

Making the case for a UK industrial strategy

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- **After the disastrous experience of the 1960s and the 1970s, the phrase ‘industrial strategy’ was banished from the UK political lexicon**
- **But with the UK falling further behind many of its peers in recent years it is time for a rethink**
- **One of the few things on which economists are able to agree is that the social returns to R&D spending are immense, and far outweigh the private returns, creating a strong case for government intervention**
- **One of the simplest ways for the UK government to encourage greater spending by the private sector on R&D is to spend more itself**
- **We call on the UK government to get substantially more ambitious when it comes to encouraging R&D**
- **Funding should be channeled towards those sectors where we already have a comparative advantage: not just aerospace, but other high-tech manufacturing, including pharmaceuticals, telecommunications equipment, and other vehicle manufacturing**

The UK experience of designing an industrial strategy is not a happy one

According to Dani Rodrik, Professor of International Political Economy at Harvard University, industrial policies are policies that:

“... stimulate specific economic activities and promote structural change.”¹

In implementing an industrial policy, a government is intervening to steer the economy away from the outcome which would have obtained in a world where unregulated markets (including markets for credit, labour, and goods and services) were left to determine the allocation of scarce resources.

When it comes to designing an industrial strategy, from which industrial policies might flow, the UK experience is not a happy one. Despite a brief resurgence in the late 2010s during the May administration, the phrase ‘industrial strategy’ has been taboo in UK policy circles more or less since the election of Margaret Thatcher in 1979. The reason is the abject failure of UK industrial strategy before that time, and particularly during the 1960s and the early 1970s. There were many factors behind that failure, but one can be singled out; the power of the union movement over the government led to choices of ‘winners’ that were essentially those sectors that employed the largest number of union members. In the case of the UK, that was

The UK industrial strategy of the 1960s and the 1970s was a disaster —by focusing on maximising employment in heavy industry it undermined productivity

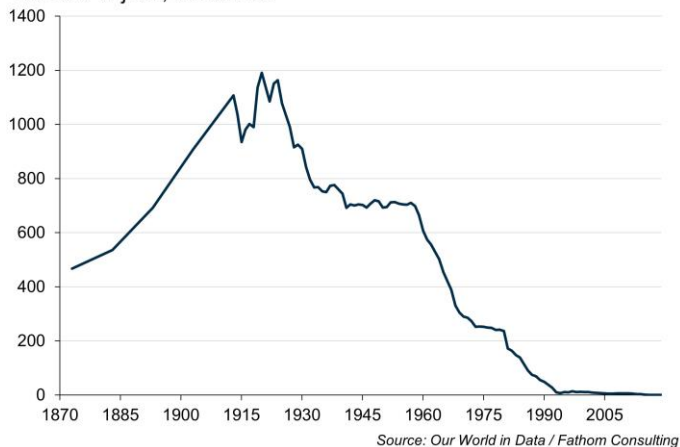
1. See Rodrik, D. (2019), ‘Where are we in the economics of industrial policies?’



mining, shipbuilding and car-making — heavy manufacturing industry. The 'strategy' was to protect employment in those sectors through nationalisation or government subsidy. The impact of that strategy was to radically undermine incentives in those sectors, transforming them from world-leading industries to basket cases in the space of a couple of decades. One of the paradoxes of economics is that, if you set out to maximise employment at all costs, you end up wiping out employment almost entirely. During 18 years of Conservative government, beginning with Margaret Thatcher in 1979 and ending with John Major in 1997, the number of people working in the UK coal industry went from a quarter of a million to almost zero. Likewise, shipbuilding in the UK more or less came to an end.² The car industry has survived, though all UK employment in that sector is in foreign-owned companies. The strategy was a disaster. The purpose of this note is to make the case for a new industrial strategy: one focused on boosting productivity rather than protecting jobs.

UK employment in the coal industry

Number of jobs, thousands



The UK is falling further behind its peers

When looking at the performance of the UK economy, particularly in the context of some of its peers, one can certainly make a case that something should be done. By 2021, a person working for an hour in the UK would, on average, produce 21% less than a person working for an hour in the US, 13% less than a person working for an hour in Germany, and 11% less than a person working for an hour in France. Moreover, things have not been moving in the right direction. Labour productivity in the UK has been declining relative to the US for the past 20 years, and relative to Germany and France for the past 10 years.

