%	-1.10%	3.09%	-0.46%
% increase from yr 1	0.00%	-1.10%	1.95%	1.49%

The first year sees the RandDTax companies' turnover fall 5 times greater than the fall in the ONS data however, the RandDTax results from year 3 & 4 are significantly larger than those for the industry.

This results in the % annual increase from year 1 to year 4 for the industry of 1.49% compared to over 10% for the RandDTax data.

Graphically, the % differences are:





The graphs show that the movement is in the same direction for both sets of data over the period however, the RandDTax data is more exaggerated.

ICT

Table 13

Turnover - RandDTax data - ICT				
	Year 1	Year 2	Year 3	Year 4
Average (£k)	947	1,007	1,004	1,137
% annual increase	0.00%	6.36%	-0.25%	13.19%
% increase from yr 1	0.00%	6.36%	6.09%	20.08%

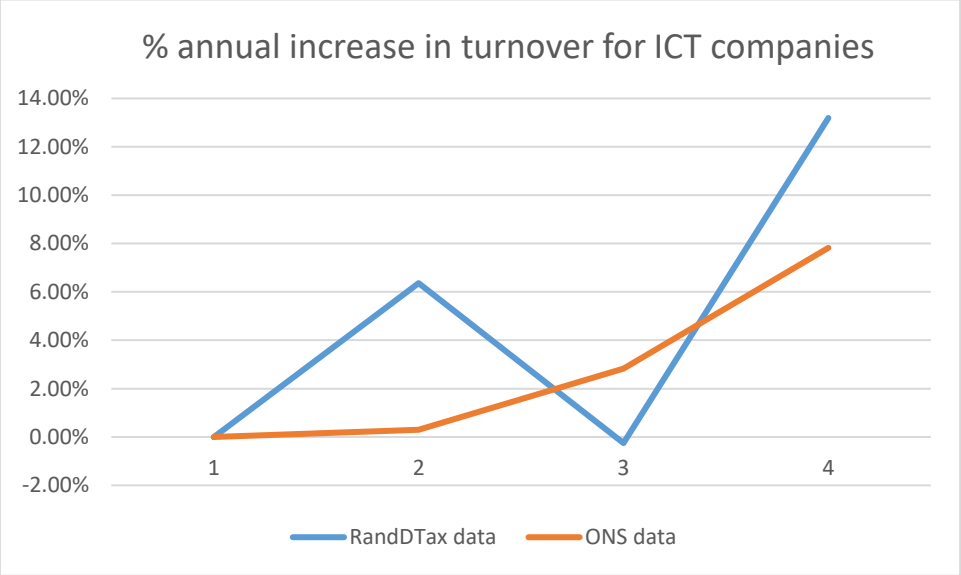
Table 14

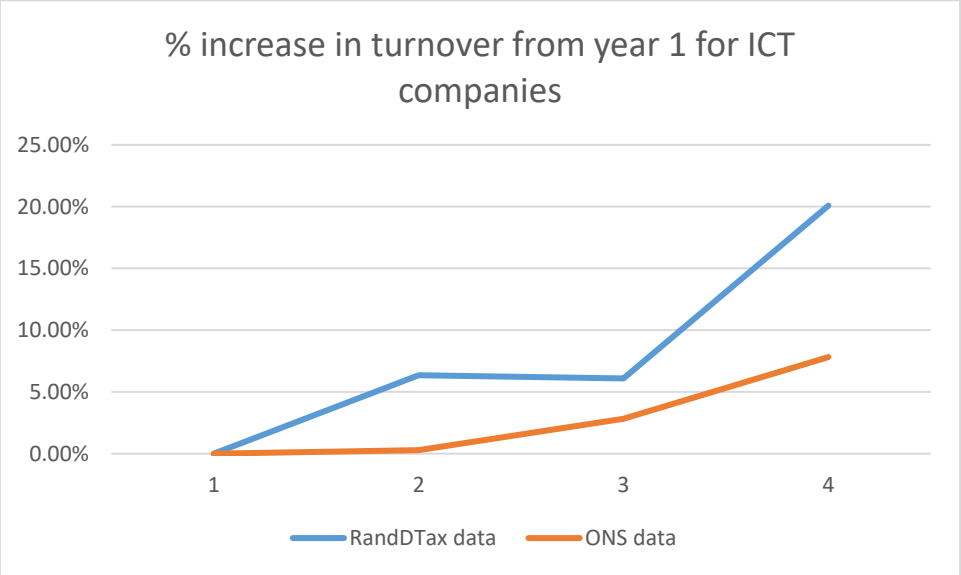
Turnover - ONS data from 31 Dec 2012 to 31 Dec 2015 - ICT				
	Year 1	Year 2	Year 3	Year 4
Total (£m)	130,995	131,381	134,694	141,241
% annual increase	0.00%	0.29%	2.52%	4.86%
% increase from yr 1	0.00%	0.29%	2.82%	7.82%

