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Does Federal Aid Drive College Tuition?

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EDUCATION

DOES FEDERAL AID DRIVE COLLEGE TUITION?

The "greedy colleges" thesis conflicts with how nonprofit universities decide on admissions and pricing.

BY ROBERT B. ARCHIBALD AND DAVID H. FELDMAN

Does an increase in the generosity of federal financial aid make college more affordable, or does it simply encourage colleges to raise tuition? In a Feb. 19, 1987 *New York Times* op-ed titled "Our Greedy Colleges," former federal secretary of education William Bennett made a strong case for the latter when he stated, "If anything, increases in financial aid in recent years have enabled colleges and universities blithely to raise their tuitions, confident that federal loan subsidies would cushion the increase." This seemingly simple claim has spawned a long, often heated, and highly politicized debate.

The "Bennett hypothesis" often is justified as simple economics. Federal aid is a subsidy. Increases in subsidies raise demand, and rising demand pushes up price. Yet the textbook model of a perfectly competitive market is a poor fit for the higher education industry as a whole, and it's quite inappropriate for understanding how tuition is determined at the nonprofit institutions that still dominate the higher education landscape. Colleges and universities are price setters, not price takers. Yale, Valparaiso, and Southeast Missouri State all "sell" education, but the services they offer are quite differentiated. And unlike most firms, nonprofit colleges and universities often turn away business. They care about who purchases their services.

We will present a simple enrollment management model of how nonprofit colleges jointly decide how to fill their classes and set tuition. Any vice president for enrollment will recognize this model as a close representation of how these decisions actually are made. This simple theoretical structure often is missing from popular discussions of how federal policy affects affordability, and from empirical tests of possible links between aid and tuition. The enrollment management model does not prove kind to the idea that federal aid causes tuition inflation at nonprofit institutions. On the other hand, there is good evidence for a Bennett effect at for-profit schools, whose behavior is better represented by the textbook model.

Although our theoretical framework finds no incentive for most colleges to adjust their tuition in response to changes in federal aid, institutions *can* "tax" away a part of the federal aid by reducing their own institutional aid. Schools can redirect those resources to other institutional uses. However, unless this tax rate implausibly exceeds 100%, students will still see lower *net price* tuition. The best evidence on the tax rate is that it is low overall, but higher at highly selective private institutions that are very generous with their own aid.

ENROLLMENT MANAGEMENT

All schools that are even minimally selective must have a way to produce the best possible incoming class while also hitting target levels of enrollment and revenue. The following simple model shows how this is done. In the short run we will assume the size of the institution is set. Its buildings, faculty, and staff determine that size. The school also knows how much revenue it needs in order to maintain its quality, and how much of that revenue it needs to extract from students in the form of tuition.

The process begins with the pool of applicants. All selective

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PHOTO BY THINKSTOCK

schools have some mechanism to rank potential students. For example, a school might employ a 10-point scale. Students rated 10 are the highest-quality applicants from the institution's perspective. Amherst's 10's and "Compass Point" State's 10's aren't the same group. Amherst's 10's will have rarified test scores and very impressive high school records. Nonetheless, for Compass Point State, its 10's will have the highest test scores and the best high school transcripts of its applicant pool. In addition, many of the 10's will bring something special to the incoming class: they may be accomplished athletes or musicians, or they may offer geographic, economic, or racial diversity.

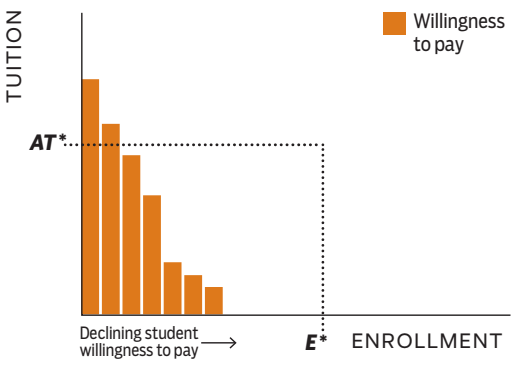
All schools would love to fill the incoming class with 10's, but few can come even remotely close to hitting their revenue needs from that group alone. That brings us to the next step in our representative school's admission process: estimating the willingness to pay of this most select group of applicants.

