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The Economic Impact of Lowering NIH's Budget and Indirect Cost Rate*

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Executive Summary

- Economic research finds that $10 million in NIH grant generates around 2.7 private-sector patents with a market value of $20-$30 million.
- The social benefit from increased longevity and life quality arising from medical research is much higher than the market value of private-sector patents.
- This suggests that cutting the NIH budget by 40%, as proposed by the U.S. Department of Health & Human Services, would reduce the social benefit from research by significantly more than $28-$42 billion.
- Since part of the indirect costs for research are used to comply with the increasing number of regulations, lowering the indirect cost rate without relaxing relevant regulations that contribute to the costs would bring financial hardships to universities and other research institutions and discourage them from conducting valuable research.
- While one may disagree with the precise manner in which indirect costs are allocated, NIH funding (including indirect costs) likely provides a greater societal return than any other governmental investment.

Since President Trump took office in January 2025, his administration has been attempting to cut funding for the National Institutes of Health (NIH). On February 7, the NIH posted on X:

> Last year, $9B of the $35B that the National Institutes of Health (NIH) granted for research was used for administrative overhead, what is known as "indirect costs." Today, NIH lowered the maximum indirect cost rate research institutions can charge the government to 15%, above what many major foundations allow and much lower than the 60%+ that some institutions charge the government today. This change will save more than $4B a year effective immediately.

After this policy was barred by a federal judge in April (Montague, 2025), the Department of Health & Human Services announced in its budget for fiscal year 2026 that it "will continue the policy to cap indirect cost rates at 15 percent" and "provides $27.5 billion in discretionary budget authority for NIH". The latter would lead to a cut by around 40% to NIH's current budget of about $48 billion, most of which is awarded for extramural research.

Although Congress seems to be on track to reject the Trump administration's proposal to cut funding for the NIH (Kaiser, 2025), it is important to assess the economic impact of lowering NIH's budget and indirect cost rate. If NIH's total budget is cut by 40%, the funding for extramural research is likely to be cut by about $14 billion (40% of the $35 billion mentioned in the X post). On the other hand, capping the indirect cost rate as mentioned in the X post would change the composition of the grants for which a smaller portion of the funds would go to indirect costs.

What is the economic rationale for government subsidies for research activities such as NIH? What is the optimal level of this subsidy? Historically, economists have argued that research produces "externalities." That meant that the benefits that accrue to society from many research activities exceed the benefits to individual researchers. This warrants governmental intervention. Could the private enterprise provide the optimal level of innovation without any form of government intervention? The best available research suggests that the answer is almost certainly no. The infrastructure financed through indirect costs is essential for research activities supported by NIH grants. There are numerous frictions associated with this process, and it is not clear whether universities would engage in building this infrastructure with a significant decline in overhead rates.

The upshot of our analysis is that cutting NIH funding would likely be a harmful policy both to the country as a whole as well as to the Wisconsin economy. From a cost-benefit analysis, NIH investment appears to be one of the very best government programs. We first show that the potential costs of a generic cut for NIH funding could be huge. We then discuss the impact of capping the indirect cost rate. Since part of the indirect costs for research are used to comply with the increasing number of regulations, capping the indirect cost rate without relaxing relevant regulations that contribute to the costs would bring financial hardships to universities and other research institutions and discourage them from conducting valuable research.

1 The Economic Impact of NIH Funding

The NIH is the nation's medical research agency and the largest public funder of biomedical research in the world. As a part of the U.S. Department of Health and Human Services, the NIH's mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability. To carry out its mission, NIH invests most of its nearly $48 billion budget in medical research, with nearly 83% of the funding awarded for extramural research, largely through almost 50,000 competitive grants to more than 300,000 researchers at more than 2,500 universities, medical schools, and other research institutions in every state.[†]

Assessing the causal economic impact of this investment is extremely difficult. Research grants are not randomly assigned. Even if they were, isolating the effects of a single grant on an outcome seems impossible in fields full of spillovers. Beyond that, public funding presumably "crowds out" some private investment. Azoulay et al. (2019) is the only paper of which we are aware to provide a causal estimate of the economic impact of NIH funding. They use a convincing "regression discontinuity design" to isolate quasi random variation in NIH dollars going to one area as opposed to another. This solves the causal aspect but not the issues with finding the best way to measure the impact. In the absence of an ideal measure, they find a relevant one based on patents. Their convincing analysis concludes that each $10 million in NIH funding generates roughly 2.7 additional private-sector patents.