Apart from a slight dip from year 2 to year 3, where turnover fell by 0.25%, the turnover increase for the RandDTax data is significantly greater than the ONS data.

This resulted in a % increase between year 1 and 4 for the RandDTax data of over 20% whilst the industry average rose only 7.82%.

Graphically the % differences are shown below:





The graphs show more clearly that whilst in year 3 the RandDTax companies lose ground, they always maintain their advantage over the ONS data.

Total R&D spend and profit levels

From the RandDTax data, the % of companies that have more total R&D spend and more profit in year 4 than year 1 are in the tables below, which show that across the board, but especially in the ICT industry, these companies have been expanding their R&D capacity and increasing their profit levels:

Table 15

	% of companies with more total R&D spend in year 4 than in year 1
Combined data	75%
ICT	80%
Manufacturing	68%

Table 16

	% of companies with more profit in year 4 than in year 1
Combined data	75%
ICT	80%
Manufacturing	69%

The changes in absolute figures noted above would suggest a strong link between increasing R&D spend and increasing profit however, when I performed a % change analysis (below), the results were different.

Relationships between the RandDTax data

On SPSS, I obtained the Pearson correlation coefficients by running a two-tailed bivariate correlation for the % changes from year 1 to year 4, for each individual company, for staff numbers, staff costs, total R&D spend, turnover and profit.

Table 16 below shows a summary of the data from appendix 4.

Table 16

Pearson correlation coefficients				
	Turnover		**Profit**	
Staff numbers				
Total	0.560	**	0.386	*
Manufacturing	0.127		0.022	
ICT	0.544	*	0.299	
Staff spend				
Total	0.864	**	0.149	
Manufacturing	-0.268		-0.001	
ICT	0.929	**	0.076	
Total R&D spend				
Total	0.925	**	0.119	
Manufacturing	0.565	*	0.027	
ICT	0.948	**	0.044	
** = Correlation is significant at the 0.01 level (2-tailed)				
* = Correlation is significant at the 0.05 level (2-tailed)				

The results above show strong positive relationships between both R&D staff spend and total R&D spend and turnover, with slightly less positive, but still a significant relationship, between R&D staff numbers and turnover.

There do not appear to be any strong (positive or negative) relationships between the various measures of R&D activity and profit level.

Questionnaire analysis

Summary of the questionnaire responses											
	R&D tax relief reduces the risk?	Invested more?	Will invest more?	R&D influence?		Brought fwd invt plans?	R&D influence?		Invt decision easier?	Invest more if rate goes up?	More staff?
Positive responses											
Total %	86%	55%	84%	78%	b	39%	95%	b	80%	76%	49%
				10%	c		5%	c			
				12%	d			d			
ICT %	86%	61%	89%	88%	b	43%	92%	b	82%	82%	50%
					c		8%	c			
				12%	d			d			
Man'f'g%	86%	48%	76%	63%	b	33%	100%	b	76%	67%	48%
				25%	c			c			
				12%	d			d			
R&D influence: a = totally, b = partially, c = very minorly, d = not at all											

With an 86% positive response, there is resounding recognition that the scheme helps to reduce the risk of undertaking innovative activities.

Whilst only 61% of the ICT and 48% of the manufacturing companies responded that they have actually invested more, a very significant 89% of ICT companies said they would be investing more in the future, and 76% of the manufacturing companies.

The figures for future investment may be quite bullish however, they are more in-line with the quantitative data with the figures being 9% and 8% more than the 80% & 68% shown previously in table 15 (page 28).

However, when asked if they had brought forward any investment plans, only 43% of ICT and 33% of manufacturing companies responded positively.

For the vast majority, the tax relief was deemed to have played a partial influencing role in these decisions, with only 12% responding that it had no influence at all.

