

The Public Role in Higher Education

Abstract - Most students attending colleges and universities, in the U.S. and the rest of the world, attend public institutions. This is a bit of a puzzle for economists, as it is clear that higher education provides private benefits to those who acquire it. This paper evaluates a number of arguments for publicly provided and publicly supported (via both nonprofit provision and direct support of students) higher education. We find that the arguments for nonprofit provision, whether public or private, are powerful for most undergraduate education and for basic research. We suggest that there are strong equity reasons for public support of higher education for lower-income students, and that general public support may have good efficiency properties as well. We also show that the common system of tiers in public higher education, with flagship universities, regional campuses, and community colleges, is economically efficient under plausible assumptions.

INTRODUCTION

What should be the public role in higher education? Asked by an American economist in 2005 (say, an editor of the *National Tax Journal*), the question carries a skeptical connotation, almost a challenge. Given the neoclassical economist's presumption in favor of markets, we are implicitly asked either to justify public provision or argue for its abolition or limitation.

Whatever the public role should be, in practice it is extensive. Around the world and around the United States, higher education receives extensive public subsidy in a variety of ways. The vast majority of students (over two-thirds of those in degree-granting institutions in the U.S., and almost certainly more in the rest of the world, with the exception of Japan and Korea¹) attend institutions that are explicitly public in their organization. Further, in the U.S., over 80 percent of students who attend private institutions are enrolled in private nonprofits, which receive substantial tax benefits by virtue of their nonprofit status (U.S. Department of Education, 2005, Table 171). Of course, students in public institutions

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¹ Organisation for Economic Co-operation and Development (OECD) data suggest that over 90 percent of students in Western Europe attend institutions that receive substantial public support. Of the OECD countries, Japan and Korea stand out as exceptions with 91 and 85 percent, respectively, of students attending private institutions. The most prestigious institutions in Japan are public (OECD, 2005).

generally pay tuition, so the public share of expenditure in public higher education is less than the fraction of students in institutions that are governmental entities. But no matter how we slice the data (and we will slice it in quite a few ways in the course of this paper), the public sector is a major part of the higher education sector, for all levels of higher education (community colleges through graduate and professional), pretty much everywhere in the world.

An extensive public role in higher education has been, near as we can tell, essentially universal for over a century, and has been replicated under a wide variety of public choice mechanisms. From the perspective of almost everyone but market-oriented economists and their kin, the more plausible motivating question of this paper might be, “what, if any, is the appropriate role of private higher education?” Knowing our audience and our editor, however, we will stick with private provision as the null, and try to illuminate and evaluate reasons for public sector provision and support.

PRELIMINARY OBSERVATIONS AND DATA

Our introductory paragraphs take note of two quite different phenomena—public support of privately provided higher education, and public provision of higher education. It is interesting that these two structures coexist at significant scale. Elementary and secondary education, health care, and the visual and performing arts are the only other sectors that we can think of where the public provides significant direct provision as well as support for private provision. (And we note that universities, public and private, are providers in all of these cases.)² But public provision

and public support are different in important ways. In the U.S., public colleges and universities are directly or indirectly answerable to citizens of the relevant state or locality, via governmental structures of various kinds. Private nonprofits are generally answerable to private boards, and the ability of governments to affect their behavior is much more circumscribed. Further, the public sector provides support to both sets of institutions, and also provides resources to for-profit institutions, via scholarship programs, student loans, research grants and contracts, and a variety of other mechanisms. Many of these sources of support are independent of the organizational form of the institutions in question. For example, Pell Grants, Stafford Loans and other forms of governmental support are available to all students in programs—including programs offered by proprietary institutions—that meet a broad set of criteria.

Public support of higher education in the U.S. varies in at least three important ways: (1) By type of institution (public, not for profit, proprietary); (2) By object of expenditure—the public sector may purchase educational services directly, pay for research through grants and contracts, make direct institutional appropriations, give tax preferences, and subsidize private expenditure on higher education; (3) By “product,” including instructional programs from community colleges through doctoral and professional education, sponsored research, extension services and their kin, technology transfer, provision of social skills and citizenship, local cultural amenities, and many more. Moreover, although not all products are provided by all types of expenditures at all types of institutions, there are examples to be found in the majority of cells in this taxonomy, as shown in Table 1.

² We also note that all of these goods have been identified as “merit goods” in the literature (Musgrave, 1959). We distinguish support for private provision from government contracting with profit—making suppliers to obtain services, as in the case of the Defense Department and Halliburton.

TABLE 1
SUPPORT FOR HIGHER EDUCATION

Source of Expenditure	Type of Institution and Object of Expenditure									
	Public			Not for Profit			For Profit			
	Undergrad	Graduate	Research	Undergrad	Graduate	Research	Undergrad	Graduate	Research	
Public										
Demand Subsidies	X	X		X	X		X		X	
Institutional Support	X	X	X							
Direct Appropriations	X	X	X	X	X	X				
Tax Expenditures										
Private										
Tuition	X	X		X	X		X		X	
Other Fees and Charges	X	X	X	X	X	X	X	X	X	X
Charitable Donations	X	X	X	X	X	X	X	X	X	X

Note: X implies something more than minimal expenditure.

Many types of public expenditure in the higher education sector are purchases rather than subsidies, and it can be misleading to look at the size of public institutions or public support simply by adding up total expenditure. Research and medical care, for example, are often purchased by governments from universities. However, such purchases may also include a subsidy component. Indeed, in the not-too-distant past, reimbursement formulas for Medicare and Medicaid were more generous for teaching hospitals than for others (Grimm, 2002; Romano, 2003), and Indirect Cost Recovery on federal research grants was widely seen as including a component for general institutional support (Bye, 2001; Raz, 2002). Public support comes in many forms.

Federal aid programs for students have also had an institutional subsidy component. Such programs look like a subsidy to students to purchase educational services (so a means-tested voucher). But it is clear from the legislative history that Congress was interested in helping colleges as well as students with the Pell Grant program.³ In fact, there was close competition between proposals for institutional aid (defeated partly because of concerns about separation of church and state as well as political difficulties of allocation) and student aid. Congress knew they would be bolstering institutions' revenues when they funded student aid (Gladieux and Wolanin, 1976). Anecdotally, the subsidy component in all of these domains has fallen over time, putting financial pressure on colleges and universities in general, including academic medicine and dentistry.

Perhaps the most notable feature of Table 1 is the similarity between public institutions and private nonprofits. They

differ only in three cells (those for direct public support at the institutional level). Notice that with the exception of direct appropriations, private nonprofits receive the same types of public support as do public institutions. This support continues, even as there has been an attenuation of public support for public institutions (Kane and Orszag, 2003). In many ways, certainly fiscally, the two types of institutions are becoming more like each other. Proprietary (private for profit) institutions look quite different in terms of Table 1, and, as we shall see, in other dimensions. To get a little ahead of our story, we will argue below that for many of the activities encompassed by higher education, and in particular for the undergraduate education of young people, the relevant choice is between public institutions and private nonprofits. For-profit institutions serve a relatively small part of the market, both in overall size and in mission. (See Table 2.)

This last point is also important as we consider the counterfactual to public higher education. Suppose that in response to a libertarian sweep of the state legislatures, public higher education (currently serving 12.75 million students of a total of 16.61 million) (U.S. Department of Education, 2005, Table 171) were abolished. What would happen to the assets (both human and physical) and operations of the existing institutions? It is a difficult circumstance to imagine, but our best guess is that much of the physical plant and many of the people employed in existing public colleges and universities would wind up in not-for-profit colleges and universities. When people talk about privatizing public higher education, they generally seem to have in mind converting state colleges and universities into non-profit colleges and universities. They may

³ The Federal Pell Grant Program, founded in 1973 as the Basic Educational Opportunity Grant, provides a federal grant of up to \$4,050 per year to undergraduate students with demonstrated financial need. The Pell program is designed to improve access to higher education for low- and middle-income students. The total value of Pell Grants in 2004–05 was \$13 billion (College Board, 2005).