Most schools have information they can use to make this determination. Some applicants have had siblings or parents who attended. Some may have applied using "early decision" or actively pursued the institution in ways that suggest real interest. Many will have filled out financial aid forms that reveal a lot of information about family income and assets. On the other hand, the school will also know that these 10's are very attractive to other schools. Competing colleges may offer them large scholarships, and this may affect the applicants' willingness to pay at the school. As a result, the "yield" from this group may not be particularly high. The yield is the fraction of any particular group of admitted students that actually enrolls. This is not as large a problem for Harvard, Stanford, and Amherst, though even they must compete for the 10's in their pool.

How much revenue can the school extract from its most highly sought applicants with a 10 ranking? Figure 1 gives an example. The school has a target enrollment of E^* and knows that to hit its revenue target the average student who enrolls must bring in AT^* in net tuition. The rectangle of $AT^* \times E^*$ is the total revenue the school needs to collect. The height of the bars represents the willingness to pay of the 10's the school believes actually will enroll after the dust settles on the admissions game. The diagram is constructed by placing students from left to right in declining order of willingness to pay. The shaded area under the bars gives

the total willingness to pay from the portion of the 10's group the school reasonably expects to matriculate. If the institution can design its financial aid offers adroitly, it will charge each student his or her full willingness to pay. The shaded area is the revenue the school can get from this group. A quick look shows that the school cannot reach its revenue requirement or its enrollment goal from the group of students with the highest admission rating. Given the fact that these 10's have many other options, there simply aren't enough of them with a high willingness to pay who will choose to attend the school.

FIGURE 1
THE WILLINGNESS TO PAY OF THE MOST HIGHLY RATED CANDIDATES

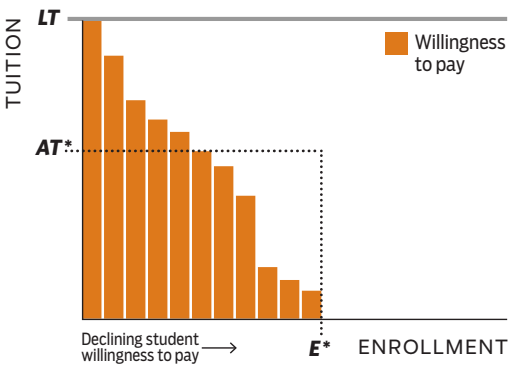


AT* = Optimal average tuition, ***E**** = Optimal enrollment

In order to meet revenue and enrollment goals, almost all selective programs admit and enroll students with lower admission ratings. Knowing the odds of enrolling students with successively lower admission ratings, schools can eventually craft a class with the highest possible average admission rating that satisfies the tuition revenue requirement while filling the seats in the entering class. In its enrollment decisions, a school may find that many of its 6's and 7's have a higher willingness to pay than many or most of the 10's. These lower-ranked applicants have fewer opportunities to earn merit scholarships at more selective schools, and many come from high-income families that do not qualify for need-based aid. For some schools this means that a student from the 6-group with a very high willingness to pay may get preference over a student from the 8-group with a very low willingness to pay. These schools practice "need aware" admissions.

Figure 2 illustrates the full outcome of the enrollment management process after the school has accepted students as far down the list as it thinks it needs to go. The area covered by the willingness to pay bars above *AT** is exactly equal to the area below *AT** not covered by student willingness to pay. If each student is charged exactly what the family is willing to pay, the average tuition will be *AT** and the institution will sell all of its seats. Institutions accomplish this by setting the list-price tuition at *LT*, the height of the highest willingness to pay bar, and giving the remaining students tuition discounts. Often these tuition discounts are given added marketing cachet with scholarship names.

FIGURE 2
PRICING AND ENROLLMENT



LT = List-price tuition, ***AT**** = Optimal average tuition, ***E**** = Optimal enrollment

This model is clearly a simplification. The real tuition-setting process is more uncertain and haphazard. For example, we assumed that the institution knows each family's willingness to pay and we also assumed it could accurately forecast the yield for each group of students. Some students do reveal their willingness to pay by presenting schools with competing offers as part of a bargaining process. But for the most part schools make guesses about willingness to pay using rules of thumb or with some type of forecasting model. Also, the yield on offers of admission can vary unexpectedly from year to year, and between the 10's, 9's, 8's, and so on down the list. Nonetheless, we think this simple discussion captures the essence of how tuition is set in much of the nonprofit sector. The model presumes the revenue needs are set first, based on the existing size and cost structure of the school, and the tuition setting and admission decisions are made together afterward.

At many public institutions, the legislature or a state board sets the list-price tuition. These schools have fewer levers to pull in crafting the incoming class. But selective public institutions still follow most of the enrollment management process. Their discount rates tend to be lower.