82% of the ICT companies thought that the relief made investment decisions easier, with the manufacturing companies not far adrift with 76%.

An equal 82% of the ICT companies (but surprisingly with many different respondents) believed that they would invest more if the rate of relief increased, with a notably smaller 67% of the manufacturing companies.

However, both of these figures are fairly high and would seem to concur with Becker's, (2013), conclusion after reviewing volumes of literature concerning the effect of R&D tax credits on R&D investment, that "One policy conclusion that can be drawn from all of these studies is that fiscal policy measures that reduce the user cost may be expected to increase private R&D expenditure."

A figure that is very surprising, and is in contrast with the quantitative figures in table 1 (page 16) is the number of companies that have employed more R&D staff, with only 50% of the ICT companies compared to 71% shown previously however, the positive response from 48% of the manufacturing companies, more closely matches the 57% shown earlier.

Interview analysis

Whilst I analysed the responses and reached my own conclusions, I deliberately included many direct quotes in order that readers can make their own interpretation.

Face to face, I was able to obtain details behind the responses to the questionnaire questions and then explore in more depth additional contributing factors that influence the decision making process of these business leaders. All comments are anonymous and are

cited below in quote marks. A transcription of all of the responses (grouped by question) are included in appendix 5.

With regard to whether R&D tax relief reduces the risk of innovative investment, there was general agreement to this due to its beneficial financial impact, as indicated in the following comments:

"If commercial risk is viewed purely as level of financial cost, then there is a lower cost given the tax relief available."

"It (tax credits) provides early stage companies with a much needed cash injection each year. As such, it helps reduce the risk of investment by providing additional operating capital which is always welcome."

"Partially, but it is still a risky business as you don't know the outcome when you start or really know what it is going to cost."

"Yes absolutely. With the kind of work we do, R&D can become hugely expensive as many of the technical uncertainties are almost impossible to estimate in terms of time to overcome. This means that we are taking financial risks with R&D which can impact our business."

However, not all agreed that it reduced the risk as follows:

"No, innovative investment is risky by its nature and the tax relief will never reduce this, it simply shares the burden of that risk. A 10% chance of success will still be the same even with the assistance of R&D relief, but it certainly reduces the cost of undertaking such projects."

Whilst agreeing that it reduced the financial risk, "All other risk factors though remain exactly the same."

The question ‘what has the relief allowed you to do?’, elicited responses indicating that the additional funds that are now available have been reinvested in taking their development processes further than they may have done without the relief.

“Makes it an affordable option to try new ideas.”

“Knowing that you will recoup some of the expense of R&D allows you to be more innovative in your projects.”

“The knowledge that R&D relief is available allows us to spend more time at the early stages of a project to properly trial concepts and designs. This reduces the risk associated with carrying out ‘live’ engineering trials when project deadlines are tight.”

“It allowed us to fully develop our products to the best of our ability knowing we could receive funding, which allowed us to take our time and develop the product and other products that run hand in hand with our original product ideas.”

It has also allowed some companies to compete on the global stage.

“We sell a commodity product and cannot compete on price with some international manufacturers. Innovative products open doors for us in larger global companies and it is the way to differentiate our brand in constantly changing markets.”

When asked ‘have they invested any more because of the relief?’, it was initially perceived by some that they had not however, the comment below shows additional expenditure through taking on additional staff.

“We probably haven’t invested more than we would have done, because we have needed to keep our products at the cutting edge and ahead of our competitors. However, it has allowed us to reduce the elapsed time that the innovation has taken, by putting us in a position to take on additional staff, thus improving the employment statistics as well as the speed of our innovation.”

Also, whilst maybe not increasing expenditure, the following comment shows that the relief enabled them to continue at existing levels.

"Probably not as we have been through a difficult few years, but I would say that it has allowed us to sustain some of our R&D through this period that otherwise we might have had to curtail."

Other interviewees were more confident that they had invested more:

"We have invested heavily because of this relief over the past two-three years, by around 30%."

And another by 50%.

When asked 'how has it changed your thinking?', the responses show that the relief has created or enhanced the natural exploratory tendencies of small business owner managers and benefitted our international competitiveness.

"We are far more inclined to suggest and trial new ways of carrying out our designs, and implementing new ideas."

