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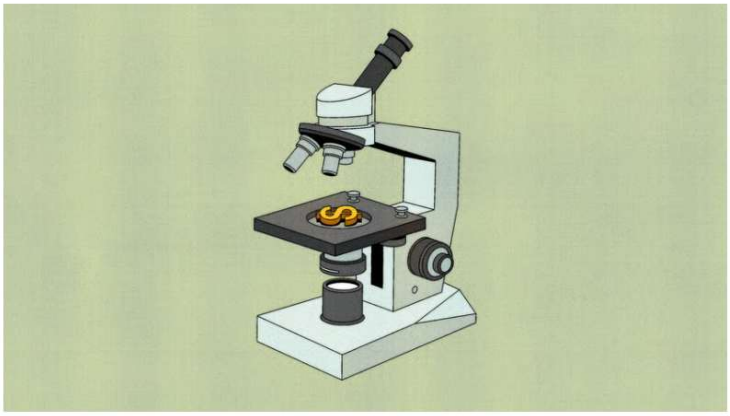
America's scientific prowess is a huge global subsidy

And it is now under threat



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Full text :

One of the best things about living in Europe is America. Faced with a moribund domestic stockmarket, European investors can redirect their savings into the s&p 500. Residents enjoy the protection of America's security umbrella without having to foot the bill. At times of crisis the continent's central banks rely on swap lines from the Federal Reserve. All the while they enjoy better food, nicer cities and superior cultural offerings.

But America, under President Donald Trump, now threatens to withdraw many of these implicit subsidies. His administration's attacks on science, involving deep cuts to the budgets of institutions, may damage the biggest subsidy of all. America is a research powerhouse. It has the best universities. It accounts for 4% of the world's population, yet produces a third of high-impact scientific papers. It also accounts for a third of global research-and-development spending.

Americans benefit most of all from their country's scientific prowess. The average American medical scientist earns $100,000 a year, for instance—some 60% more than the average American worker. But as any economist knows, knowledge is a public good, meaning science has large "spillover" benefits. In 2004 William Nordhaus of Yale University argued that companies only capture 2.2% of the total returns from their innovations. Patents expire and even before that competitors copy ideas. Innovation therefore drags up everyone's living standards, as lots of companies become more productive and ordinary people benefit from better goods and services. America's average incomes are fantastically high.

Economists have devoted less attention to the question of international spillovers. Nevertheless, America almost certainly runs a surplus in science with the rest of the world, providing much more to foreigners than it receives in return. In recent years, too, the size of this subsidy has almost certainly grown. Three mechanisms stick out—all of which are now under threat.

First, people. American scientific institutions are a melting pot. There are twice as many foreign students today as in the early 2000s. Many outsiders, having graduated, return home, taking ideas with them. We estimate that around 15% of the people who have graduated from mit, a top American science school, live abroad. On that basis, the raw material of future scientific progress has already spilled out from America to elsewhere.

Second, new ideas. When a scientist publishes a paper online, almost anyone in the world can read it. Traditionally research was a domestic affair. One bibliometric study found that in 1996 only about 40% of citations of American scientific publications were from foreign researchers. More recently the globalisation of scientific knowledge has intensified. By 2019 foreign scientists accounted for about 60% of America's citations. Scientists in the rest of the world thus stand on the shoulders of American giants.

American consumers also subsidise r&d. This is most well-known in the case of pharmaceuticals. Prescription drugs are more expensive domestically than abroad. American consumers, in effect, pay for the research that creates them. And this pattern is apparent elsewhere, too. National-accounts data suggest that, on average, American corporations earn returns on domestic capital that are more than 50% higher than abroad. So while Americans may fund corporate r&d, the world shares the benefit.

The third factor is new technologies. Every other country has long drawn from the well of American innovations. This was how Europe rebuilt itself following the second world war. French steel executives visited American steelworks in order to copy workflow designs. Britain's car bosses turned to American executives in an attempt to improve plant efficiency. Economists struggle to measure the ways in which American tech spills abroad today. In some cases the American government explicitly provides it to the world for free, as in the case of gps. During the covid-19 pandemic America gave away vaccines to poor countries. Many American artificial-intelligence companies release "open source" models. Even when American firms try to protect their intellectual property, foreign competitors find workarounds. Many other smartphone companies have copied Apple's aesthetic, for instance.

According to Nancy Stokey of the University of Chicago, one quantitative measure of technological spillovers involves looking at capital goods, in which new tech is often embodied. From the early 1990s to 2024 America exported nearly $5trn-worth of high-tech capital goods, more than any other country, spreading the American way to every corner of the Earth. Another proxy is outward foreign direct investment. This is when an American buys a controlling stake in a foreign business or builds a new industrial facility abroad—and often introduces new tech as part of the bargain. Americans' direct investments abroad are worth some $10trn, which is far more than any other country.

Nutty professor

If Mr Trump follows through with his proposed cuts, and America's scientific system stumbles, can another country pick up the mantle? Many American scientists say they want to leave the country; a few already have. China, which on some measures of scientific prowess already surpasses America, may hope to capitalise. Yet few foreigners want to do their phd in China. A closed political system slows down the diffusion of innovations across international borders. So does the language barrier.

Even if China changed, however, decades of research on economic clusters shows that they are rarely replicated. Just as you could not uproot Hollywood and move it elsewhere, scientists leaving Berkeley and Boston will not carry on as before when they arrive in Beijing or, indeed, London. If America's scientific system sneezes, the rest of the world will catch a cold. ■