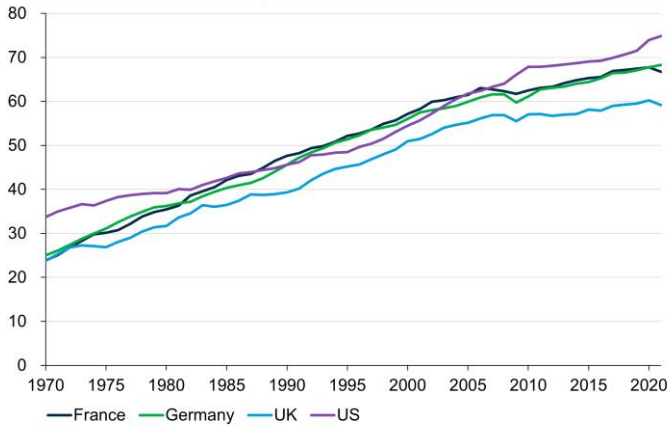
The UK is not just less productive than many of its peers, it is moving in the wrong direction

2. From the perspective of economic efficiency, that was probably the right outcome. But the laissez-faire approach of the Thatcher administration meant that little attempt was made to help those who had lost their jobs find alternative employment. Unemployment rocketed, and with the failing industries located almost exclusively in South Wales, in parts of Scotland, in the Midlands and Northern England, those parts of the UK bore almost all of the pain.



Output per hour

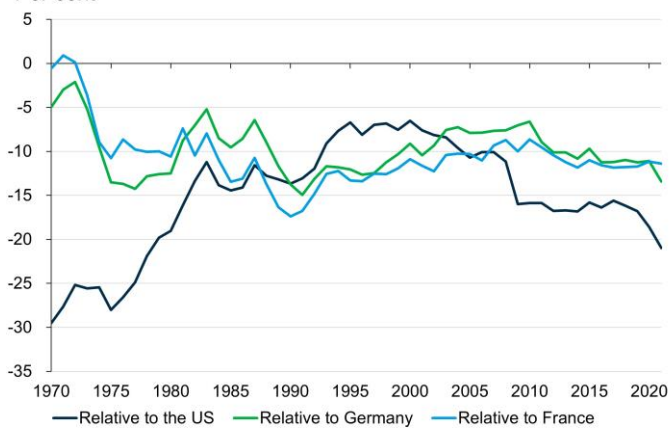
PPP USD, constant 2015 prices



Source: OECD / Fathom Consulting

UK output per hour relative to other countries

Per cent



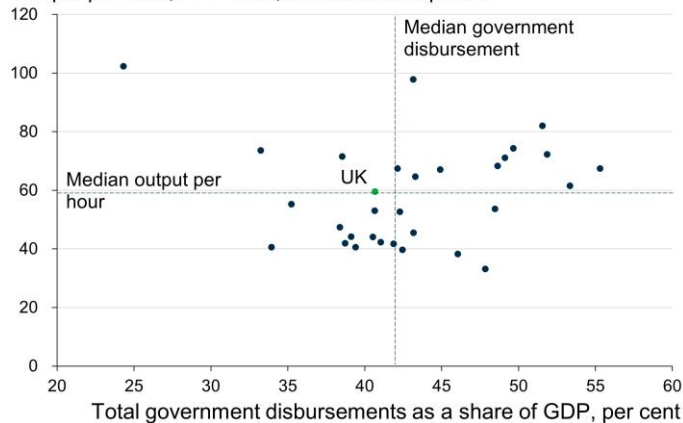
Source: OECD / Fathom Consulting

But is more government spending the solution? Surely a small state is good, right? That at least was the view of last year's short-lived Truss administration. We can quickly put that canard to rest. Looking across the OECD economies, there is pretty much no relationship between the size of the state, represented by total government spending as a share of GDP, and labour productivity, as our chart below makes clear. In truth, increased government spending is likely to raise labour productivity if it is spent wisely, and vice versa.



