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Regulation was first published in July 1977 "because the extension of regulation is piecemeal, the sources and targets diverse, the language complex and often opaque, and the volume overwhelming." Regulation is devoted to analyzing the implications of government regulatory policy and its effects on our public and private endeavors.

FOR THE RECORD

Bennett Hypothesis 2.0

In their recent *Regulation* article, Robert Archibald and David Feldman revisit the "Bennett Hypothesis": the idea, promoted by former federal secretary of education William J. Bennett, that increases in federal financial aid lead to higher tuition. ("Does Federal Aid Drive College Tuition?" Summer 2016.) They argue that the "federal financial aid system is not a significant driver of the tuition bill at the nation's nonprofit colleges and universities," but the for-profit sector does exhibit stronger evidence of the Bennett Hypothesis.

For almost 30 years, the evidence on the Bennett Hypothesis has been all over the place. Given this mixed evidence, I've argued elsewhere that "'Is the Bennett Hypothesis true?' is the wrong question as it has no consistent answer. The better question is, '*When* does the Bennett Hypothesis hold or not hold, and *why*?'" So I am pleased that Archibald and Feldman avoid the common mistake of being Bennett Hypothesis zealots or deniers.

But they do go wrong in their selection of the model to explain the mixed evidence. They follow an "enrollment management model" that builds upon the observation that "unlike most firms, nonprofit colleges and universities often turn away business. They care about who purchases their services." If these colleges prioritize enrolling the "best-possible incoming class," it is relatively straightforward to show that these schools will often forgo the opportunity presented by an increase in federal aid to raise tuition because allowing students to keep some of the aid—instead of jacking up tuition to harvest those government dollars—helps in attracting high-quality students.

Their model isn't necessarily wrong as a description of what colleges try to do in enrolling a class. But that isn't the issue they are investigating. Rather, they are seeking to explain the empirical evidence on the Bennett Hypothesis, and for that their model isn't helpful.

Violating an assumption / The first problem with Archibald and Feldman's argument is that to explain the empirical evidence, their model needs to violate one of its foundational assumptions.

Their model starts with the assumption that "the revenue needs [of the college] are set first … and the tuition-setting and admission decisions are made together afterward." This is the $AT^* \times E^*$ amount in their Figures 1–3: the product of multiplying a school's average tuition revenue by its enrollment. Basically, their model assumes that there is a predetermined amount of tuition revenue that schools need to raise from their students. Colleges will then recruit the best students possible subject to the condition that this class of students must, in aggregate, pay this predetermined tuition revenue. As Archibald and Feldman point out, this doesn't mean that each student pays the exact same amount (AT^*). Rather, students whom the college wants to attract (e.g., those with high academic or athletic potential) will often be offered discounts/scholarships in the hopes of enticing them to enroll. Other, less desirable students will be charged more than average to finance those discounts.

When federal aid is offered, the empirical evidence clearly indicates that colleges have a range of different "tax" rates, Archibald and Feldman explain. By "tax," they refer to a college decreasing the discounts/scholarships it gives a student from its own funds when the student gets federal aid. This way, schools can harvest the federal funds without harming their original, intended enrollments.

The problem for Archibald and Feldman is that they misinterpret what their model implies about these "tax" rates. They claim that the "enrollment management model offers no firm prediction about the tax rate an institution might choose." This is false. The model explicitly assumes that tuition revenue is fixed. The only tax rate that leaves tuition revenue unchanged is

0%. Any tax rate greater than zero will result in an increase in tuition revenue. This oversight appears to be based on confusion between tuition revenue (what the college receives) and net price (what the student pays). They acknowledge that with a hypothetical 100% tax rate (every $1 increase in federal aid leads to a $1 decrease in college aid), "the institution would get a tuition windfall," but then they change topics to focus on net tuition: "But notice that in neither case would the student see a higher list price or net price." The "tuition windfall" result violates the assumptions of their model, without which the prediction of no increase in net price has no basis.

In other words, Archibald and Feldman are trying to explain the empirical evidence of greater than zero "tax" rates with a model that is only internally consistent with its own assumptions if the "tax" rate is zero. They need to find a model that can explain the evidence without violating its own assumptions.

For-profits/ A number of studies find that the Bennett Hypothesis does hold for for-profit colleges. Archibald and Feldman explain that this isn't a strike against their model because for-profits do not try to enroll the best possible class, and therefore their "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." They then note, 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.