TABLE 2
 NUMBER OF DEGREE-GRANTING INSTITUTIONS AND FALL ENROLLMENT
 BY CONTROL OF INSTITUTION

	Number of Degree-granting institutions*				Pct Public	
	Total	Public	Private			
1949-50	1,851	641	1,210		34.6	
1959-60	2,004	695	1,309		34.7	
1969-70	2,525	1,060	1,465		42.0	
1979-80	2,975	1,310	1,665		44.0	
1989-90	3,535	1,563	1,972		44.2	
1999-2000	4,084	1,682	2,402		41.2	
2003-04	4,236	1,720	2,516		40.6	
Total Fall Enrollment**						
	Total enrollment	Control of institution			Pct Public	
		Public	Private			
			Total	Not for profit	For profit	
1950	2,281,298	1,139,699	1,141,599	—	—	50.0
1959	3,639,847	2,180,982	1,458,865	—	—	59.9
1961	4,145,065	2,561,447	1,583,618	—	—	61.8
1970	8,580,887	6,428,134	2,152,753	—	—	74.9
1980	12,096,895	9,457,394	2,639,501	2,527,787	111,714	78.2
1990	13,818,637	10,844,717	2,973,920	2,760,227	213,693	78.5
2000	15,312,289	11,752,786	3,559,503	3,109,419	450,084	76.8
2002	16,611,711	12,751,993	3,859,718	3,265,476	594,242	76.8

Source: U.S. Department of Education (2004, Tables 171 and 244).

*Data on number of institutions for 1950-1980 covers "Institutions of higher education, excluding branch campuses," 1990 includes branch campuses, and data for 2000-2004 covers "Title IV eligible degree-granting institutions, including branch campuses."

**Enrollment data for 1950-1990 covers "Institutions of higher education," while data for 2000-2002 covers "Degree-granting institutions."

also be talking about some consolidation and rationalization of the sector. Rarely do commentators envision handing these assets over to profit-seeking businesses. (We will have something to say about why that is so below.)

During the period immediately after World War II, there was a huge increase in the number of students going to college. Strikingly, the lion's share of the growth in capacity between 1950 and 2002 was in public institutions, which increased annual enrollments by over 11.6 million students over that half century, while private institutions increased enrollment by about 2.7 million (U.S. Department of Education, 2005, Table 171). In other words, the last time the country "decided" that the sector should grow markedly, it grew disproportionately on the public side. Goldin and Katz (1999) document that this postwar trend is a continuation of

a trend that began around 1890. The share of students in higher education that were in public institutions grew steadily from the 1890s to the 1970s. Since the 1970s, that share has stayed roughly constant. In states where private universities were well established, public enrollments grew more slowly. Goldin and Katz (1999, p. 54) find that the correlation of public college enrollments per capita in 1994 with private college enrollments per capita in 1900 was -0.56. "[N]ewer states with a high share of well-to-do families and scant presence of private universities in 1900 became the leaders in public higher education by 1930. They remain so today" (Goldin and Katz, 1999, p. 54) Finally, it is interesting to note that almost half the growth in enrollment in private institutions between 1980 and 2002 is in institutions with explicit religious affiliation (U.S. Department of Education, 2005, Table 179).

Thus, one argument in favor of public higher education is that it seems to have been much the more responsive to demand over the last 100 years and more. This could be an artifact of public choice mechanisms that favor public institutions, of course, although we have not uncovered any evidence that the nonprofits were somehow prevented from increasing capacity during this period. Indeed, Ehrenberg (2001) suggests that those private nonprofits with ample resources and excess student demand may have been less responsive to the growth in demand because of an interest in maintaining endowment per student and, hence, quality.

ARGUMENTS FOR AND AGAINST PUBLIC SUPPORT FOR HIGHER EDUCATION

The substantial private return that accrues to postsecondary students leads to a *prima facie* case for private provision and a minimal public role, on what appear to be straightforward efficiency grounds. Concerns about equity lead quite naturally to a possible public role for need-based aid, but beyond some mechanism of portable tuition grants and other subsidies to needy students, many economists have trouble finding any rationale for public subsidy of higher education *per se*. After all, here we have an investment that yields a handsome private return. This is exactly the sort of circumstance in which one expects markets to do a good job.

In this paper we discuss, in turn, four general classes of rationale for public subsidy of higher education.

1) Undergraduate education of young people—that is, students who are just out of secondary school and who are still growing up—is almost universally provided by nonprofit institutions (both public and private) and, hence, almost universally provided with substantial

public support. Weisbrod (1988; 1998) has suggested that nonprofit and public production tend to be preferred organizational forms when important elements of output are difficult to measure. This is a feature of undergraduate education of young people, notably of the parts of the college experience that are aimed at helping teenagers to become adults, including the residential experience that many colleges provide. It is also a feature of pure research, as well as other products of the higher education sector.

Hart, Schliefer and Vishny (1997) suggest similar criteria in considering whether goods with public elements should be privatized. When complete performance contracts are difficult to implement, public provision may be more efficient than private. Weisbrod also points out that to the extent that charitable contributions are a potentially important source of revenue, nonprofit status—with its limitation that any profits be spent within the firm—is essential. (No one donates to General Motors, even when, as today, GM is needy.) To the extent that at least some of the outputs of higher education—notably undergraduate education and basic research—must be evaluated on many dimensions, some of which are not readily quantifiable, the most efficient organization for their production is not-for-profit. (This line of argument does not suggest any advantage to public provision *per se*, but it does imply public support, given the tax advantages of not-for-profit organization.)

2) Bowen (1977) provides a long list of outputs of the higher education sector that are public or quasi-public in nature. Some of these involve desirable characteristics of an educated citizenry that do not provide direct economic benefit to those educated. Some involve positive externalities from research. Additionally, Rizzo (2004) and others have argued that there are economic and other benefits

to localities, states and the country as a whole that derive directly or indirectly from the presence and performance of colleges and universities.

3) Suppose, as has been widely argued, the standard method of providing need-based aid, namely discounts from posted tuition levels, augmented by further aid in some cases, is not transparent to the population that would receive such aid. Bowen, Kurzweil, Tobin and Pichler (2005) for example, find that income levels are an important determinant, over and above the effects via secondary schooling, on rates of college attendance (see also Ellwood and Kane, 2000). In this case, where relatively needy students do not avail themselves of the potential high rates of return and high incomes that higher education could afford them, it may be that a highly effective way to induce those students into the system is by widely advertised low or zero tuition.

4) General subsidy of higher education will surely lead to rents accruing to students who would have been willing to pay up to the net present value of their investment. But in light of the preceding argument, such subsidy may be desirable on distributional grounds. Depending on how the subsidy is financed, it may also be efficient. Suppose, as is widely asserted, that the rate of return to higher education at the margin is considerably higher than the net rate of return to alternative investments in the marketplace, plausibly due to the difficulty of using future earnings as collateral for human capital. In the aggregate higher education will be underproduced, implying a simple efficiency argument for subsidy or public provision, provided that the associated finance mechanism does not itself lead to reduced efficiency that is larger in magnitude than the gain. (One might also be concerned with equity criteria regarding the net effect of the financing

mechanism.) Taken to an extreme, this argument can support free public provision, provided that some nonmarket rationing mechanism is used to match students with institutions efficiently. If we believe that the rate of return to higher education is high because of some combination of imperfections in capital markets and underestimation on the part of some potential students (especially those of relatively low income) of the net benefits of higher education, the argument for free or subsidized provision is strengthened. To be sure, the private value of higher education is such that there would be a lot of economic rent generated in such a system, but from a welfare standpoint, rent is just rent.

