Federal spending for scientific research at U.S. academic institutions amounted to $15.1 billion in 1997. As Figure 1.1 shows, the federal government is the largest source of funding for research in colleges and universities. Other external sources provide substantial funds as well: about $2 billion each from industry, state and local governments, and a combination of other funders, mostly foundations and private gifts. After the federal government, the largest supporter of university research is the universities themselves from their own funds. Each year universities direct resources they control to support about $5 billion in research.

NOTE: Values as reported by colleges and universities.

Figure 1.1—Funding for Research in Higher Education, 1997 (Billions)
Looking at federal support in more detail, we see six agencies that sponsor most of the research in colleges and universities. As shown in Figure 1.2, one agency, the Department of Health and Human Services (DHHS), accounts for more than half of the total federal outlay. The DHHS includes the National Institutes of Health (NIH), which organizes almost all of this agency’s academic research funding. Five other agencies—the National Science Foundation (NSF), the Department of Defense (DoD), the Department of Agriculture (USDA), the National Aeronautics and Space Administration (NASA), and the Department of Energy (DoE)—account for almost all the rest of federal research funding for colleges and universities.

Just as research funding is concentrated in a few agencies, most of the funds go to a relatively small number of institutions. There are more than 4,000 accredited institutions of higher education in the United States. Of these, about 460
report receiving some federal research funding on an NSF survey. Major recipients are a smaller set. The top 50 recipients of federal research support account for 60 percent of total spending. The top 150 recipients account for more than 90 percent of the total.

The partnership in research between the federal government and U.S. research universities has been beneficial to both. The partnership has been widely praised for advancing scientific knowledge, improving the quality of life of Americans, contributing to the nation’s prosperity, strengthening its national security, promoting technological innovation, and training the future scientific workforce that will continue these advances in the future. Recent congressional calls for doubling science budgets across the board indicate the high regard policymakers have for this partnership.

In this partnership, the partners not only share some important objectives but also experience some divergence in their interests. Federal agencies naturally try to stretch their budgets and seek an equitable cost to the taxpayer. Universities want projects to have adequate resources to cover their costs. If those resources are not provided—or are not fully provided—by federal agencies, then universities must cover the remaining costs from other sources. As shown in Figure 1.1, universities do cover a substantial amount of the total research budget.

Universities combine many activities and sources of funds. These combinations can make it ambiguous exactly who is paying for what. The costs of maintaining buildings, for example, may be properly shared among instruction, research, and public service functions. Because universities pursue many objectives simultaneously (including various teaching programs and research projects), they incur significant shared costs that benefit multiple objectives. The federal government has developed a set of procedures for allocating these costs to the multiple objectives, which we will describe in Chapter Two.

PERSPECTIVES ON FACILITIES AND ADMINISTRATIVE COSTS

Based on the analysis in this report, about three-quarters of federal outlays support the direct costs of conducting research, such as the materials and labor.
used to perform each project. The other one-quarter covers facilities and administration (F&A) costs. F&A costs (sometimes called indirect or overhead costs) encompass spending on such items as facilities maintenance and renewal, heating and cooling, libraries, and the salaries of departmental and central office staff.

Allocating shared costs to projects is a simple concept, but the detailed rules governing how to do the allocation for research universities are complex. The rules for recovering facilities and administrative costs have evolved through about 15 revisions since they were first standardized in 1958 by the Office of Management and Budget (OMB). Some changes were initiated by the Executive Branch, and some were developed in response to congressional concerns, discussed in more detail in the following paragraphs. Many of these changes were intended to prescribe standard ways of accounting for costs and seeking reimbursement. In addition to OMB rules, codified in OMB Circular A-21, colleges and universities face a number of other requirements imposed by specific agencies and funding mechanisms governing which of their F&A costs are eligible for reimbursement. Higher education institutions may also voluntarily share the costs of facilities and administration. As a result of mandatory and voluntary cost-sharing, federal outlays for F&A costs amount to less than the full documented costs on campus. In this report, we estimate that the federal government reimburses universities somewhere between $3.6 and $4.2 billion per year for F&A costs. The federal government does not reimburse an additional $0.7 to $1.5 billion in F&A costs allocated to federal projects. Universities also share in the direct costs of projects, for example, contributions of faculty time. That form of cost-sharing is not included in these calculations.