For-profit schools / The model is not a good description of how for-profit schools operate. These schools maximize revenue in the short run and profits in the long run.

For-profit schools do face some constraints on their selection of students. To keep their access to Title IV programs (Pell Grants and federally backed students loans), they need to ensure that their three-year cohort default rates on student loans remain within federal limits, and they need to get at least 10 percent of their revenues from non-Title IV sources (i.e., money from students and their families). But this sets a bare minimum quality standard for students.

For-profit schools do not sculpt their classes to improve the learning environment for everyone, and they have no particular interest in offering scholarships to attract particularly talented students to the residential mix. Most applicants to these schools will pay a set price with little or no

internal discount. The financial aid that is available to students at for-profit institutions is almost wholly made up of federal Pell Grants and loans.

THE BENNETT HYPOTHESIS

We can now ask how a nonprofit institution practicing the enrollment management approach we've described might change its behavior when the federal government makes financial aid more generous. Let's consider an increase in the maximum Pell Grant. Pell support goes to students with the lowest ability to pay. Because they are income-constrained, these students also have the lowest willingness to pay. If the Pell Grant maximum is raised, many of these lower-income students will be willing to pay more for a chance at a degree. Figure 3 illustrates this situation. The lighter-shaded portion of the willingness-to-pay bars shows the increased willingness to pay of students whose maximum Pell Grant has grown.

After an increase in the Pell maximum, an institution has many options and they're all good. However, some of them are less good for the average student who relies on Pell Grant support to pay for school. The best thing the institution could do to make college more affordable for its Pell recipients is to subtract the full increase in the Pell Grant from the amount the student needs to borrow. At the other extreme, the institution could cut its own institutionally funded scholarships dollar-for-dollar with the increased federal support. In the first case, the institution has not taxed the extra federal support at all; every dollar of added Pell support goes directly to the student in the form of a lower net price. In the latter case, the institution would get a tuition windfall; the institution has effectively imposed a 100% tax rate on the added Pell money, leaving the average Pell recipient's net price unchanged. But notice that in neither case would the student see a *higher* list price or net price.

A 100% tax rate is not 100% bad news for students, depending on what the college does with the found money. That extra revenue could be used to improve programming that benefits all students, Pell recipients and full-paying students alike. Alternatively, it could be targeted to student support services that are of disproportionate benefit to students from a disadvantaged background and to students who are the first in their family to experience the college world.

The federal government might prefer the first option, a zero internal tax rate. But it's up to the schools to set the tax rate because they know the Pell Grant award students are getting before they make their decisions about financial aid awards. The Pell program is an example of a "first dollar" award. Schools get to give the last dollar and the giver of the last dollar has more choice.

The school's most pressing needs will have a strong effect on the tax rate it chooses. Passing extra federal support to students as a lower net price can enlarge the applicant pool and this could help a university to attract a few more 10's and 9's compared to schools that tax the extra Pell money heavily. This would improve the quality of the incoming class and boost the graduation rate a few years later. In fact, for students who are near the threshold of Pell eligibility, the desirability of getting students tagged as Pell recipients may encourage some schools to add more institutional aid to those students' packages to boost the yield in that group, and there is very good evidence that many schools do behave this way. On the other hand, schools that offer very generous internal grant aid to low-income families may divert a large fraction of the extra federal aid into programming to aid students. At some elite programs, the net price is already zero for low-income families, so there is little incentive not to tax extra federal aid.

In our enrollment management model, list-price tuition is set by the willingness to pay of the wealthiest families whose children attend the institution. These students won't be eligible for Pell Grants. Moreover, schools cannot increase a student's Pell Grant by raising the list-price tuition. The size of the Pell Grant is determined by the difference between the Pell maximum and the expected family contribution (EFC). Congress controls the Pell maximum, and the EFC is a formula based on family income, family assets, and the number of children the family is supporting in college.