But step back for a moment and recognize how bizarre the evidence is: the producer is able to capture a large portion of the subsidy. This would be like if the government offered a $1 subsidy per loaf of bread, and the result was that bakeries increased the price of bread by roughly $1. While such a price increase would be possible in the short term if there are capacity constraints (if each bakery is already producing the most bread it can), the extra revenue from higher prices would translate into unusually high profits, which would then attract entrepreneurs to build new bakeries. The competition from these new bakeries would drive down the price of bread until profits were no longer unusually high. In the long run, we would expect for the consumer to pay $1 less for bread, which combined with the $1 subsidy would leave bakery profits unchanged (assuming a perfectly elastic long-run supply curve).

Yet the empirical evidence shows that this doesn't happen in the for-profit college sector. For-profit colleges are able to raise prices even in the long run. It would be like if the original bakeries were able to raise prices by $1 and keep them there indefinitely. Thus, even though Archibald and Feldman correctly argue that the enrollment management model doesn't apply to for-profits because for-profits do not seek to enroll the best possible class, they still can't explain why we see convincing evidence of the Bennett Hypothesis among for-profit colleges. (Elasticity arguments cannot salvage this result either, as supply in the for-profit sector, which uses scalable online courses heavily, is likely to be very elastic in long run).

One possible explanation for the for-profit results that would be consistent with Archibald and Feldman's argument is the "90/10" rule. This rule dictates that no more than 90% of a college's revenue can come from federal financial aid programs. But colleges can't control how much federal aid a student gets (the government determines this), so a good case can be made that these colleges have to set their price above the level of federal aid. For example, if the government is giving each of a college's students $90 in federal aid, then the college needs to charge tuition of at least $100 to comply with the 90/10 rule. This implies that an increase in federal aid would lead to a corresponding increase in tuition, explaining the evidence showing the Bennett Hypothesis occurs at for-profit colleges. I actually think there is a lot of truth to this story, but if so, then Archibald and Feldman's *schadenfreude* about for-profits being "greedy" seems more than a little misplaced as their behavior is driven by compliance with government policies.

A better model?/ Archibald and Feldman are on the right track in seeking a "structural model" that accounts for the goals of colleges, but perhaps there is a better model that is more consistent with both the "tax rate" and for-profit evidence. My own research leads me to the conclusion that Howard R. Bowen's Revenue Theory of Costs, better known as Bowen's Laws, provides the basis for a better structural model, in part because it doesn't assume away the revenue goal like the enrollment management model does. Indeed Bowen's Laws treat the determination of revenue as a central question to be answered by the college. According to Bowen:

- The dominant goals of institutions are educational excellence, prestige, and influence.
- In quest of excellence, prestige, and influence, there is virtually no limit to the amount of money an institution could spend for seemingly fruitful educational needs.
- Each institution raises all the money it can.
- Each institution spends all it raises.
- The cumulative effect of the preceding four laws is toward ever increasing expenditure.

As I detail in "Introducing Bennett Hypothesis 2.0," a policy paper available from the Center for College Affordability and Productivity, this theory does a good job of explaining the mixed evidence. Colleges want more tuition revenue, so when federal aid is given to their students, they will be tempted to either raise tuition or cut back on their own discounts/scholarships. But their goal is not revenue maximization; it is prestige maximization, which means that sometimes other considerations (e.g., maintaining selectivity) will preclude the college from choosing to harvest all the federal aid by raising

tuition or cutting their own scholarships/discounts. The mixed evidence that we've seen over the past 30 years is therefore exactly what we'd expect.

In summary, Archibald and Feldman are right in seeking a more structural model and in highlighting the importance of changes in college-provided discounts/scholarships as opposed to only focusing on listed tuition. (This is a great insight that many scholars, including myself, have not adequately appreciated in the past.) But their enrollment management model does not help explain the evidence on the Bennett Hypothesis. Models building off of Bowen's Laws do a better job of explaining the evidence, and therefore offer a much more promising path for future research.

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Reply

We thank Andrew Gillen for his thoughtful comments on our recent paper. We have two reactions that highlight where we concur and where we don't. First, we agree that structural modeling is crucial in helping analysts and policymakers alike understand the complex ways that federal policy affects tuition in the diverse American higher education system. But we disagree with his contention that our model's foundational assumptions make it unsuitable for analysis of the Bennett Hypothesis. Secondly, Gillen argues that the "revenue theory" is a better alternative to our enrollment management approach. In our view, the revenue theory suffers from serious methodological flaws. We will describe a few of them in this short reply.