In the remainder of this paper we treat each of these four general flavors of justification for public support in some detail. The discerning reader may have guessed by now that we are generally favorably inclined towards public support of higher education. We are much less clear on how much support is warranted, and how it should be allocated across types of institutions and types of output. A major purpose of this paper will be to suggest a research agenda that would enable us to be much more precise than is currently feasible.

We note that as a practical matter the arguments for public support are generally complementary with one another, because of complementarities in production (economies of scope) and economies of scale. Once we are teaching young people, we have a locus for other interventions involving young people. Where we have a faculty that knows what it is talking about, that faculty will also be interested in and engaged in research. The faculty will also have a taste for both production and consumption of a number of cultural amenities, and it will make sense for the local area to produce those amenities, in part to attract good faculty at reasonable

prices. Once some area of research is well developed, there will be other, related areas, that can produce at reduced unit cost by being in the neighborhood, leading to a payoff to large universities (or cities with many universities) with diverse expertise. Some of the outputs of these structures are all or essentially all private, and some are highly public. If there is a cost or production advantage to locating the activities together, however, there will be an argument for some subsidy as long as the value of the public components exceeds the cost of the subsidy.

Nonprofit Provision

With the exception of proprietary institutions, such as DeVry Institute and the University of Phoenix, which accounted for about five percent of students in 1999–2000 (U.S. Department of Education, 2002), higher education in the United States is provided by non-profit institutions. Indeed, as we noted earlier, there are considerable similarities in both the financing and the functions of public and of private non-profit colleges and universities. As public support through state appropriations declines as a share of revenues at public institutions, as it has been doing since the early 1980s, the similarities between public and private nonprofit colleges and universities have increased. As a practical matter, discussions of the “privatization” of public higher education, whether from those who welcome it or those who decry it, are really discussions about moving public institutions in the direction of private, nonprofit status.

Nonprofit institutions differ from proprietary ones in important ways. A similarity is that both types of institutions gain revenue from demand-side governmental subsidies (see Table 1 above) and, indeed, for-profit colleges are more dependent on these sources of revenue than either public or private nonprofit suppliers. However, for-profit suppliers benefit from neither

the direct public appropriations that are important for public institutions nor the tax exemptions on financial investments, gifts, property, etc. that both public and private nonprofit institutions receive.

For-profits also differ greatly in their governance from nonprofit and public institutions. Private nonprofit institutions are governed for the most part by self-perpetuating boards of trustees who are legally bound to advance the interests and mission of the institution and severely regulated in their ability to profit from the institution’s activities. Public institutions are generally governed by boards selected through a political process who are in some sense ultimately accountable to the state’s (or for community colleges, sometimes a local government’s) citizens. Importantly, public and private nonprofit institutions cannot be bought and sold in the usual way that companies are, because there is no “residual claimant” who can profit from a sale.

Thus, even if UCLA merged with USC and the University of Michigan became the Harvard of the Midwest that it loves to assert that it is, the resulting institutions would still be in the nonprofit sector and would still benefit from significant public subsidy.

The division between public and private nonprofit institutions may in some ways be less interesting than the question of why nonprofit provision is so prevalent in higher education. While the for-profit segment has grown rapidly (see Table 2), it continues to enroll only a small share of students and, moreover, serves mainly quite specialized roles—principally providing direct career training for adults. Very few students enroll in proprietary institutions right out of high school and for-profit provision is essentially unknown in liberal arts education and academic graduate education. The student bodies of leading proprietaries including the University of Phoenix are made up of adults with work experience and the curricular emphasis

is on specific, focused business training (Breneman, forthcoming).

What explains the prevalence of nonprofit supply? We think there is considerable merit in Weisbrod's (1988) argument that nonprofit provision is favored when output is hard to measure and monitor. In such circumstances self-interested incentives on producers are unreliable, because buyers cannot readily observe output quality. Markets may, of course, emerge to supply monitoring services, as by publishing ratings of products, but such efforts are themselves costly and imperfect, in part because the monitors themselves will require monitoring. (Note that Consumer Reports, which rates commercial products, is itself a nonprofit organization.)

When self-interested incentives are unreliable, there is reason to turn to institutional arrangements that limit the role of self-interested profit incentives and increase the role of commitment to institutional goals.⁴ Nonprofit organizations operate under rules that limit the ability of managers and trustees to benefit personally from their role in the organization. As Hansmann (1981) has noted, the crucial feature of nonprofit organizations is not that they cannot make profits, but that nobody can (legally) take those profits home with them—what Hansmann labels the “non-distribution constraint.” Obviously such rules can be stretched, by providing attractive benefits to managers or trustees, or simply broken. (Weisbrod refers to organizations that deliberately attempt to generate such private benefits as FPIDs—for-profits in disguise.) Still, these imperfections do not imply that a costly and imperfect for-profit arrangement will do better.

Many aspects of higher education seem to fit conditions that favor nonprofit provision rather well. The benefits to students of undergraduate education, particularly in the liberal arts, are often seen as many-sided, long lasting and difficult to measure. Even the material benefits, in terms of jobs and earnings, are harder to observe in the context of liberal education than in more immediately vocational preparation, where the first job after completing the program is a good indicator. Outcomes of basic research are similarly hard to measure in many cases and much of the apparatus of assessing the scientific quality of work relies on the non-self-interested judgment of editors and referees.

In these circumstances, creating an organizational framework in which leaders and overseers are selected on the basis of sharing the same values as the consumers of the output, and limiting the role of financial incentives, may have real advantages. Moreover, the nonprofit form creates opportunities for those who share the institution's values to make gifts to the institution without requiring the contractual commitment that would be necessary in a for-profit context.⁵ Moreover, the prospect of such gifts, which is enhanced by the charitable deduction, will encourage the nonprofit institution to advance donors' goals and, thus, pursue the institution's goals.

The fact that for-profit provision is most prevalent in those aspects of higher education where output is most readily and quickly measured—notably vocational preparation for adults—is consistent with this model. In fact, the history of proprietary supply in higher education strikingly illustrates these points. In 1973, when the Pell program was introduced, proprietar-

⁴ Hart et al. (1997) make a related argument regarding problems that can arise when public goods and services are privatized.

⁵ A profit-maximizing firm that receives an “unrestricted gift” would simply distribute the gift as profit to its owners. The fact that such distributions are forbidden in nonprofit institutions makes it more likely that unrestricted gifts will be devoted to purposes the donor values.

ies were a vanishingly small segment of higher education. Entrepreneurs quickly realized that students who could qualify for Pell grants and subsidized loans created a great opportunity. Entry was rapid; by 1990–91, 22 percent of Pell grants and 17 percent of subsidized loans went to the 1.5 percent of all students who enrolled at proprietaries (College Board, 2002; U.S. Department of Education, 2005). There was evidence that significant numbers of these largely unregulated schools were providing little of value to their students. Poor employment outcomes were indicated by the embarrassingly high default rates on student loans experienced by those who attended proprietaries. After years of struggle, Congress came up with ground rules that successfully linked eligibility for federal student aid at an institution to its default record. Many proprietary schools closed in the wake of these changes. Remaining proprietaries, and a number of new entrants, now faced better incentives to promote successful labor market outcomes for their students (as well as to screen their entrants more closely). Proprietary institutions now receive a smaller share of loan and Pell grant dollars than they did earlier, but have sharply reduced default rates, which appear to be explained by better employment outcomes for their graduates. As we go to press, the regulatory environment for distance learning has become more favorable. It will be interesting to see if this has any effect on default rates (Carnevale, 2006).