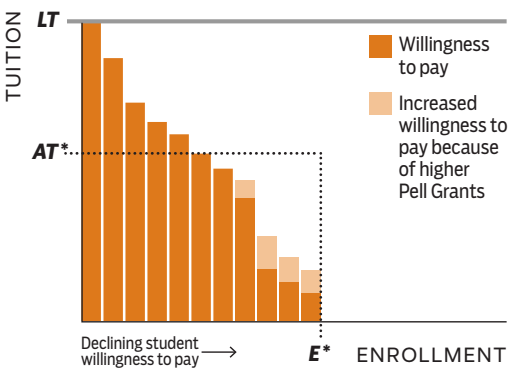
High-income families aren't the ones on the borderline between getting some Pell support and getting none. And at most nonprofit institutions, these families are unlikely to be eligible for subsidized federal loans or tuition tax credits. According to the *Digest of Education Statistics*, for the 2010–2011 academic year, 37% of students at private four-year schools did not borrow and 11% received no financial aid at all. Most nonprofit colleges have at least a few students who pay the full list-price tuition, and these families aren't affected by funding increases in need-based federal programs.

Some states offer their own tuition assistance grants to students attending in-state nonprofit institutions (public and private). These state grants often are not need-based. Making these programs more generous could induce tuition increases because they affect the willingness to pay of high-income families. These are not the programs that concerned Bennett.

There are some institutions that

FIGURE 3

THE EFFECT OF INCREASING THE MAXIMUM PELL GRANT



LT = List-price tuition, *AT** = Optimal average tuition, *E** = Optimal enrollment

offer fertile ground for a Bennett effect. The first is the set of relatively non-selective colleges, which pull in no students from the high-income families that are immune to direct federal (or state) subsidy policies. An increase in the generosity of federal financial aid might affect the willingness to pay of the students with the highest willingness to pay at these institutions. The second and more important category is the large set of for-profit schools. For-profit schools do very little if any tuition discounting. These institutions do not try to shape the incoming class with an educational goal in mind or a mission to achieve. A cosmetology school or a school that trains medical coders will not offer tuition discounts to particularly able or needy students in the same way that a private nonprofit institution or a state-supported institution might.

These institutions also are heavily dependent on federal funds. In 2013, the for-profit sector absorbed 20% of the total allocation of Pell grants and 42% of Post-9/11 GI Bill dollars. In the 2009–2010 academic year, over 75% of the revenue in the for-profit sector came from federal Title IV sources. In 2014, only 12% of the 1,947 proprietary schools earned more than half of their revenues from non–Title IV sources. Almost 20% of them received more than 85% of their revenues from Title IV programs. The legal limit is 90%. In the proprietary sector, the willingness to pay of almost all of their students will be affected by an increase in the generosity of federal financial aid.

In his op-ed, Bennett argued that "our greedy colleges" would tax any increases in the generosity of federal financial aid by raising the tuition students have to pay. We have argued at length that this conclusion has very limited scope. In the traditional nonprofit sector, neither list price tuition nor the net price that students face is likely to rise following an increase in the generosity of federal financial aid. The one exception is in the for-profit sector where the competitive model seems more appropriate than the enrollment management process in use at mission-driven nonprofits.

Yet Bennett's broader point may hold. Schools can tax an increase in federal aid. We simply posit a different mechanism. In the enrollment management model, taxation is much more likely to come in the form of reducing eligible students' tuition discounts rather than in the form of higher tuition (list or net). The traditional nonprofit sector can siphon off a portion of the government aid and repurpose it toward other institutional goals. How much of this goes on is an empirical question.

EMPIRICAL STUDIES OF THE BENNETT HYPOTHESIS

There is a long and growing body of empirical work on possible links between federal aid policy and the list price (or net price) tuition that colleges and universities charge. Instead of offering another exhaustive review of this increasingly complex econometric work, we will focus on two aspects of it. First, we want to summarize the main contributions and identify what we see as some fundamental weaknesses. These weaknesses should cause analysts and policymakers alike to shy away from overarching or hard-edged claims about the tuition-raising effect of U.S. policy toward higher education. The evidence is nuanced, not conclusive. Secondly, recent evidence from a number of papers fits nicely into the enrollment management framework we outlined earlier.

The enrollment management model offers no firm prediction about the tax rate an institution might choose, but it does highlight the role of competition. Schools that are not very selective have to work harder to enroll a student of a given quality than do more selective schools. Other things equal, this suggests that less selective programs are likely to pass more of the subsidy through to applicants as a lower net price. Other things, however, are rarely equal. Schools that need extra revenue more than they need the benefits of higher yield on offers of admission might choose to tax at a higher rate. On this margin, less selective schools may be the ones with a stronger need for extra revenue. These two incentives may push a school in opposite directions in deciding how to tax an extra dollar of federal aid, which is why we offer no clear prediction about the tax rate set by these institutions. On the other hand, well-endowed, highly selective schools that fully meet all or most financial need with internal grant aid may see little need to pass additional federal aid through to students. We would forecast a higher tax rate at these highly selective schools.