Size of government and productivity, 2019*

Output per hour, PPP USD, constant 2015 prices



*All OECD economies for which data are available

Source: OECD / Fathom Consulting

The social returns to R&D are immense

What is the function of government within an economy? What is 'wise' government spending? Putting to one side redistribution from rich to poor, which most governments perform to some degree, and the provision of public goods such as defence, economics textbooks tell us that the state should intervene only to correct inefficiencies that might otherwise arise when markets are left to do their own thing. Two common causes of these inefficiencies are imperfect information, which might leave certain individuals unable to obtain insurance, or unable to obtain credit, and externalities. There is a negative externality when a cost spills over to a third party, there is a positive externality when a benefit spills over to others in society. Pollution is an example of a negative externality. When airlines do not have to compensate those left on the ground for the environmental damage caused by their CO2 emissions, the cost of a flight will be 'too low', and the amount of flying that takes place will be 'too high'. This makes the case for carbon taxes.

However, there are example of positive externalities too. In the context of industrial strategy, there are important positive externalities in the so-called 'spillover benefits' that flow from research and development (R&D) spending. Knowledge that is acquired by a firm carrying out R&D rarely stays within that firm. Instead, it will tend to spill over to other firms in the same industry, to other industries, and even to other countries, as new ideas are copied and perhaps improved on, whether legitimately or otherwise.³ Occasionally, products developed for a specific, limited purpose within a single industry, will turn out to have a much broader range of uses, often in other industries — another form of 'spillover'. The Global Positioning System (GPS) originally developed by the US Department of Defense for the exclusive use of the US military is now available as a navigation aid, free of charge, to civil aviation, merchant shipping, the car industry, and the world's six billion or more smartphone users. Through a process of spillovers, R&D spending benefits society as a whole far more than it benefits the firm carrying out the R&D. Without government intervention 'too little' R&D will take place.

Substantial positive externalities to R&D spending create a strong case for government intervention

3. Writing in 1675, Isaac Newton described the process of innovation, with each new discovery building on previous research, as like "standing on the shoulders of giants".



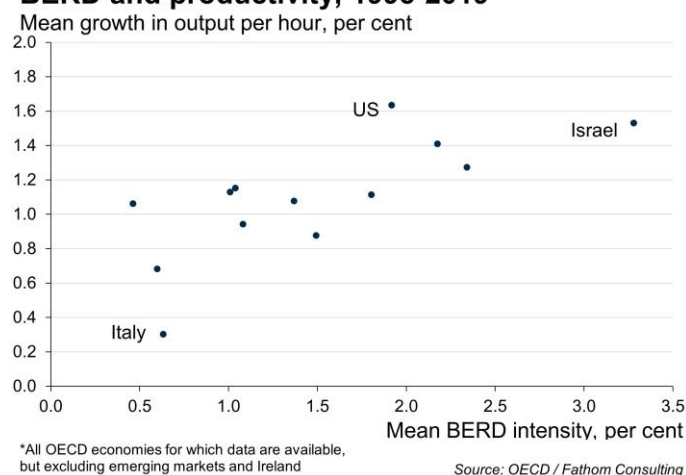


Beginning with the work of Griliches (1979), there is now a substantial literature that seeks to measure, in a variety of different ways, the economic impact of R&D spending.⁴ A survey by Hall et al. (2010)⁵ summarises the findings of more than 100 empirical studies. Looking at only those studies that allow the rate of return to R&D to be calculated directly, the median own-industry return was found to be 19%,⁶ the median return to other industries within the same country was found to be 31%, and the median return to other countries was found to be 29%. Summing across these three sources of return, the social return to R&D spending could be as high as 80%, perhaps an order of magnitude greater than the private return, creating a very strong prima facie case for government intervention.

The social returns to R&D spending are perhaps an order of magnitude greater than the private returns

Within the literature, it is often assumed that the social benefits of R&D spending do not diminish over time. Once an idea has been developed, it cannot be unlearned. The wheel is just as useful now, as when it was first discovered. If that is the case then it can be shown, algebraically, how an economy's rate of growth will be proportional to its R&D intensity — the share of R&D spending in GDP. The greater this share, the faster the economy will grow. Looking across the major economies, we find some evidence for this. In the chart below, the correlation between a country's average business enterprise R&D (BERD) intensity between 1995 and 2019 and its average annual rate of growth of output per hour over the same period was 0.73.^{7,8}