As noted above, cost-sharing in general makes it difficult to be specific about who is actually paying for what. The partnership is characterized by various features. A large number of universities compete for federal research grants and contracts. A small number of agencies provide funds. Universities have information about their cost structure that may be difficult for agencies to verify. Universities must make long-term investments in people and facilities in anticipation of their ability to recover costs from federal projects. Universities must construct research facilities with a lifetime of several decades and bear the risk that their fortunes in federal funding may change or that the rules of the cost recovery framework may change over that time. In a very similar way, universities grant tenure to scientists. Tenure is provided as an incentive to encourage independent thinking, which is especially important in scientific research. But tenure implies a career-long commitment to a scientist. The university bears the risk of these investments in people and facilities. This system promotes healthy competition among institutions and researchers, but it requires the universities to bear the risks of their investments.
The codification of rules in OMB Circular A-21 in part limits the risk borne by the universities. In general, an environment in which the rules are subject to frequent revisions is more risky. When a university board of trustees faces the decision of whether to invest in building a new research facility, it considers how likely the university is to recover costs from the federal government. To the extent that cost-recovery rules are stable over time, the prospects for cost recovery are more certain. Although we do not have hard evidence on how changes in rules affect decisionmaking, private conversations with university board members indicate that they consider the stability of the federal cost-recovery system in their building decisions. Starting in 1981, the government allowed universities to seek reimbursement not only for depreciation of buildings but also for interest costs for construction as described in Chapter Five. This provision reduced the risks of investments in buildings. Although the evidence is not conclusive, a substantial increase in the quantity and quality of research facilities occurred after this provision went into effect.

We observed differences in agency policies and practices for cost recovery. Some agencies stay close to full cost recovery for universities; others reimburse significantly less than full project cost. If the government as a whole significantly underreimburses university costs, then universities will seek ways to make up the difference in their personnel and facilities costs from other sources.

Universities, according to the data in Figure 1.1, already cover much of the costs of research from funds they control. Clearly, universities value federal research support and are willing to accept somewhat less than full cost recovery. They are, after all, already sharing in the costs of the overall research enterprise. But there are limits to how much a given university can share in research costs before other programs must give way. A university must also provide education to its students and perhaps other functions, such as patient care or agricultural extension service. If federal support for research is reduced, whether for salaries or for facilities, universities may have to cut back in these other areas. If universities do not cut back in other areas, they may avoid constructing new facilities, renovating existing facilities, or investing in the careers of scientists. Without high-quality facilities and personnel, universities may shift their research focus or even reduce their overall research activity. Nonetheless, universities do support a good deal of research, including part of the facilities and administrative costs for federal projects.

Some research programs align closely with the interests of other university funders, including state governments, private donors, and students. These types of programs make it easier for universities to share costs because the objectives of more than one funder are simultaneously satisfied. When a federal agency supports research that is not closely aligned with the interests of these other
funders, the federal agency should expect to pay more of the full cost of research.

CONGRESSIONAL INTEREST IN FACILITIES AND ADMINISTRATIVE COSTS

As the research partnership between the federal government and universities developed, federal agencies developed principles for reimbursing both the direct costs of research and some of the costs of facilities and administration. The reimbursement of these costs has long been the subject of congressional interest. In the late 1980s, there were some widely publicized incidents of alleged overcharges for F&A expenses, and in a few cases, universities returned some federal funds.

In 1991, the House Science Committee, working through the vehicle of the National Science Foundation Authorization Act, expressed its intention that both administrative and facilities costs should be restricted. For administrative costs, the committee intended that a specific numerical cap apply to recovery (26 percent of modified total direct costs as further explained in Chapters Two, Four, and Five). For facilities, the committee intended a requirement that whatever reimbursement was received by a university the full amount must be applied to research buildings and equipment and to no other purpose (House Science Committee, 1991). Although the NSF Authorization Act was not passed in that session, OMB did modify Circular A-21 to incorporate both of these provisions governmentwide. The provisions adopted can be seen in the history of changes to OMB Circular A-21, as detailed in Appendix A.

The language of the 1991 NSF Authorization Act also called for study to define more carefully the cost categories used in facilities and administrative rates. Again, although the Act was not passed by Congress, OMB did study and define cost categories, issuing a new version of Circular A-21 in 1993, which incorporated these defined categories and a number of other changes.

Subsequent sessions of Congress continued to express concern over the level of F&A costs. In 1995 and 1997, the House Science Committee again took up an NSF Authorization Act. During discussions of this act, the committee advocated a shift in how research funds were allocated.

The Committee continues to be concerned that too great a share of academic research funds may be allocated to indirect costs. According to the President’s budget, over one-quarter of the $12 billion the government spends on research at universities and colleges are used to cover indirect costs. While the government has a responsibility to reimburse that portion of the overhead directly associated with carrying out federally sponsored research, the Committee is
concerned that the current system of indirect cost payments is consuming too large a share of a limited research budget. (House Science Committee, 1997.)

The committee was not seeking to reduce funding for research. The committee desired to maintain the same overall level of funding for universities but sought to shift the balance more toward direct costs and away from facilities and administrative (indirect) costs.

The Committee believes that any resultant savings in indirect cost payments should be used to increase overall federal research support. (House Science Committee, 1997.)

Specifically, the committee called on the Executive Branch to propose methods to reduce outlays on facilities and administrative costs by 10 percent. The 1997 version of the Act was passed by the House and sent to the Senate for consideration.