Turning this result into a rate of return is difficult. Azoulay et al. (2019)'s back-of-the-envelope calculations lead to tentative estimates on the order of a $20–$30 million increase in firm market value for each $10 million NIH grant. This suggests that cutting the NIH funding by $14 billion would cost $28-$42 billion when measured by firm market value alone.

Results from Murphy and Topel (2003) (which we discuss below) suggest the true social rate of return might be significantly higher (e.g., if patients value the medical advances

[†]The description in this paragraph was compiled from the NIH's website (https://www.nih.gov) on February 12, 2025.

significantly more than firm market value) but could be lower (e.g., if patents frequently cite papers with no real intellectual influences). Even if one focuses only on the results that can be determined with more precision—the positive effect on private-sector patenting and the lack of measurable crowding out—the estimates by Azoulay et al. (2019) are important data points for the increasingly polarized discussion of direct government R&D funding.

Murphy and Topel (2003) do not provide causal estimates of NIH funding, but they do estimate the value of medical advances. There are two main values of improved health care: increase in the length of life and increases in the quality of life while alive. Murphy and Topel (2003) focus only on the former and estimate that the total gain from increased life longevity from 1970-1998 is $72 trillion! This averages to $2.6 trillion per year, which is enormous considering that real GDP averaged about $5.7 trillion per year during that period. The spending on medical research in 1995 was large, about $36 billion, but this is only around 1.4% of the potential benefit from increased longevity. This is not a causal estimate, but even if the medical research led to a small fraction of the gain, we would obtain a huge return on the investment. This suggests that the social benefit for each $10 million of NIH funds is much larger than $20–$30 million, and cutting NIH funding by $14 billion would reduce the social benefit by much more than $28-$42 billion.

NIH funding also has a direct and immediate effect on the economy. Using the Regional Input-Output Modeling System (RIMS II) of the U.S. Bureau of Economic Analysis, United for Medical Research (2024) estimates that the $37.8 billion of NIH funding in the U.S. in 2024 created 412,041 jobs and about $92.9 billion of economic activities. The estimates account for both jobs and economic activities directly funded by NIH and other jobs and economic activities induced by NIH funding, e.g., production of equipment and other materials used by NIH-funded research labs. Wisconsin received $653.6 million from NIH in 2024, which is estimated to have created 7760 jobs and about $1.48 billion of economic activities.

Assuming jobs and economic activities are evenly spread across the $37.8 billion of NIH funding in the U.S. in 2024, cutting the funding by 40% would cost 164,816 jobs and $37.2 billion of economic activities. For Wisconsin, the cost would be 3104 jobs and $592 million of economic activities.

2 The Impact of A Lower Indirect Cost Rate

In general, NIH grant for a research project provides for reimbursement of both direct and indirect costs of the project. Following federal cost principles, direct costs are any cost that can be identified specifically with a particular sponsored project, an instructional activity, or any other institutional activity, or that can be directly assigned or allocated to such activities relatively easily with a high degree of accuracy. Direct costs may include, but are not limited to, salaries, travel, equipment, and supplies directly supporting or benefiting the grant-supported project or activity.

In addition to these direct costs, most organizations also incur costs for common or joint objectives that cannot be readily identified with an individual project or program. These are referred to as indirect costs, also called Facilities and Administrative costs (F&A). Facilities operation and maintenance costs, depreciation, and administrative expenses are examples of costs that usually are treated as F&A costs. Examples of more detailed activities supported by indirect costs on NIH grants include

- Building and laboratory maintenance (repairs, cleaning, security, electricity, water, heating, and cooling)
- IT and communications infrastructure
- Grants administration
- Financial, HR, legal, regulatory, tech transfer
- Library services (buildings, subscriptions, institutional repos, staff)
- Shared research facilities (animal facilities and core services)
- Environmental/lab safety - IRB, IACUC

All of these activities are essential for research.

Because indirect costs are often shared across multiple projects within an institution, an indirect cost rate (ICR) is negotiated every 2-4 years between each institution and one of two cognizant federal agencies (the Department of Health and Human Services and the Department of Defense's Office of Naval Research). The negotiated ICR for an institution is equal to the ratio between (1) indirect costs allocated to organized research in the institution and (2) modified total direct research costs of the institution that exclude some exemptions, such as graduate student tuition, capitalized equipment, and project participants who are not formally part of the project team (Droegemeier, 2017).

With the ICR at the institution level, the indirect cost allowable for each project is determined by the product between the modified direct cost of the project and the relevant ICR of the institution where the project is conducted.