BERD and productivity, 1995-2019*



4. Griliches, Z. (1979) 'Issues in assessing the contribution of research and development to productivity', *The Bell Journal of Economics*, Vol. 10, No. 1, pages 92-116.
5. Hall, B., Mairesse, J. and Mohnen, P. (2010) 'Measuring the returns to R&D' in Hall, B. and Rosenberg, N. (eds.) *The Handbook of the Economics of Innovation*, Vol. 1.
6. The own-industry return is a measure of the increase in output across an industry resulting from R&D spending carried out in that industry. It conflates both private, and within-industry spillover benefits.
7. Business enterprise R&D (BERD) is expenditure on R&D carried out within the business sector, regardless of the source of funding. The broader concept of gross expenditure on R&D (GERD) includes expenditure on R&D carried out in higher education establishments, in the private non-profit sector, and in government, again regardless of the source of funding.
8. We exclude Ireland from the analysis, along with all emerging economies, which tend to benefit more from R&D carried out elsewhere and have less incentive to carry out their own. Since 1995, output per hour in Ireland has grown at an impressive average annual rate of 3.6% despite Ireland having a relatively low R&D intensity of just 0.9%. Ireland's labour productivity statistics are flattered by the inclusion in Irish GDP of profits earned by a number of multinationals, including Microsoft, who have regional headquarters in that country. Those profits reflect, to a great extent, the proceeds of economic activity carried out elsewhere.



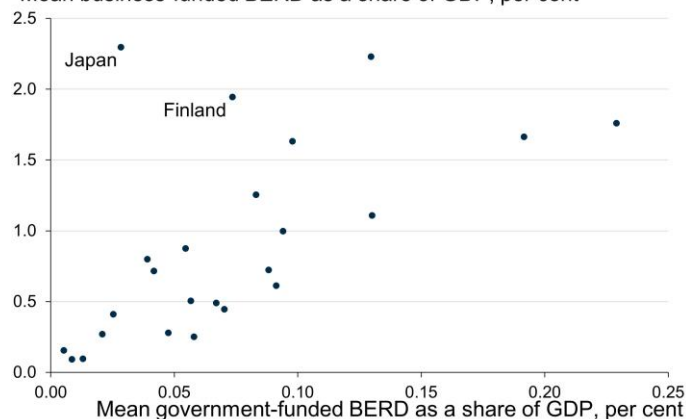
A naïve interpretation of this finding might be to suggest that a country devote all of its resources to R&D activity. If a country's rate of growth truly is proportional to its R&D intensity, then why not? The answer, of course, is that there are almost certainly diminishing returns to R&D spending — estimates of the returns to R&D contained in the literature are not separate estimates of an unknown constant. Instead, they will depend on the circumstances of the firm, the industry and the country at the time. Our own work suggests that the returns to R&D spending are maximised when a country's R&D intensity is somewhere in the range 4.0–7.0%. Looking across 37 OECD economies in 2019, just one country, Israel, was inside that range with an R&D intensity of 4.6%. The UK's R&D intensity was a modest 1.2%.

How might the UK government encourage greater R&D activity within the UK business sector? There are many different ways, but perhaps one of the more fruitful would be simply to finance more of that activity itself. In a recent study, Moretti et al. (2019)⁹ looked at the relationship between government financing and business-sector financing of R&D carried out in the business sector. They find strong evidence of 'crowding in'. That is to say, when the state spends more on R&D, so too do private firms. A clear, positive correlation between state and private-sector funding of BERD can be seen in the chart below. Japan, and to a degree Finland, are outliers, with very high levels of private-sector funding of BERD despite relatively low levels of state funding. If you remove Japan and Finland from the sample, the correlation rises from 0.63 to 0.82. The 'crowding in' result suggests there are significant economies of scale in undertaking R&D. The more the government invests, the cheaper it becomes to carry out R&D, and so the more the private sector invests.

It is sometimes argued that government investment in fixed capital 'crowds out' private investment. This does not apply to R&D spending, where increased government spending 'crowds in' private spending

BERD by source of funding, 1995-2019*

Mean business-funded BERD as a share of GDP, per cent



*All OECD economies for which data are available

Source: OECD / Fathom Consulting

We should focus on what we are good at

If the UK government wanted to improve the productivity of UK workers by using public money to encourage greater R&D, where should it focus its efforts? Writing more than 200 years ago, the Scottish economist David Ricardo argued that a country should focus on whatever it is comparatively good at — the theory of comparative advantage. Fathom has constructed a