In the Senate, the Committee on Labor and Human Resources echoed the concerns of the House Science Committee.

The committee is greatly concerned about the rising cost of the administration and delivery of scientific research and higher education. (Senate Committee, 1997.)

The Senate committee connected concerns about the cost of research to state and federal regulations as well as possible influence on tuition rates for college students.

In recent years university administrators have cited State and Federal regulatory burdens as well as the unreimbursed costs of conducting scientific research as contributors to the rapid growth in the cost of attending college. (Senate Committee, 1997.)

The Senate committee did not preserve the House’s desire for a study of how to achieve a 10 percent reduction in facilities and administrative costs. Instead the Senate substituted a request to study specific concerns related to the federal government’s role in reimbursing these costs. One concern was how the federal government fared in comparison with other research sponsors.

In 1992, the Department of Health and Human Services inspector general testified that many schools charge the Federal Government higher indirect cost rates than they charge other research sponsors, including “foundations, public corporations, and foreign Governments. . . . It appears clear that schools may be looking to the Federal Government to cover the overhead associated with research performed for non-Federal and foreign entities.” (Senate Committee, 1997.)
The Senate version of the NSF Authorization Act was passed May 12, 1998, including a request to the White House Office of Science and Technology Policy (OSTP) for a detailed report on six issues related to facilities and administrative costs. The six issues are quoted in the following section. This version of the Act was subsequently passed by the House and signed into law by the President on July 29, 1998.

Some observers believe that F&A spending consumes an increasing share of federal research dollars, with a corresponding decrease in funds going directly to researchers. \textit{The data presented in this report do not support this view.} Overall, the system appears stable. According to the available data, F&A spending as a percentage of project cost has remained about level for at least a decade. In addition, F&A spending at colleges and universities is generally slightly lower than at other types of research institutions, such as federal laboratories and industrial research laboratories.

\textbf{PURPOSE AND ORGANIZATION OF THIS REPORT}

As explained above, in the NSF Authorization Act of 1998, Congress directed OSTP to conduct an analysis of six issues. At the request of OSTP, the RAND Science and Technology Policy Institute compiled and analyzed current information to assist OSTP, Congress, and the public to understand and discuss policy choices for indirect cost recovery. The analysis was structured around the six issues raised by Congress:

\textbf{Issue 1:} analyze the federal indirect cost reimbursement rates (as the term is defined in Office of Management and Budget Circular A-21) paid to universities in comparison with federal indirect cost reimbursement rates paid to other entities, such as industry, government laboratories, research hospitals, and nonprofit institutions.

\textbf{Issue 2:} analyze the distribution of the federal indirect cost reimbursement rates by category (such as administration, facilities, utilities, and libraries) and by the type of entity; and determine what factors, including the type of research, influence the distribution.

\textbf{Issue 3:} analyze the impact, if any, that changes in Office of Management and Budget Circular A-21 have had on the federal indirect cost reimbursement rates, the rate of change of the federal indirect cost reimbursement rates, the distribution by category of the federal indirect cost reimbursement rates, and the distribution by type of entity of the federal indirect cost reimbursement rates; and
the federal indirect cost reimbursement (as calculated in accordance with Office of Management and Budget Circular A-21), the rate of change of the federal indirect cost reimbursement, the distribution by category of the federal indirect cost reimbursement, and the distribution by type of entity of the federal indirect cost reimbursement.

**Issue 4:** analyze the impact, if any, of federal and state law on the federal indirect cost reimbursement rates.

**Issue 5:** analyze options to reduce or control the rate of growth of the federal indirect cost reimbursement rates, including such options as benchmarking of facilities and equipment cost, elimination of cost studies, and mandated percentage reductions in the federal indirect cost reimbursement, and assess the benefits and burdens of the options to the federal government, research institutions, and researchers.

**Issue 6:** analyze options for creating a database that would serve two functions: tracking the federal indirect cost reimbursement rates and the federal indirect cost reimbursement and supporting analysis of the impact that changes in policies with respect to federal indirect cost reimbursement will have on the federal government, researchers, and research institutions.\(^3\)

This report presents the results of RAND’s analysis. Issues 1 through 4 above are essentially factual investigations. RAND has compiled and analyzed available data in support of these issues. For Issues 5 and 6, RAND, in its role as an objective analyst, can present options for both OSTP and Congress to consider. RAND does not take a position on the various alternatives presented; that is the purview of the policymaking community.

This report continues with a background discussion on the principles, procedures, and methods for determining rates of reimbursement of facilities and administrative costs. Following the background discussion, six chapters correspond to each of the six issues identified by Congress. The main body of the report ends with a brief conclusion. Two Appendixes contain additional information on OMB Circular A-21: a detailed history of changes and a description of rate types.

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