Figure 1 plots the distribution of indirect costs as a share of direct costs across NIH grants in 2024.[‡] The solid line uses all grants to U.S. institutions where the direct cost is strictly

[‡]We use data from the NIH's website at `https://report.nih.gov/award/index.cfm`.

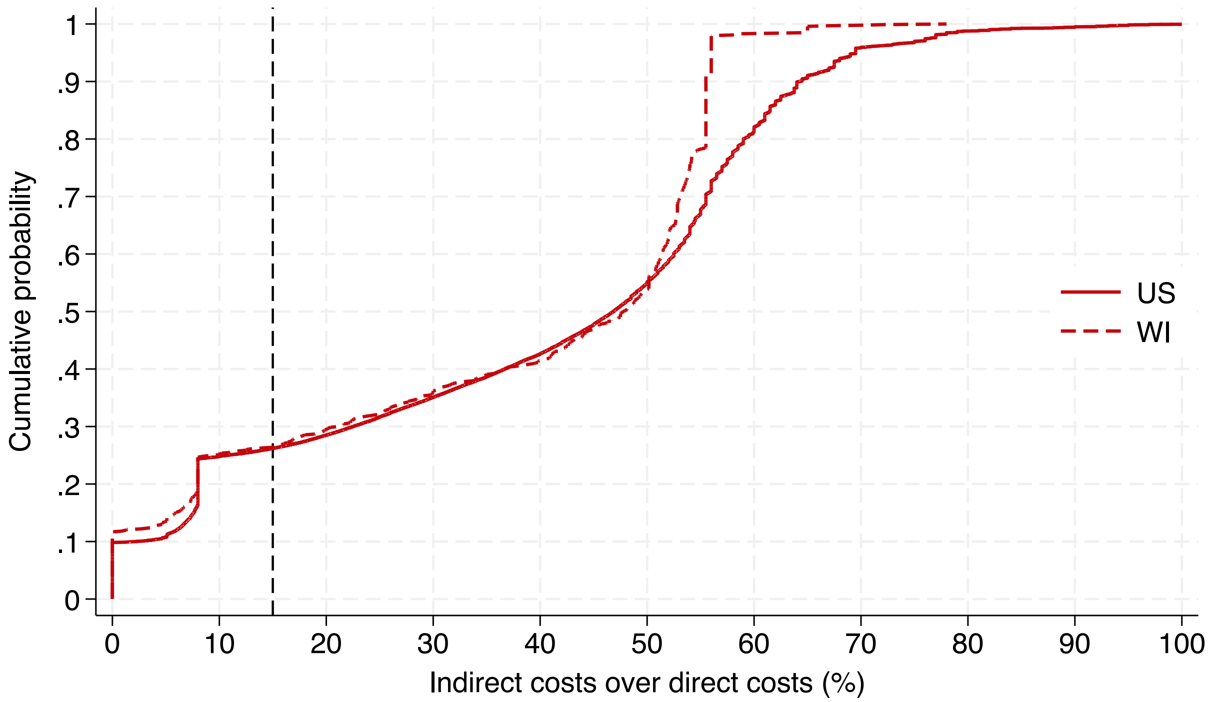

Figure 1: Indirect Costs Across NIH Grants in 2024

positive and the indirect cost is nonnegative, which accounts for 95% of the 64,442 grants and 91% ($33.7 billion out of $37 billion) of total funding in the U.S. The dashed line focuses on the subset of grants received by institutions in Wisconsin. The vertical line indicates 15%, the maximum indirect cost rate announced by NIH on February 7, 2025.

Over 70% of the NIH grants in both the U.S. and Wisconsin would have been negatively affected by the new maximum rate of 15%. The total funding for the negatively affected grants are $27.7 billion in the U.S. and $460 million in Wisconsin. For the negatively affected grants, the funding for indirect costs would drop by about $9 billion in the U.S. and $93.8 million in Wisconsin. If grants with an indirect cost rate less than 15% could be funded at the new maximum rate of 15%, the total funding for indirect costs would drop by $5.48 billion in the U.S. and $84.3 million in Wisconsin. These are rough estimates because, as mentioned above, some direct costs cannot be used to calculate the indirect costs.

2.1 Indirect costs as a share of total costs

It should be noted that ICR is the ratio between indirect costs and (modified) direct costs, as opposed to the ratio between indirect costs and total costs. Roughly speaking, the ratio between indirect costs and total costs is equal to $\frac{ICR}{1+ICR}$, which is smaller than ICR.