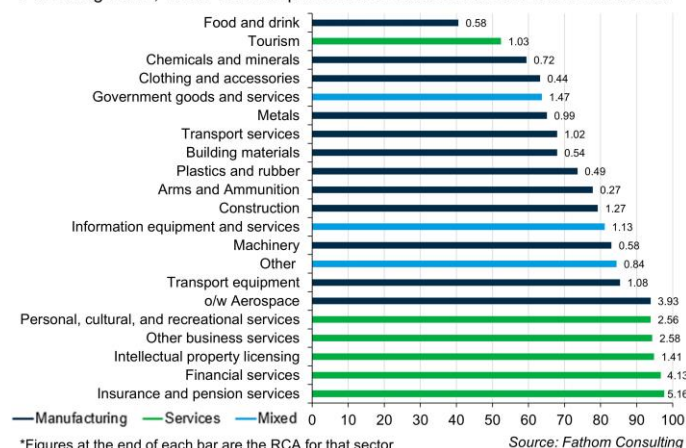
9. Moretti, E., Steinwender, C. and Van Reenen, J., 'The intellectual spoils of war? Defense R&D, productivity and international spillover', *NBER working paper 26483*, 2019.



large database, known as RiCarDo, that tracks, through time, the Revealed Comparative Advantage (or RCA) of 20 industries across some 200 countries.¹⁰

UK RCA by industry, 2019

Percentage rank, where 100% implies UK RCA exceeds that of all other countries*



So, what is the UK good at? From the chart above, we can see that the UK has a strong revealed comparative advantage in insurance and pension services. With an RCA of 5.16, it is one of the best in the world at insurance and pension services — better indeed than almost 98% of all other countries. The UK's strongest suits are typically services rather than manufacturing. The production of services tends to be less reliant on R&D than manufacturing. But the UK is also good at hi-tech manufacturing, and at aerospace manufacturing in particular. In 2019, the UK had an RCA of 3.93 in aerospace, putting it in 13th place across some 200 countries.

There is little on which economists, as a profession, agree. But the far-reaching benefits of R&D are a rare exception. It is widely recognised not only that the social benefits of R&D far outweigh the private benefits, but also that governments can increase private expenditure on R&D simply by spending more on R&D themselves. When it comes to productivity, the UK lags many of its peers, including the US, France and Germany, and by an increasing amount. It also spends relatively little on R&D, and substantially less than the amount at which the returns to R&D would be maximised. In our own work, we find that the multiplier on government-funded R&D carried out in the business sector is around six. In other words, for every additional pound spent by government, the private sector spends an additional six pounds. A note of caution though. We also find some evidence that the multiplier falls the more volatile is the contribution from government. If the government spends lavishly one year, only to tighten the purse strings in the next, then it is unlikely that the private sector will feel confident enough materially to increase its own contribution. In 2017, the then Prime Minister Theresa May launched a new UK Industrial Strategy — the first time that term had been used since Margaret Thatcher's election victory in 1979. It included, among other things, a

Although the UK's very strongest suits tend to be services, the UK is also good at high-tech manufacturing

10. The RCA for industry i in country j is given by the share of country j 's exports of the product made by industry i in all of country j 's exports, relative to that same concept for the world as a whole. As an example, imagine that exports of clothing account for 0.5% of UK exports but 1.0% of global exports. The UK's RCA for clothing would then be 0.5. In that example, as within any RCA that is less than 1.0, the UK has revealed itself to be not particularly good at clothing.



commitment to raise the UK's R&D intensity to 2.4%. But it was quietly shelved by Boris Johnson's government in 2021 to be replaced by a somewhat broader, and less coherent 'Plan for Growth', that included objectives such as 'levelling up', 'driving growth that is green' and 'supporting [the Conservatives'] vision for a Global Britain'.

UK industrial strategy failed in the 1960s and the 1970s because it focused on protecting jobs in declining industries rather than raising productivity. The simplest way for the UK government to raise productivity, and with that the size of the economy, would be to materially increase the amount of money that is spent on R&D. In 2019, expenditure on R&D carried out by UK businesses amounted to just 1.2% of GDP. That was less than the average for the OECD as a whole, less than France and Germany, and about half the amount spent by the US. The UK has a strong aerospace sector. But it is also good at other high-tech manufacturing, including pharmaceuticals, telecommunications equipment, and other vehicle manufacturing. The UK government aims to raise total expenditure on R&D, including work carried out in the private sector, in higher education and by government itself, to 2.4% by 2027. This is undoubtedly a step in the right direction, but it needs to be much more ambitious. It needs to go further and faster, with diminishing returns unlikely to set in until expenditure on R&D accounts for more than 4.0% of GDP.



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