

Regularly Supported Firms and the “Wage Equation”

The economic benefits of public sector R&D are captured in a 2014 report by Haskel, Hughes and Bascavusoglu-Moreau. This paper states that the quantifiable economic impact of public R&D is **channelled through businesses with whom they are working** (A business corresponds to a Companies House reference number).

As part of NPL’s work to develop a whole systems model for the UK’s Measurement System, we have been able to determine the value of **NPL’s direct economic benefits channeled through the private sector**. This doesn’t include benefits channelled through the public sector and non-monetisable societal benefits (Public Health, Environmental and Security).

How we measure the NPL’s direct economic benefits channelled through the private sector is through **Regularly Supported Firms (RSFs)**:

“Support” is defined as either **collaborating** with NPL through R&D or **payment** for NPL’s services.



The “RSFs” are those who were **supported** for at least **five years within a six-year period**

It should be noted that “collaborators” and “paying customers” do have **different relationships with NPL**. Paying customers tend to be **longer-term partners** with a level of brand loyalty, often due to being functionally dependent on NPL’s services. In comparison, collaborators are focused on specific innovation projects, meaning that the continuation of such relationships are dependent on follow-up projects.

These RSFs see a **net-additional increase in productivity** through **employment and wage growth**, as detailed in Nayak et al (2022).

Wages are only one of the three elements that comprise a firm’s Gross Value Added (GVA), the other components being **profits for the owners of capital (Investors)**, and **taxes paid to HMRC**, which is calculated from the “**extra wages**” detailed below:



During 2022, NPL had **404** UK-based RSFs



Each of these firms grew by **~6.3 employees each year** due to support



The benefits going to supported firms, **endure for around six years** (discounted due to time preference - **5.12**)



On average, employees who switch to one of these new jobs see their **annual wage increase by £4,080**

Using these numbers, **extra wages** is calculated as follows, with total benefits calculated in subsequent steps:

$$\text{“Extra Wages”} = \frac{404}{\text{No. of RSFs}} \times \frac{6.3}{\text{Employment Growth at RSFs}} \times \frac{5.12}{\text{Lifetime of benefits (discounted)}} \times \frac{£4,080}{\text{Wage Premium for job switchers}}$$

Step 1

Evaluating the above equation, the “extra wages” (labour productivity) is **~£53.2 million** per annum. These benefits are only those received by the workers themselves.

Step 2

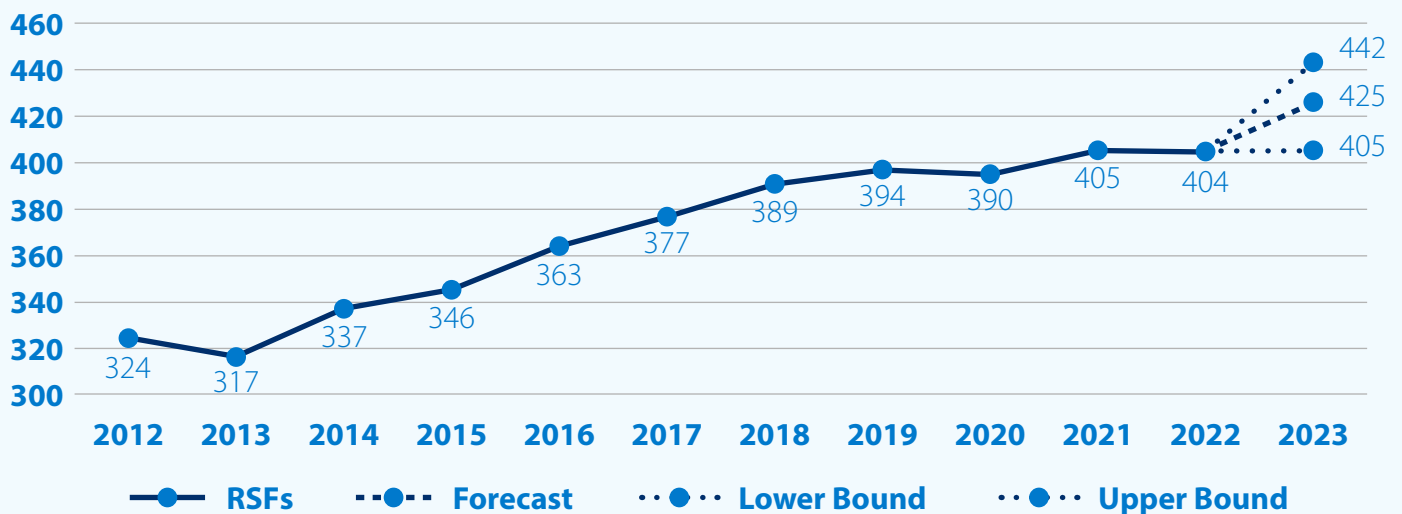
Both the **taxpayer** and the **investors** see the **same amount of benefit as workers**, implying a flow of direct economic benefits amounting to **~£160 million**. (from Olakojo et al (2022))

Step 3

Indirect benefits from the diffusion of technological knowledge are **typically twice that of the direct benefit** to the original innovator. A lower bound for the total benefit (direct plus indirect) is **~£480 million**.

The numbers detail above are all constants apart from the RSFs' number, which fluctuates year-on-year. NPL can also generate a one-year forecast for this number which has been proven to be accurate in the past (MAPE of 2.46%), as detailed below:

Regularly Supported Firms - 2012 to 2023*



NPL's impact **remained flat last year (2022)**, following a period where there was a slowing in the rate of increase of RSFs. Between 2015-2018, the average yearly growth rate of RSFs was **4%**. This subsequently fell to **1%** between 2019-2022. There are both internal and external reasons for this. Internally, needed reform was undertaken, involving a portfolio-rebalancing exercise. This was likely to have had a short-term effect on RSFs.

Externally, there are two main reasons. First, the Higher Education Institutions budget flat-lined between 2010 - 2017 (after accounting for inflation). This likely impacted the broader science base for several years, both during and following this period of fixed funding. Second, the COVID pandemic in 2020 compounded the aforementioned effect, leading to the first year of decline in RSFs since 2013.

However, following these reforms, a small increase between 2020-2021 was seen and a **notable increase has been forecasted in 2023**. However, this may lead to a decline in regular support levels in future years due to the **natural churn of supported companies**. In order to keep regular support numbers high, there must be sustained instances of support.

For further information, go to: npl.co.uk/government/evidence-of-impact

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This work was funded by the UK Government's Department for Science, Innovation and Technology (DSIT) through the UK's National Measurement System programmes.

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References:

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[2] Dias, C. and King, M. (2023). <https://eprintspublications.npl.co.uk/9634/1/IEA13.pdf>

[3] Haskel, J., Hughes, A. and Bascavusoglu-Moreau, E. (2014). <https://spiral.imperial.ac.uk/bitstream/10044/1/13751/2/Haskel%202014-04.pdf>

[4] Nayak, S., Olakojo, S. and King, M. (2023). <https://eprintspublications.npl.co.uk/9682/1/IEA17.pdf>

[5] Olakojo, S. and King, M. (2023). <https://eprintspublications.npl.co.uk/9681/1/IEA15.pdf>