Using data from NIH's Office of Budget, Figure 2 plots indirect costs as a share of total

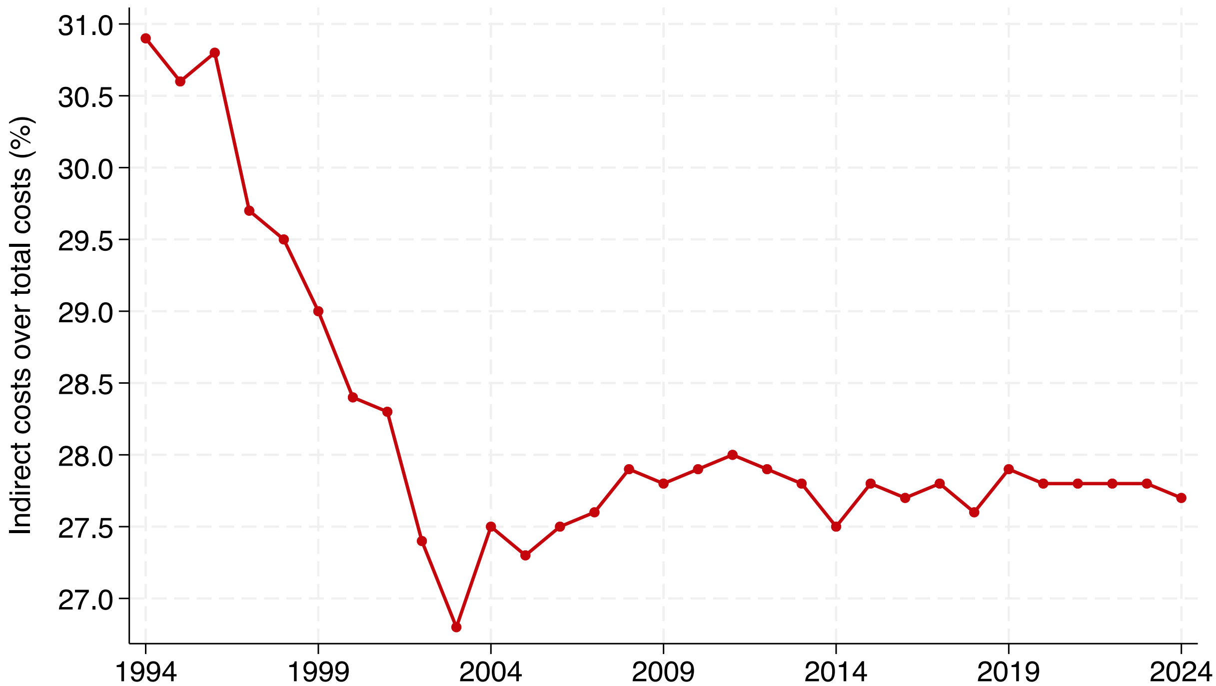

Figure 2: Indirect Costs Over Total Costs: 1994–2024

costs awarded by NIH in each fiscal year between 1994 and 2024. The share dropped from 30.9% in 1994 to around 26.8% in 2003 before rising slightly to 27.5% in 2004, and it has been almost flat in a narrow range between 27.5% and 28% since 2006.

2.2 Indirect costs as reimbursements

Indirect costs should be viewed as reimbursements for research expenditures already incurred by universities and other research institutions, as opposed to upfront payment for new investments. If a university needs a new building for its researchers and labs, the university needs to pay for the building first and then try to recover some of the expenditures through indirect costs awarded to research projects conducted in the building.

This has three implications. First, when viewed as reimbursement for past research expenditures, the funds from indirect payments could be used by universities and other research institutions on any of their missions, including teaching and other activities not directly related to research, subject to applicable laws. To make this point clear, Droegemeier (2017) provided the following analogy from the insurance industry. “Suppose the roof of your home is destroyed by a hail storm. An insurance adjuster provides a cost estimate, and then you hire a roofer to replace the roof and pay the costs from your savings account. A month later, the insurance company writes you a check in an amount identical to your payment, but instead of placing the check back into your savings account, you purchase a boat. Have you defrauded the insurance company? Not at all! You were simply reimbursed for money already spent, and thus you are free to use that reimbursement for any purpose."

Second, a lower ICR means that universities and other research institutions could recover a smaller portion of past research expenditures than expected, so that they need to make up the differences by cutting future expenditures or finding money from other sources.

Finally, a lower ICR means that universities and other research institutions need to bear a larger share of the costs for new research investments. This would discourage research investment and ultimately research output that benefits the society.

2.3 Administrative costs and regulations

For universities, the administrative portion of the F&A/indirect cost has been capped at 26% since 1991. In other words, they cannot recover the full administrative cost for research if it exceeds 26% of the modified direct cost.