The foregoing discussion suggests that, to the extent that there are important elements of higher education in addition to the relatively straightforward transmission of academic skill, not-for-profit institutions, public and private, are better organized to produce higher education of young people than are proprietary institu-

tions. By virtue of their tax-exempt status, both public and private not-for-profit institutions also receive important public financial subsidy. Brody and Cordes (1999) estimate that tax expenditures that directly benefited education institutions in the late 1990s were over \$11 billion per year.

Public Goods and Externalities

There is an extensive literature identifying and measuring (with greater or lesser success) aspects of higher education that generate positive externalities or public goods. Bowen (1977) describes a broad range of benefits of a variety of kinds—public and private, marketed and non-marketed, cognitive and affective, personal and social. More recently, Rizzo (2004) summarizes much of the literature, and Siegfried, Sanderson and McHenry (2005) provide a critical summary of putative economic development benefits in excess of the private returns to higher education. Topel (2004) also evaluates these claims, as does Vedder (2004).

As we evaluate external benefits that derive from higher education, an interesting issue rises with respect to local or regional (especially state-level) externalities and public goods. Given the setup of U.S. public higher education, states and localities (in the case of community colleges) may well find it rational to produce such goods in competition with other states and localities, even if the net social benefit of such competition is zero or negative.⁶

The positive externalities claimed for higher education redound both to economic performance and to non-economic aspects of civic life. Indeed, the non-economic motivation is explicit in one of the earliest expressions of national policy towards higher education, the Northwest Territories Act of 1787: “Religion, morality,

⁶ Further, as is often the case of various local economic development schemes, there may be political incentives to such behavior even if the local net economic effect is nonpositive (see Courant (1994)).

and knowledge, being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged.” Many such non-economic arguments are difficult to evaluate.

However, the connection between education and voting behavior is by now well-documented (College Board, 2004; Dee, 2004; Milligan, Moretti and Oreopoulos, 2004; Rizzo, 2004). The College Board uses Census, BLS and other data to show that college graduates engage in higher rates and quantities of volunteer behavior, donate blood in greater quantity, among other good things. Dee describes a large political science literature supporting these positive civic effects of education, but notes that unmeasured individual and family characteristics affecting both educational attainment and civic engagement make it difficult to identify a causal relationship. Dee instruments for college attendance using local availability of community colleges and finds that “college entrance” increases reports of voting by 17–22 percent. Using child labor laws as an instrument, he also finds that education increases support for free speech. Given that college graduates also have higher incomes and, hence, opportunity costs of time than the population on average, the results regarding volunteerism and blood donation are quite striking.

Economic Benefits

Local economic benefits of higher education come in a variety of forms. Some are related to the size or fraction of the college-educated population and, hence, raise “build vs. buy” decisions, which we discuss later in this section. Others are

directly attached to the existence of institutions of higher education in particular places. We deal with each in turn.

Moretti (2004a; 2004b) finds that wages of low-skilled workers and productivity of establishments rise with the share of college graduates in an area. Similarly, Glaeser, Scheinkman and Shliefer (1995) and Glaeser and Saiz (2004) show that growth rates of income are positively correlated with the fraction of college graduates in an urban area. To the extent that some of the income growth redounds to the benefit of residents other than the graduates themselves (Moretti) this implies a positive external benefit. Glaeser and Saiz compare Detroit and Boston in 1980, and note that Boston, which had and has the higher percentage of college-educated residents, has done much better since 1980.

At the national level, it is plain that human capital is positively associated with economic performance, and it is widely argued that human capital is the only mechanism that can support innovation and high wages in a sustained way.⁷ However, the holders of human capital may well capture enough of the benefits privately that there is no national economic argument for supporting human capital acquisition *per se* (see Topel (2004)). At the same time, there is a persuasive argument for national-level support for basic research, as the benefits of such research are difficult for commercial entities to appropriate. To the extent that universities are efficient loci of basic research, there is an argument for federal support of universities.⁸ The theoretical arguments for national support of basic research are familiar and there is good evidence that average returns are high (Nelson,

⁷ The popular form of this argument is presented in Friedman (2005).

⁸ One advantage that universities have relative to research labs is that they tend to cover a broader range of expertise, and, are, thus especially effective at conducting research that requires a high level of expertise across fields. Additionally, if the production function for teaching is complementary with that for basic research, as we believe it is, universities have a further efficiency advantage relative to dedicated laboratories (Nerlove, 1972).

2002). We know of no persuasive empirical evidence that would tell us whether marginal returns imply that current levels of support are well justified on efficiency grounds. This strikes us as promising territory for empirical work.

A second cluster of putative economic benefits of higher education derives from the idea of economic impact, and local and regional multipliers on aggregate economic activity with respect to expenditure on and by institutions of higher education. Of course, even if such impact is established, changes in employment or measured income are not necessarily good measures of economic benefit (Courant, 1994). Moreover, as Siegfried et al. (2005) point out, economic impact studies are prone to errors that would embarrass the economics departments in the very institutions that often cite such studies as justification for public support. Many of these studies fail to account for the fact that state and local revenue, if not spent on education, will be spent on something else (private or public), which would also have economic impact.

The counterfactual case is often badly specified. What would the world look like if, say, Michigan State University were to disappear? Would the students who are residents of Michigan be picked up by other schools in-state, or not get educated at all, or go elsewhere? How would MSU's existing capital stock be used? Would the dogs and cats that are treated at MSU's excellent veterinary facilities simply languish, or be treated in-state or out of state, or would the facilities be sold or donated to a nonpublic provider? Would the extension service disappear or be picked up by another state agency? All of these questions matter in an assessment of economic impact.

Economic impact is a domain in which it is especially important to consider the relevant geographic range. If community college students do not purchase their educational services at the local com-

munity college, they may well purchase pretty much the same services at a similar institution not very far away. There may be an effect on the distribution of economic activity at the city or county level, but it is hard to imagine in many cases that it extends much farther. However, the ability of community colleges to run programs that are tailored effectively to local industry can have a positive effect on employment in the local region, with real economic benefit to local workers and to other factors that are not perfectly mobile.

The geographic compass is very important at every scale of evaluation. From the perspective of fixed factors in a state, subsidy of a major research university may well be warranted, as the university will sell services to the federal government, and students from out of state will spend money in state, leading to the usual kinds of economic multipliers. (Siegfried et al. (2005) warn us, correctly, to be suspicious if the multipliers are estimated to be much greater than 2.0.) But from a national perspective, these effects net out provided that the total level of such activity is fixed. The analogy to other state and local economic development programs is straightforward.

As in the evaluation of such programs in general, if we are to assert that subsidies for higher education have a net payoff for a state or region, simply counting direct and indirect employment won't do. One important hint that there may be net benefits to the investment at the state level is the specialization of research expertise, state by state, to match important sectors (often deriving from natural resources) of the state's economy. Goldin and Katz (1999) point out that during the period when the public universities of the Midwest and West were being established, they often specialized in mining, or agriculture, or engineering, according to differences in the local economies. Especially in a world with substantial frictions due

to transportation costs, the payoff to this kind of local expertise could have been very high. Indeed, Goldin and Katz suggest that many of these institutions may have gotten into the teaching business because the marginal cost of doing so, given the presence of a research faculty, was quite low.