What does the empirical literature actually tell us? First, the overall evidence about the Bennett hypothesis isn't remotely conclusive. In an early work on Pell Grants, Michael McPherson and Morton Schapiro examined institution-level data from the U.S. Department of Education's Integrated Postsecondary Education Data System. They found a positive relationship between gross tuition revenue and federal aid revenue at public universities but not at private institutions. This suggests that the public schools taxed the aid but private schools did not. By contrast, an exhaustive congressionally mandated study conducted by the National Center for Education Statistics found no relationship between federal/state grant aid or loans and institution-level tuition increases. In a third study, Larry Singell and Joe Stone looked at the relationship between the total amount of tuition revenue collected at public and private nonprofit institutions and the size of the average Pell Grant award per recipient. They found no relationship at public universities but a positive relationship at private schools, suggesting that the private schools taxed the aid but the public schools did not.

One of the most recent studies in this vein is a 2015 working paper from researchers at the Federal Reserve Bank of New York. They found that an additional Pell dollar to an institution leads to a 55¢ rise in sticker price, while an extra unsubsidized loan dollar has a 30¢ effect. While this paper is not yet final, the loan effects appear to be statistically robust but the Pell effect is less so. This study recognizes that tuition and loans/grants are bi-directionally linked, i.e., easier loan availability could cause tuition to increase or rising tuition could cause loan demand to rise. But like much of this literature, this paper lacks a convincing causal story for why tuition might be linked with federal policy and it omits many controls that in theory could have generated the observed correlation.

This very partial review tells us a number of things. First, no

clear answer has emerged. If you look around, you can find any result you want. One reason for this is that there is no consensus on what relationship should be tested. What is the right measure of federal policy, for instance? Is it the maximum Pell Grant (or loan) a student can get (as in the New York Fed study), the average level of Pell support per student at affected institutions (Singell and Stone), or the total amount of federal funding an institution receives (McPherson and Schapiro)? Different studies use different measures and there is no agreement about the appropriate relationship to test. There is also no common understanding of the right set of control variables to use. One reason is that all of this work is at best only lightly related to any structural model of how colleges and universities actually behave.

When the literature in question has coughed up clearly contradictory findings and many of the papers have left out seemingly crucial correlates, the case for worrying about omitted variables is quite strong.

Building a causal model of university behavior is certainly not the only path to wisdom, but the absence of one makes interpreting these very contradictory results quite difficult. A positive link between aid and tuition could be simple spurious correlation, while the absence of a link might reflect a failure to include an important control variable that is positively correlated with aid but negatively correlated with tuition.

Our model of tuition setting suggests a particular way to use control variables. For instance, you should clearly control for different types of institution if your structural model tells you that they behave differently. You should control for-profit schools separately because their pricing mechanism is quite different from nonprofits. Within nonprofits, state schools operate quite differently. You should control for differences in the pattern of state-level higher education spending per student (their business cycle), and at what level they set their public university tuition (at the institution level, by a state board, or by the legislature). The size and composition of state-level financial aid programs is another important control that is rarely used.

Lastly, the private nonprofit sector is not monolithic. Our model suggests that schools without a meaningful cadre of wealthy families will set their list price differently than schools that have a sizeable contingent of wealthy families. Studies that do not control for these predictable effects are unlikely to offer good tests of institutional behavior, and any correlations that emerge may very well be spurious.

As one example, we know of no study of the Bennett Effect that has attempted to control for the tuition-setting mechanism at the state level, or for the interaction of state policymaking with federal aid policy. Increases in non-need-based state aid to students can indeed create a Bennett Effect, so any study that does not control separately for changes in state aid programs may very well find a spurious link between federal policy and list price tuition at institutions in that state. Likewise, controlling for institution type often is not done (as in the New York Fed study cited above), and the groups of schools that are often aggregated may contain subgroups that behave in opposite ways.

We realize that charges of omitted variable bias are sometimes the last refuge of an intellectual scoundrel. After all, anyone can dismiss evidence he dislikes by claiming that the study in question has not controlled for every possible influencing factor. But when the literature in question has coughed up clearly contradictory findings and many of the papers have left out seemingly crucial correlates (sometimes for lack of data), the case for worrying about omitted variables is quite strong. Omitted variable problems seem endemic in this literature.