"I would say without tax relief, companies like us are more likely to 'play it safe' in terms of the complexity of work they take on, and less likely to innovate and take on work in the category of 'advanced manufacturing.' In a place like the UK this would represent a major risk to our global offering versus overseas suppliers, as UK engineering companies typically offer high flexibility, high complexity, but lower volume manufacturing."

"We were always looking for new ways to do things, and the R&D relief has given us more incentive to find these routes."

Whether ‘R&D tax relief has played a role in the decision making process?’, produced a mixture of responses, but highlighted that confidence, financial stability and commercial pressures were key factors driving decision making.

“Yes, we have decided to develop a whole new product as a result of this, which we may not have done without the governments assistance on R&D tax relief.”

“Yes, or at least committed ourselves to our investment with much greater confidence.”

“It makes the decision to innovate easier to make with more certainty of financial stability for the company whilst the innovation is under way.”

“I would say it’s slightly accelerated plans but marginally.”

“This is not the driver – commercial pressures force continued investment.”

“It probably hasn’t changed our behaviour.”

These last three show the potentially minor role that the relief plays for some companies.

Exploring the level of influence that the relief has had regarding their investment decisions, in-line with the questionnaire data, the overwhelming response was partial, due to the financial benefit however, they all appreciate that they need to innovate to survive.

“Partial – we would have invested anyway, but we can factor in the R&D tax relief to increase the total amount we invest.”

"Partial - we would do the R&D work anyway, regardless of tax relief, because we are passionate about what we deliver and want to be the ‘best’. However, it has certainly relieved the pain of keeping the business going whilst doing great innovative work.”

“Partial - in that some of this investment would have been necessary anyway to remain competitive.”

The responses to the question ‘has the relief made investment decisions easier to justify?’ showed that it produced less stakeholder resistance to bearing the financial and development risks of innovation.

“Yes much easier, as it gave us the confidence to keep investing in our project to ensure all of our design features were realised.”

“Yes, in an indirect way we can afford to take some risks that we may not have taken previously.”

“The difficulty of making any one decision remains the same, I think. However, it makes some decisions easier to approve.”

I then explored ‘what factors affect their decision making process?’ and the responses indicated that the potential for financial gain by satisfying customer demand were the most significant reasons however, the stability of the economy and general level of business confidence were also important.

“Money of course, but mainly our customers seem to love the new ideas and plans we have, so help us to continue to grow whilst being innovative.”

“Our decisions are really made on the basis of earning new business or increasing existing business, we can only afford to invest where we are reasonably confident of increasing turnover and then profitability.”

“Cash flow, industry confidence and stability, customer demands.”

“The most important criteria are (a) scale of business opportunity that might be potentially derived from the innovation, including competitive advantage (b) cost of developing the innovation, and (c) the risks and potential for success, taking into account the wider economy.”

‘How could the scheme have more influence?’, raised issues of the certainty of the future availability of the relief, the consistency of its interpretation and application by HMRC’s Inspectors, the level of administrative burden and the monetary value of the benefit.

“If we could be assured of continuing relief we would take on dedicated personnel.”

“It would reduce the risk further if you could be certain that the criteria for R&D was being met, it would not change and that all departments within HMRC were applying the criteria in the same manner.”

“As with most forms of funding, there are many hoops to go through to ensure that a company receives their money, and for small companies with limited human resource, this can be daunting. I certainly know of a couple of companies who are not claiming because of this.”

“It is one of the factors that helps the business being viable and worthwhile. But, although very welcome, I don’t think that the level of relief is high enough to be a determining factor.”

The question, ‘would an increase in the rate of relief influence your level of investment?’ produced completely opposing responses, with the slight majority of negative ones in contrast to Becker’s policy conclusions stated previously on page 31.

“Potentially yes, as the reason we innovate, is because without innovation our company would become less competitive, lose customers, and wither and die. Enabling us to innovate faster with the knowledge that it is not such a financial burden is the key for us.”

“Yes – as the business is built on innovation, if we can afford to invest more we will do.”

“No - the same level of innovation would be required regardless of the R&D Tax relief to remain ahead of competitor activity.”

"No – we have a planned budget and would only invest more if we saw a specific market opportunity."

"No, but it would make the investment easier and less difficult to get approval."

The responses to 'have you brought forward any investment plans?' highlighted the positive benefit of the relief essential in the rapidly evolving global market place.

"The funding allowed us to develop our product over 3 years rather than the 5 to 7 years we had anticipated, to allow us to spread the costs to develop and manufacture our prototypes."