There can be little doubt that provision of ideas and skilled labor to the particulars of local economies was an important motivation for the development of public universities from the late 19th century well into the 20th century. As transportation and communication have become cheaper, justification of subsidy to produce local expertise surely gets weaker, although it does not vanish provided there is still some advantage to locally oriented expertise. Moreover, once institutions exist and are effective, if there are scale and scope economies there is an economic motive for continuing to exploit them, even if the configuration of public benefits that they produce has changed.

Most students who go to college choose to do so close to home. The median distance to school in 1999–2000 was 13 miles for all undergraduate students and 23 miles for traditional four-year programs. (The averages, respectively, were 88 miles and 137 miles.) For community colleges, the median is nine miles, and the average, 33 miles. 88 percent of students in public institutions, and 90 percent of those in proprietary institutions, go to school in their state of residence (U.S. Department of Education, 2002). There are a number of reasons to believe that such choices are rational. For students at all but elite institutions, there are both economic and social supports nearby that will not be available farther away. Everything else equal, going to school close to home can reduce costs and increase benefits.⁹ There

is also some evidence (Groen, 2004; Groen and White, 2004) that college graduates are somewhat more likely to stay in the state where they went to school than are graduates from other states.

Many of the benefits of higher education adduced in this discussion—economic performance of graduates as well as overall economic productivity, citizenship, lower crime, etc.—are available by creating environments that are attractive to college graduates, but do not require producing college graduates locally. At the same time, a number of considerations suggest an advantage to building rather than buying. These include the tailoring of research and training to local economic opportunities, the ability to compete for export income based on research and education, and such advantages as may accrue by providing educational opportunity to nearby residents, among others.

The net costs and benefits to states and localities of subsidizing local institutions of higher education then becomes an empirical question, and our reading of the literature as it stands is that we do not know the answer. The fact that U.S. public institutions tend to be funded at the state and local level, rather than at the national level, as is the case in much of the rest of the world, provides a quasi-competitive explanation for at least some public provision. Universities provide economic benefits on a local and state scale and, hence, there are payoffs, pecuniary and otherwise, to their presence in one's state or locality. When university expertise was more closely tied to local natural resource bases than is now the case, this motivation for public provision appears to have been quite powerful. One of the consequences may be salutary for the whole system: Michael Rothschild

⁹ Many educators, including the authors of this paper, would argue that one of the benefits that higher education offers to young people is the opportunity to develop in a novel setting, away from home. What the data make clear is that this benefit is far more prevalent at the high end of the market.

(personal communication) has suggested that the quality of the U.S. system derives in part because of extensive competition among the public (as well as the private) institutions, something that does not arise in a unitary, national system.

Basic Research and Broad Expertise

There is one other important public good at stake, and that is the production and maintenance of knowledge and expertise that, although not immediately practical or popular, may be of value when conditions change. This is a classic insurance argument, and one that has repeatedly paid off. Had there not been university-based departments of Near Eastern Studies, and of religion, the ability of the U.S. and the West generally to understand and develop policy in response to 9/11 would have been even weaker than it has proved to be. Arcane fields in all branches of knowledge, from the sciences to the humanities and arts, often turn out to be of practical value, and it is very hard to predict what will be useful. This argument for both liberal education and for basic research—worth doing in part because we simply do not know what the next problem is going to be—is internalized both by public institutions and by nonprofits. It is difficult to imagine it sustaining the agendas of proprietary institutions of either education or research.

Local Amenities

There are also cases that combine the economic and civic motivations, as might occur when the university-based music school both soothes a savage breast and, in so doing, provides a local consumption amenity that reduces the equilibrium wage of skilled labor and, hence, adds

to the strength of the local economy.¹⁰ A similar argument applies to museums, intercollegiate football games, library holdings and a host of other attributes of college towns that are found attractive by at least some segments of the populace.

Quite speculatively, imagine a world in which the only external economic benefit that derives from institutions of higher education were amenity values of this kind. If the rest of the activity—that is, all of the direct educational products—exactly met a private benefit–cost test, it would still be rational for localities and states to subsidize colleges and universities provided that there were scale economies to be exploited in the production of the related amenities. Indeed, if the amenity value were large enough, it might be rational to run the educational enterprise at what (without the amenities) would be a net social loss. If the human capital market imperfections that we discuss in the next section are large enough, the social loss could turn into a social benefit even at national scale.

This line of argument also provides a partial explanation of the fact that public institutions did not tend to grow where there were preexisting successful private institutions (Goldin and Katz, 1999). There is also a more traditional rent-seeking explanation. For example, Harvard succeeded in delaying by 31 years the granting of a charter to Williams on the grounds that Massachusetts did not need two colleges (Birdseye, 1907).

Equity and Financial Aid

Young people from low-income families are substantially less likely to attend college than are their more affluent counterparts. The income-related attendance gap is greater at four-year colleges than

¹⁰ There is an extensive literature documenting the positive effect of local amenities on local economic activity (see Rosen (1979), Roback (1988), Courant and Deardorff (1993), and Schmidt and Courant (forthcoming) for examples and references).

at two-year colleges, and is strikingly large on highly selective “elite” college campuses. In 1999, for example, more than a quarter of students from families earning over \$200,000 per year attended highly selective colleges and universities, while fewer than six percent of students from families earning under \$20,000 did so (McPherson and Schapiro, forthcoming).

A large part of this inequality in college attendance rates can be explained by differences in academic preparation. We know that as early as first grade there is already a substantial gap in test scores between students from richer and poorer families (Duncan and Magnuson, 2005), and we know that this gap grows in the course of schooling. Bowen, et al. (2005) show that only 2.4 percent of high-school graduates from the bottom quartile of incomes wind up scoring above 1200 on the SATs (a reasonable threshold for admission to the most selective colleges), while 14.6 percent of those from the top income quartile do (see Table 3).¹¹

Yet differences in academic qualifications do not appear to explain all of the difference in college attendance rates by income group. Table 4 shows differences in attendance rates for high-school graduates cross-classified by income group and test score group. It is clear that for four-year colleges, even after controlling for test scores, there remains a significant gap in college attendance rates. Ellwood and Kane (2000), in a much more carefully controlled study, find that after correcting for differences in academic qualifications, parental education, race and several other factors, there remains a significant negative effect of low income on likelihood of enrolling in college.

Economists’ favorite explanation for this income gap is imperfections in the capital market—the inability to finance worthwhile investments in human capital through borrowing, an inability that comes about because of the difficulty of using future earning power to secure a loan. Such imperfections have no doubt

TABLE 3
 PERCENTAGE OF NELS 1988 EIGHT-GRADE COHORT WHO GRADUATED FROM HIGH SCHOOL, TOOK THE SAT, AND SCORED ABOVE 1200 BY FAMILY INCOME AND PARENTAL EDUCATION

	Graduated From High School (Diploma or GED)	Took the SAT (of HS Graduates)	Took the SAT (full cohort)	Scored Above 1200 (of those who took the SAT)	Scored Above 1200 (full cohort)
Family Income					
Bottom quartile	79.9	34.2	32.2	7.4	2.4
2nd quartile	90.1	40.3	38.8	7.9	3.1
3rd quartile	94.8	50.9	49.3	12.0	5.9
Top quartile	97.1	70.1	68.4	21.4	14.6
Parental Education					
Neither parent attended college	76.9	30.8	28.0	3.3	0.9
At least one parent attended college	92.4	49.6	48.1	13.7	6.6

Source: Bowen, Kurzweil, Tobin, and Pichler (2005).