According to Figure 3 from the Council on Government Relations (COGR), 270 regulations and policies affecting federal research have been adopted or substantially modified between 1991 and 2024. To comply with the increasing number of regulations, administrative costs have to increase over time. Reducing ICR without cutting regulatory burdens would bring financial hardships to universities and other research institutions and discourage them from conducting valuable research.

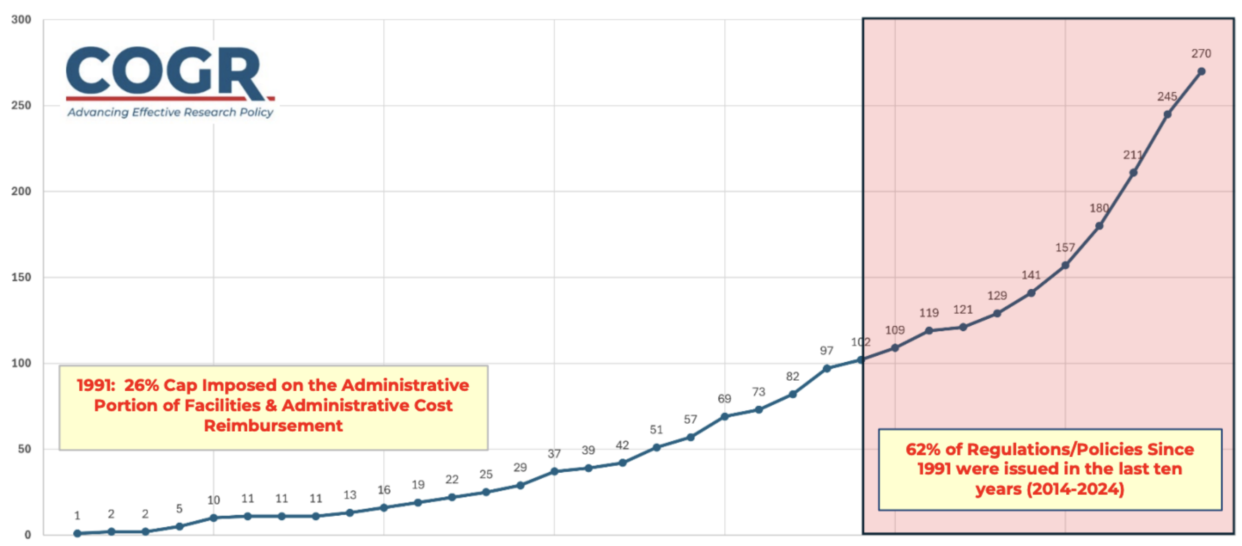

Figure 3: Regulations & Policies Adopted or Substantially Modified & Changes in Interpretation Affecting Federal Research

2.4 Potential impacts of lowering the ICR

If the cut in NIH funding is limited to indirect costs, how will that differ from the effect of a generic cut? We know of no research that we trust to answer this question. It is possible that it makes no difference in the long run if direct and indirect costs could be converted into each other freely, so that the policy capping the indirect cost rate would amount to a $4 billion generic cut in NIH funding, as mentioned in the X post quoted at the beginning of this report. However, this is not allowed under the current federal cost principles. Consequently, it is possible that the impact from cutting indirect costs alone is much larger than a generic cut of the same amount. This could happen if cutting indirect costs makes it prohibitive to purchase some items that are crucial for certain types of research. One example is the well-known importance of electricity for research on artificial intelligence (AI). Reducing the funding for electricity, which is typically considered an indirect cost, could significantly slow down the progress of AI-related research. More generally, new research buildings and labs may not be constructed if universities and other institutions have to bear a larger share of the costs, which could severely limit the amount of research being conducted even if researchers could receive sufficient funding for direct costs.

On the other hand, the total reduction in research expenditures could be smaller than the cut in NIH funding if universities and other research institutions could make up some of the differences by obtaining more resources through other channels. This could affect other activities if, for example, the additional resources for research are financed through higher tuition costs. Babina et al. (2023) use administrative data from the U.S. Census Bureau to study the effect of federal funding on innovation outputs of university researchers. They find that negative federal funding shocks reduce high-tech entrepreneurship and publications but increase patenting. More importantly, the lost publications tend to be of higher quality and more basic, whereas the additional patents tend to be of lower quality, less general, and more often privately assigned. They also find that federal funding cuts lead to an increase in private funding, which partially compensates for the decline in federal funding. Together, the results suggest that federal funding cuts shift university research funding from federal to private sources and lead to innovation outputs that are less openly accessible and more often appropriated by corporate funders.

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