There are a number of recent studies that do capture important features of the simple model of institutional price setting that we have outlined. The first is a study of the for-profit sector by Stephanie Cellini and Claudia Goldin. Our model suggests that a Bennett effect is quite plausible in the for-profit sector, and that is exactly what Cellini and Goldin observe. They identify a set of for-profit institutions in five states that offer very similar services to very similar students. The major difference is that some of the schools are eligible to participate in Title IV programs. Their students are eligible to receive federal grant and loans. Other for-profit schools in the study are not Title IV–eligible because they lack accreditation. Cellini and Goldin find that the Title IV–eligible schools charge a higher tuition than the schools not eligible for Title IV programs across all states, samples, and specifications, controlling for program length, enrollment, how long the school has operated, and a set of other school, location, and year effects. The tuition premium is 78%. They also show that tuition at Title IV schools for particular programs that are too short to qualify for federal aid is about the same as what is charged for similar programs at non–Title IV schools. This suggests that school quality differences are not driving the result.

In a recent working paper, Christopher Lau confirms this finding about for-profit institutions, whose students use a surprisingly large fraction of federal aid. In the 2008–2009 academic year, students at for-profit schools comprised only 11% of the total postsecondary population, but they received 24% of Pell allocations, 28% of unsubsidized Stafford loans, and a quarter of the subsidized Stafford loans. Lau estimates a differentiated product model of monopolistic competition in the for-profit sector and

shows that for-profit schools absorbed 57% percent of Pell grants and 51% of extra loan amounts, passing through the remainder to students as consumer surplus (a lower net price).

Lesley Turner directly addresses the tax rate question that we pose by estimating the economic incidence of the Pell program, taking into consideration how schools can adjust their own aid packages for individual students. She exploits two features of the aid system to separately identify the effects of federal aid programs. The Pell program has discontinuities in both the level of aid and the slope (rate of change) that lead similar students to get different amounts of support. Overall, she finds the tax rate is a modest 12–16%. Things are more interesting when she breaks the higher education industry down into specific subsectors. Selective nonprofits tax at a much higher rate (79%). This could be a function of their market power, though as we have noted it could also be caused by the fact that these schools already offer a very low net price to low-income students. Public universities' net tax rate is close to zero. In fact, public universities exhibit a willingness to pay for students categorized as Pell recipients, though some of the increased aid that they give to students who are near the Pell threshold comes from Pell recipients who are even more needy. She also finds that the for-profit schools tax rate is a low 18%, which is similar to the amount appropriated by most non-selective schools.

For-profit colleges are the most market-oriented segment of the higher education industry, so it's not surprising that they would react to increases in federal financial aid by hiking tuition, as predicted by the Bennett hypothesis.

The fact that for-profit schools assess a modest tax rate is perfectly consistent with the finding that they raise their list price in response to federal subsidization. A strong Bennett effect coupled with a low tax rate may seem odd at first, but this sector does not use institutional aid to craft the group of students who enroll, unlike their more selective nonprofit brethren, so there is little institutional aid to displace. That does not mean that aid is passed through to students. As Lau and Cellini and Goldin have shown, the for-profit sector takes its cut of federal support through list price increases.

THE HIGHER EDUCATION POLICY DEBATE

We highlight two major conclusions. For the four-year public and private nonprofit institutions that still educate the bulk of America's college students, our enrollment management model tells us that increases in the generosity of need-based federal financial aid are unlikely to cause schools to raise list price tuition. Most of the evidence suggests that a significant portion of any increased aid does get through to students as a lower net price. But schools can siphon off some fraction of the aid, and our second conclusion is that this "tax rate" is fairly low overall. At state universities, there is good evidence that virtually all of the aid reaches its target and schools do not tax it. Schools that are the most generous with their own aid assess the highest tax rate.

The original Bennett hypothesis does have some empirical support. With more than a touch of irony, the "greedy colleges" that would react to increases in the generosity of federal financial aid by hiking tuition tend to be found in the for-profit sector, which is the most market-oriented segment of the higher education industry.

The debate about the Bennett hypothesis is part of an ideological tussle that currently dominates public discussion of higher education. On one side we hear impassioned claims that the magic of unfettered and unsubsidized markets can solve the college cost problem. On the other side we have those who believe that free is the right price for everything of social value. And from both sides we are regularly treated to finger-wagging about costly and wasteful amenities. But the college cost problem has deep roots in the nature of higher education as a personal service industry with a highly educated workforce. Our student-centered federal financial aid system is not a significant driver of the tuition bill at the nation's nonprofit colleges and universities. *R*

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