"Yes, since it has strengthened our whole innovation programme."

The responses to 'have you recruited more R&D staff?' were much more in-line with the quantitative data than the questionnaire responses and indicated that most had either taken more people on, or would be likely to in the future, or are increasing the level of subcontractor input.

"We have hired two new senior developers over the last 9 months for that reason with a view of hiring more over the next 12-18 months."

"No, at the moment we have fully developed our product, however when we move onto our next project should funding still be available then we would definitely consider taking on more R&D staff to undertake the project."

"We recruited a head of product development and increased our investment in these activities significantly since learning about R&D tax relief."

"We have recently employed an industry recognised expert to undertake some product development for us however, he is not an employee and his work will be invoiced through his company."

Conclusions

With regard to the comparisons made between the RandDTax data and the industry averages, albeit that with a larger data set analysed over a longer period of time, the results would be more robust and reliable, I believe that as both the employment levels and turnover levels for the RandDTax figures (by the end of the 4-year period) are significantly higher than the ONS figures, they are indicative that the influence of the relief creates a benefit to the Treasury, by increasing employment taxes and reducing benefit payments, and to UK plc, through the creation of increased levels of intellectual property.

Short term profit movements are difficult to interpret and conclude upon because if a company in increasing its R&D activities, it will be increasing its expenditure and the likely short term effect would be a reduction in profit, until sales rise sufficiently to increase the profit level. Hence the necessity for R&D tax relief to bridge the gap and encourage companies to take the risk to invest in innovation.

The qualitative data suggests that the relief has increased the speed of the decision making process ie accelerated investment plans and, in some cases, increased the level of expenditure and hence the depth of R&D undertaken, resulting in better researched and ultimately better products, services, systems and processes as a result. These enhancements have also been brought to market in a timelier fashion, which in our increasingly complex and fast changing world, is essential for their success.

Together with this, in some cases the relief has encouraged the continuation of projects that otherwise may have fallen by the wayside.

As well as the financial impact of the relief, I believe there could also be a psychological effect whereby, if it is perceived that what you are doing is worthwhile, evidenced by the fact that your government is willing to incentivise you to do it, and internationally respected business leaders like James Dyson are repeating the same message, then you are more likely to continue that behaviour and perhaps increase your commitment and involvement with it. This could be an interesting area for further investigation.

Recommendations

Due to commercial pressures, the interviewee's time was fairly limited however, as I believe that this part of the project was key to obtaining a deeper understanding of the decision making process and the factors that are taken into consideration, further research could be performed on a wider range of respondents, with more time spent with each one.

As I mentioned before regarding including significant amounts of the interviewee's comments, whilst I have drawn my conclusions, a more experienced researcher could firstly have gained a deeper understanding through more insightful questioning and secondly been able to analyse the data more thoroughly.

There was significant positive feedback about the relief and whilst it may not be a primary reason for investing more in R&D, its positive financial impact facilitates the decision making process. However, there were also comments concerning the lengthy or arduous process of making a claim which would naturally reduce the positive financial impact.

This is especially relevant for micro companies with limited resources (both financial and human) and in fact throughout my years of being an active R&D tax consultant, I have met many qualifying companies who have decided that they simply do not have the available resources to allocate anyone away from the 'front line' to collate the information required to make a claim.

A recommendation could therefore be to simplify the process for the smallest companies to encourage greater uptake of the scheme.

Other comments suggested that if the continuity of the relief could be assured, this would increase the level of confidence and certainty and lead to increased investment.

Also regarding certainty, as the application of the relief is by individual HMRC Inspectors and their individual interpretation of the rules and regulations. This interpretation can be different from unit to unit and from Inspector to Inspector and can lead to inconsistencies which create uncertainty, which increases the risk and could ultimately reduce the level of investment.

This research report seems to suggest that the original aim of the relief, to encourage innovative activities, is being achieved and that this fiscal measure should continue in operation for the foreseeable future.

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Appendices

Appendix 1 Small company definition

Appendix 2 R&D Tax data – 4 years – Analysis and summary - Full data on soft copy

Appendix 3 Correlation data and SPSS output

Appendix 4 Questionnaire, analysis and summary – Full data on soft copy

Appendix 5 Interview questions and responses – Full data on soft copy

Appendix 6 ONS data and analysis – Full data on soft copy

Appendix 7 Ethical checklist