Note: Income quartiles are based on the 2000 Census, deflate to 1991 dollars. The third and fourth quartiles are slightly smaller than they should be, and the bottom two quartiles are slightly larger due to variable coding restrictions. The percentage of the cohort who took the SAT is not equal to the product of those who graduated from high-school and the high school graduates who took the SAT because there were non-graduates who took the SAT.

¹¹ This gap is partly the result of differences across income groups in the likelihood of taking the test—which has no doubt only partly explained by differences in academic preparation—but even among those who take the test, low-income students are substantially less likely to score above 1200.

TABLE 4
 POSTSECONDARY ENROLLMENT RATES OF 1992 HIGH-SCHOOL
 GRADUATES BY FAMILY INCOME AND MATH TEST SCORES

Math Test Scores	Lowest Income	Second Quartile	Third Quartile	Highest Income
All				
Lowest Third	48	50	64	73
Middle Third	67	75	83	89
Top Third	82	90	95	96
Four-year				
Lowest Third	15	14	21	27
Middle Third	33	37	47	59
Top Third	68	69	78	84
Two-year				
Lowest Third	33	36	43	46
Middle Third	34	38	36	30
Top Third	14	21	17	12

Source: College Board (2004, pg. 30).

been reduced substantially over time by the introduction of federally guaranteed (and now also federally financed) loans for college, along with grants and subsidies to tuition. In 2003–04, the federal government provided over \$25 billion in subsidized loans to students and another \$30 billion in unsubsidized educational loans to students and parents, along with more than \$17 billion in federal grants (College Board, 2005). In most states, community college attendance is very low in price for students who qualify for aid. Still, it is not obvious that loan capital is sufficient to eliminate credit rationing. The most a dependent freshman can borrow in the federally subsidized loan program is \$2,625 (U.S. Department of Education, 2004), a ceiling much lower than in 1977, when the nominal limit of \$2,500 was equivalent to over \$7,500 in 2005 dollars. Pell grants, too, are worth less than in 1977. Moreover, the opportunity costs of attendance may remain high for students, particularly if their families rely on them for support, and in many states capital market constraints may loom larger for attendance at four-year than at two-year colleges.

There is a lively dispute among economists about the empirical evidence con-

cerning credit rationing for college (see Kane (forthcoming) for an overview and extensive references). James Heckman has been a strong proponent of the view that the “short-run” liquidity constraints facing students at the time of high-school graduation are far less significant than the “long run” capital market constraints that low incomes impose on these students’ earlier cognitive development—the constraints that lead low-income students on average to be much less well prepared for college. That these long-run constraints are more important than borrowing capacity for high-school graduates seems quite likely, but that does not imply that the capital market constraints are trivial. Carneiro and Heckman (2002) suggest that as many as eight percent of high-school graduates confront liquidity constraints that affect college attendance. While eight percent is fairly small in aggregate, these liquidity constraints are presumably concentrated in the low-income population, where eight percent or even less would amount to a significant portion of the population.

Other factors beside liquidity constraints and differences in academic preparation may contribute to explaining the negative relationship between low

income and college enrollment. Several kinds of evidence suggest that young people from disadvantaged backgrounds may be poorly informed about the world of postsecondary education. Interviews and surveys suggest that students' career ambitions and educational plans are quite poorly aligned. For example, there are high-school students who say that they want to be doctors but do not take math in high school (Schneider and Stevenson, 2000). Similarly, high-school students are often unaware of the preparation they will need to succeed in college (Rosenbaum, 2001). These "disconnects" are generally worse for lower-income students, presumably because these students have fewer relatives and friends who can pass on good information about college and because lower-income students tend to attend weaker high schools that offer less adequate college counseling. It seems likely that this lack of information extends to knowledge of financial aid, so that students from disadvantaged families may underestimate costs.

Other evidence for this last point comes from several kinds of studies. Kane (1999) has argued that the responsiveness of enrollment to changes in tuition price is significantly higher than the responsiveness of enrollment to equivalent changes in student aid, indicating that families are less well informed about aid than about tuition level. Sue Dynarski (2000) has found that simple, broad gauged programs to cut the price of college, like the Hope Scholarship program in Georgia, which offers free tuition at Georgia's public universities to anyone who maintains a B average in high school and sustains it in college, have much bigger enrollment effects than do comparable increases in student aid. The natural experiment that occurred when Congress decided to begin subsidizing out-of-state attendance by D.C. students showed similarly outsized effects. All this suggests that students and their families have difficulty either

in understanding or in taking advantage of the aid programs. Furthermore, there is evidence that families often fail to apply for aid in programs they would clearly benefit from, suggesting again an information failure (Singell, Waddell and Curs, 2004). Finally, anecdotal evidence from discussions with university officials at a number of flagship institutions that have attempted to recruit more low-income students suggests that many in the target population simply have never considered the possibility that they could attend, for example, UNC Chapel Hill or UT Austin. Some students who could do well in such places see them as out of reach. (Turning these anecdotes into serious estimates would be a useful research project.)

The concern about information suggests that programs to subsidize college tuition should be as simple and transparent as possible. Particularly if one is aiming at students who have parents with limited education and/or limited proficiency in English, complex application processes may be a serious barrier to access. The old tradition of making public higher education "free" has much to recommend it from this point of view, even though it plainly also generated substantial rent for those who could afford to pay. Although community colleges continue to be low-cost alternatives even without much aid in many places, low-income students generally require aid to attend most colleges. Under current arrangements, the actual cost of attending college and the proposed means of financing it (that is, what loan options will be available) are the last pieces of information students receive in the college application process—information often received long after the decision about where to apply and the whole complicated process of applying has been completed.

The justification for this complex system is, presumably, that it improves efficiency in targeting existing aid resources (whether those are governmental

or institutional) and reduces the amount of rent provided to students who would receive more aid than they need under a less targeted system. This target efficiency, though, is purchased at the expense of an aid system of formidable complexity that delivers specific information only at a late stage in the decision process.

Difficulties under the current system in predicting what college will wind up costing may have a significant effect on students at earlier ages. To the degree that younger students or their parents either overestimate what college will cost or are simply discouraged by the uncertainty about that, they may be less inclined to invest in academic preparation at earlier points in schooling.

Efficiency and Subsidy

The preceding discussion can be used to motivate an argument in principle for public provision of higher education at zero or subsidized tuition. To be sure, students without financial need would receive a lot of rent. But rents are merely transfers, and economists recognize that such transfers are not, in themselves, resource-consuming. At the same time, if students with financial need were induced to go college, they would receive substantial benefit. Further, depending on the return to higher education and the marginal excess burden of the financing structure that is used to subsidize public higher education, such a scheme could be efficient. To be precise: If the propensity to attend college for this population is sufficiently tuition-elastic, and the excess burden of free or subsidized tuition is sufficiently small, and admissions are selective, higher income students will receive rent from public subsidy, but (in the limiting case where taxes are lump-sum) there is no efficiency loss on the financing side to offset the efficiency gain of inducing students to acquire productive higher education. Thus, the net effect on efficiency could be

positive. It is further true that this type of policy is easy to understand and, thus, would tend to overcome the information problems facing low-income students that we have discussed above.

The distributional aspects of such a policy, viewed in isolation, might, of course, be viewed as substantially less appealing. The benefits accruing to high-income families would be substantial, especially considering that their children are more likely to attend college, and to attend longer, than those from poorer families. Yet it can also be argued that the income benefits to students are partly recaptured through higher taxes and that wealthier parents also pay higher taxes. All this was the source of great controversy following the publication of Hansen and Weisbrod's 1969 book (Hansen and Weisbrod, 1969; Hartman, 1970; Pechman, 1970). A fundamental difficulty is that of assessing an isolated element in an overall scheme of taxation and expenditure. Even under an egalitarian criterion like Rawls' difference principle, the rent received by higher-income students might be justified by the improvements in circumstances for the students who would otherwise not have obtained higher education—provided anyway that there was no feasible way to provide these benefits without aiding the well-off.

Arguments for zero tuition might be compelling in the abstract world of a social planner free to optimize subject only to basic resource constraints. They may also have made considerable practical sense in an earlier day, when a much smaller fraction of young people attended college and when an expansive view of government was more credible politically. (California's 1960 Master Plan for public higher education, with its ambition to make public higher education available at very low cost to all high-school graduates, is an exemplar of that era.) In present-day circumstances, however, it is implausible that governments can command enough

resources to finance near-zero tuition for the large share of high-school graduates who enroll in public colleges and universities. The practical policy challenge is to provide adequate public subsidy for those students who would otherwise be discouraged from making socially desirable investments in further education, while limiting subsidies provided to more affluent families so that overall public expenditures on higher education are fiscally and politically manageable.

Economists sympathetic to the goal of encouraging more students to enroll in higher education, and wary of the budget implications of free tuition, have often advocated a “high tuition–high aid” strategy instead. This approach involves setting public tuition at levels that come close (or closer) to covering costs, and then providing substantial means–tested subsidies for students from families of low or moderate income. If one thinks of available subsidy dollars as constrained by a politically determined budget, such a policy may well maximize efficiency in using these dollars. Relative to a policy of low tuition for all students, this approach raises the net price to high-income students and lowers the price to low-income students. This puts the money where it is needed, and fits well with evidence that enrollment of low-income students is more tuition–elastic than is that of high-income students (Kane, 1994; McPherson and Schapiro, 1991).

This approach faces difficulties of its own. First, as noted earlier, the information demands imposed on families by a high-aid policy are substantial. When a public university announces that tuition is going up by \$500 and aid to high-need students is also going up by \$500, the tuition story gets headlines on the front page and the aid story is likely to be in paragraph 11 on page 23. As noted earlier, families need a good enough understanding of the system to forecast accurately that they will be able to handle the net price they will face and the linguistic and

analytic capacity to complete financial aid forms. Typically, the last piece of information the family learns in the college search–and–application process is what they will be asked to pay. This uncertainty may not only discourage college application, but at earlier stages may discourage college preparation. Second, the “high tuition–high aid” approach faces substantial political hurdles. Legislatures cannot bind their successors to balance tuition increases with aid increases. Moreover, the constituency for “high aid” consists of low-income people, a relatively small group (if the program is highly targeted) with little political power. In contrast, low tuition enjoys much more widespread support and is relatively easy to communicate. And much of the “cost” of funding students from well-off families is not an opportunity cost but a transfer. The big challenge to such low-tuition policies is that their budgetary costs are high, and have grown higher with expanded enrollments at the same time that states have experienced tax limitations and increased demands for spending on health care and other matters.

The grail to be sought here is a policy that (1) makes it easy for families to be confident at an early point (say at the beginning of high school) that they will have the help they need to manage college costs at the best institution that their students are qualified to attend, and (2) makes help available to a broad-enough segment of the population to be politically sustainable, while (3) at the same time targeting subsidies well enough to keep the budget costs acceptable. The broad-gauged state “merit aid” programs recently enacted in a number of states have some of the right properties—notably simplicity and (at least for now) political popularity—but they have also come under criticism both for their weak targeting and for possible unintended consequences (such as grade inflation and incentives for students to choose easy-grading courses) resulting

from their merit requirements (Dynarski, 2004; Heller, 2006).

Essential to an efficiency-based argument either for across-the-board or targeted subsidies is that higher education would be underproduced in the absence of public subsidy. Few would argue against the claim that, at a minimum, there is need for some governmental solution to the problem of capital market imperfections. That there is an efficiency-based case for subsidies beyond those required to improve capital markets is only mildly more controversial, in light of positive externalities from higher education. Many of these externalities are hard to measure and to value, but the widespread merit-good treatment of higher education seems to derive in part from a sense that education is a good social investment generally, as well as an effective means of promoting social mobility.

While a case for subsidy is easy to make, it is much less clear whether higher education is underproduced currently, given the complex patchwork of subsidies and governmental provision that now exists. Certainly there is substantial evidence that on average the rate of return to an additional year of schooling equals or exceeds that in capital markets generally (Card, 2001; Judd, 2000; Krueger, 2003). What is relevant to the policy question, however, is the rate of return at the relevant margins, and here there is much division of views. One line of thought is that, if access to capital markets is still constrained, some students who would earn a rate of return exceeding the social opportunity cost of the funds will not attend college. (The classical reference for this analysis is Becker (1967).) Lang (1993), Card (1995a; 1995b; 2001) and Kane and Rouse (1995) present empirical evidence favoring this view. A different perspective is suggested by the notion that individuals differ in their capacity to benefit from educational investments and that, at the margin, those

with lower expected returns will be less likely to attend (a phenomenon also elegantly shown in Becker's classic piece.) Carneiro (2003), Carneiro, Heckman and Vytlačil (2001) and Cameron and Taber (2004) question the interpretation of the results described just above and defend the view that the marginal rate of return is much lower than the average. Resolving this controversy or at least clarifying further the issues at stake is a worthy research goal.

In thinking about public investment in higher education, there is more than one margin to consider. In addition to the question of whether more (or fewer) students should attend college, there is also the question of how resource-intensive their education should be. Peltzman (1973) argued that the sort of in-kind subsidy provided by a public university could lead to underinvestment in college by creating a notch in the student's budget line: to get an education costing a dollar more than the one the public university provided, the student would need to forego the entire subsidy and switch to a private university. Kane (forthcoming) notes that the trend of recent years, with expenditure growth at private universities substantially outpacing that at public universities, makes this theoretical outcome more likely to be a real issue.

Peltzman modeled a situation in which there was only one type of public university, with a given per-student spending level. In fact, of course, most states operate some version of the California "Master Plan" model, in which there are several "tiers" of public higher education, typified by "flagship universities," state college campuses, and community colleges, and there is often further differentiation within the tiers. Admissions rules often play a strong role in allocating students across these sectors (with California's rules being more prescriptive and more

precise than most).¹² These stylized facts pose two fascinating and deeply intertwined resource allocation questions: how should levels of resources per student be set across the three sectors, and how should students be allocated across them? This is a classic “economist–type” question on which, so far as we have found, economists have had virtually nothing useful to say. We, therefore, report below on a simplified model, which has the virtue of bringing the issues to the fore and inviting further theoretical and empirical work.

Characteristics of Efficient Subsidy¹³

To keep our story simple, let us consider a world in which the public sector provides free tuition to all public institutions in a state, as a means to overcome the underprovision of undergraduate education. How might this be done most effectively?

Following Winston and Zimmerman (2003), we posit a production function for higher education:

$$Y = f(S, P, E),$$

where Y measures the educational attainment of a student, S is the student’s own input into the process (aptitude and effort), E is the input from the institution (expenditure on education per student would be the usual implementation) and P represents peer effects from other students. The production function is assumed to be well behaved in the sense that the marginal product of each of the

arguments is increasing in the levels of the others. This is the same as saying that the factors are quantity compliments. For the remainder of this discussion, we will ignore peer effects, important as they may be.

It immediately follows that at any constant cost of E , E should be an increasing function of S . That is, students who are best suited to profit from higher education should get more of it. Sallee, Resch and Courant (SRC; 2006) have shown that in the absence of scale economies, a production function of this form would require that each value of S would be associated with a unique value of E . If the production of E exhibits scale economies or if for some other reason E can only be produced in a limited number of fixed quantities, then the optimum configuration will involve clustering students by their values of S . The highest- S group will go to an institution with the highest E , then the next highest, etc. This social efficiency result will in fact be obtained independent of whether students are charged tuition. The most efficient system will involve selective admissions and (assuming economies of scale) a hierarchy of school qualities.¹⁴

Just how many tiers of school quality should be provided will depend on the details of the production function and the extent of scale economies. What is most important is that quality of school will be discontinuous, even if student quality is distributed continuously. This is exactly what we observe in most public systems, either formally, as in the three California systems—UC, CSU, and the community colleges—or informally, as

¹² The California Master Plan for Higher Education specifies that the UC system selects from among the top 12.5 percent of the statewide high-school graduating class, the CSU system selects from the top third, and the California Community Colleges admit any student who can benefit from further education (see <http://www.ucop.edu/acadinit/mastplan/mp.htm>).

¹³ The following discussion draws heavily on work done by James Sallee, Alexandra Resch and Paul Courant. See Sallee, Resch and Courant (2006).

¹⁴ Winston (1999) documents that both expenditure on and subsidy to students are increasing functions of school and student quality.

in the prevalence of a “flagship” public, other regional publics, and community colleges in many states. The institutions in the top tier invariably engage in selective admissions, and some or all of the regional institutions often do as well.¹⁵ Generally (Winston, 1999), the subsidy per student is largest in the top tier.

Consider the best student in the lower of two adjacent tiers. If she moves to the upper tier, she is unambiguously better off, as she receives more educational input. Similarly, holding total expenditure constant, all of the other students in the lower tier are better off, as the average input that they receive is increased due to removing one of their numbers. The other students in the upper tier receive a slightly lower quality education, due to increased congestion in the upper tier. At the optimum, the positive effects must be exactly balanced by the negative ones.

Note that the characteristics of this optimum imply that there will be excess demand for attendance in the higher tier. In this simple model, with no prices, students will want to attend the best school. It is important to underscore that, if tuition is kept at zero either for all students or for a high-need subset, rationing by admission standards will still be required for an efficient outcome (assuming the production function is as we have assumed). This is because all students will choose the higher tier if it is available for free. Indeed, even setting a uniform market clearing price will not solve the problem, for at the market clearing price, there will be students whose private benefit of attendance exceeds their private costs, but is not great enough to cover the congestion cost they impose on their colleagues. (Nor will they take into account the positive effects on the lower tier, but at the optimum

these must be less in total than the negative effects in the upper tier.)

There is a second optimality condition in SRC, which requires that the change in educational output in each tier be the same for a marginal change in expenditure. This assures that money cannot be moved around so as to increase total output.

The full optimum also requires that adding or subtracting a tier would not increase total wealth, and that expenditure at the margin be as productive as its opportunity cost, which is presumably private investment. The optimal number of tiers will depend, *inter alia*, on the distribution of student characteristics (which, in a richer model, will itself depend on the configuration of opportunities in higher education) as well as on the production technology.

On average across the country, instructional expenditure per full-time-equivalent student (FTE) in public doctoral institutions is more than twice that in community colleges (authors’ calculations using the 2004 Integrated Postsecondary Education Data System). We expect that the difference between flagships and community colleges is considerably larger. The point here is that we haven’t a clue whether the actual configuration, in California or elsewhere, of either total expenditure or provision of education across tiers, is anywhere near the optimum. What we do know is that the efficient system involves selective admission and a hierarchy of institutions.

CONCLUSIONS

Governments—state and (to a lesser degree) local as well as federal—have played a persistent and multi-faceted set

¹⁵ A revealing asymmetry is that students are almost never barred from enrolling in a lower tier than they qualify for. This presumably reflects that it is almost always in the student’s interest to go as far up the ladder as possible, because there are greater resources per student and (in reality, though not in the model) positive peer effects as well.

of roles in American higher education for well over a hundred years. There seems little likelihood—and no good reason—that this governmental role will end or be sharply attenuated in the near future, although the financing of public institutions and private nonprofits seems likely to continue to converge. The highly varied and notably unsystematic “system” of higher education in the U.S. manages to be responsive to the educational needs of a very wide range of Americans, while at the same time sustaining the majority of the most highly regarded universities in the world. In the words of *The Economist* (2005), “...America has the best system of higher education in the world.”

That said, we have no reason for confidence that the current array of governmental subsidies and operations is anything like optimal. Thus, while persistently high average returns to college education in the face of greatly broadened participation provide evidence that our overall investment in higher education (including the public investment) yields good returns, much more refined information about marginal returns would be needed to judge whether at the margin expansion or contraction of governmental investment would be efficient. Even more clearly, we know shockingly little about the marginal payoff to governmental investments in different parts of the higher education system. It is striking that economists have almost nothing to say about whether current relative spending levels on more and less academically well-prepared students are reasonable. There are researchable questions here that will become increasingly important as fiscal pressures on states and households force tough choices.

There is reason to worry about the equity of current governmental policies toward higher education. Our current financing system still throws up barriers to low-income students in the form of credit constraints, informational obstacles,

and mixed messages about college access. High economic returns to college have produced a substantial increase in the fraction of students going to college, but the increase has been much greater for higher-income students than for others, and not all the difference can be explained by differences in pre-college preparation. At least three kinds of policy initiatives deserve attention. First, simply keeping prices low or providing broad-ranging, simple financial assistance (as some state-level “merit scholarship” plans do) is often criticized as conferring excess benefits on more affluent students. True enough, but it is well to remember that these excess benefits are transfers or rents, not social opportunity costs. If broad gauged policies work because they are simple to communicate and politically attractive, inefficiencies in targeting need not be the decisive factor in evaluating them. On the other hand, when there are “hard” governmental budget constraints, there is an obvious case for directing money where it will meet the most need. Moreover, the manifest ability of the most visible private nonprofits to charge high tuition and to provide need-based aid suggests that public institutions could do the same, thereby reducing pressures on taxpayers while still assuring access. To the degree that policies can be developed that reach high-need students while overcoming the sometimes self-defeating complexities of the current aid system, there is reason to support them. Merely providing need-based aid, without widespread understanding of its magnitude and reliability, is probably not good enough. In any case, it is important to remember that the current level of subsidy to higher education appears to yield high returns on average. Without knowing more than we do, we see more downside risk than upside in reducing subsidies.

The public finance of higher education raises interesting questions of intergov-

ernmental relations. Some of the public goods and positive externalities of higher education are of only limited geographic range, and competition among states and institutions, viewed from a national perspective, merely produces rent for providers. Moreover, as transport and communication costs fall and as labor becomes more mobile, the benefits to a state from a local public university or the education of local students will also fall—a fact that is consistent with the declining priority states have been attaching to public higher education. To the extent that the benefits provided before were just rent at the national level, this change may be of little consequence (except regarding the regional distribution of welfare). But local and state public goods may well be produced jointly with national public goods, which include research (both basic and applied), external economic benefits of a more educated workforce, and the public goods of better citizenship, including reduced crime, among others. If states continue to reduce the relative priority they give to higher education, and the locus of public goods shifts to the country as a whole, it may make sense to consider an expanded federal role, especially so in light of the negative effect that reduced tax rates can be expected to have on charitable giving. At the same time, an increased federal role could come with strings attached that would weaken the distinctive strengths of American higher education.

The stakes are high; both the public interest and private wealth surely depend on human capital and the ability of the society to innovate. It is, thus, gratifying to see that education—including higher education—is attracting greater attention from economists. There are intellectually challenging and socially important questions to be tackled here, and we look forward to a period of rapid growth in knowledge in the service of policy.

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