Gillen claims that our enrollment management model is flawed because "to explain the empirical evidence, [our] model needs to violate one of its foundational assumptions." This is not correct. Our foundational assumption is that "the size of the institution is set." This is a standard assumption in microeconomics when we explain short-run behavior of firms. The assumption about size implies a given physical plant, a certain faculty, and a certain amount of expenditures to deliver programming. The institution uses historical information from past applicant classes and information from the current applicant pool to attract the highest-quality class that meets its goals for number of students and tuition revenue per student. Discounting is the key tool. Some schools use it primarily to meet revenue needs while more elite programs use it to sculpt the highest-quality incoming class.

If there is a change in federal financial aid policy, we assume that the institution does not immediately change its size. We are still doing short-run microeconomics. The change in policy means that the institution's revenue options have changed. Our model points out the many ways an institution may react to its new opportunities. Indeed, one possibility is that it will earn more revenue from its students. When we point out this possibility, we are not violating our foundational assumptions. The institution's initial assessment of the revenue it needs from its students was conditioned on its size, its programming, the quality of the students it hoped to attract, and the amount of tuition discounting required to hit its initial objectives.

The change in federal financial aid policy affects the amount of tuition discounting that is required to hit these initial objectives, so it is perfectly sensible for the institution to adjust the amount of revenue it extracts from its students. As we suggested, the institution might use this golden opportunity to increase the quality of its programming by spending more per student. But it also might choose to pass the increased subsidy on to poorer students as a lower net price.

It is a fair criticism of our approach that we do not fully model what each category of college or university will do. In our defense, we were writing down a descriptive account of an abstract school's options, not a mathematical model for professional economists. It's also fair to note that we do not fully describe the process by which the institution sets the quality of its programing, its long-run size, or its aspirations for student talent, all of which determine its initial revenue needs. These are tasks for another day and a more technical approach.

With regard to for-profit schools, Gillen thinks it bizarre that they might see increased profits from more generous federal policy. He believes that competition between schools would eliminate the rents they could collect. If higher education is highly competitive and the number of seats available to students expands elastically with demand, then the Bennett Hypothesis makes no sense for any type of school. We would note that in the large nonprofit sector there is good evidence that the number of seats has indeed grown rapidly as demand has surged. But there is no obvious reason to presume the industry is perfectly competitive. Many for-profits likely have local market power that could allow them to push up price in the event that the federal subsidy grows. The empirical work on the Bennett Hypothesis that uses some structural model of university behavior (at nonprofits and for-profits alike) usually presumes that schools can exercise some form of market power.

Local market power may be eroded in a fully online world, and fully online training is growing fastest in the for-profit sector. But 60% of students at for-profit institutions currently experience a fully face-to-face education. And many fully online programs deliberately keep classes small to ensure some degree of personalization and brand differentiation. Lastly, the "90-10" rule, requiring that 10% of school revenues come from sources other than federal funds, is not likely the driver of the Bennett Effect at for-profits, since most for-profits are distant enough from the 90% threshold that they would not be forced to increase tuition just to remain in compliance with the federal rules.

Gillen's suggestion that Howard Bowen's revenue theory of cost would provide a better model is not at all appealing to us. In fact, Gillen's own discussion of the revenue theory illustrates how it is internally inconsistent. One of Bowen's Laws is "Each institution raises all the money it can." Yet

Gillen says, "But their goal is not revenue maximization." In other words, to use this theory, one has to violate one of its laws.

More generally the revenue theory of costs is based on a tautology. All nonprofit institutions spend as much revenue as they earn. We tested and critiqued the revenue theory in earlier work ("Explaining Increases in Higher Education Costs," *Journal of Higher Education*, Vol. 79 [May/June 2008]). In brief, the revenue theory is a higher education specific theory. It claims that the driving factor shaping the long-term evolution of higher education costs is higher education revenue. Yet many other industries display a very similar evolution of cost over time. If higher education revenues are the force driving higher education costs, then it must be a coincidence that costs in many other industries have behaved so similarly. In our view, features the industries share in common likely drive the similar behavior of cost. In our last book on college cost, *Why Does College Cost So Much?*(Oxford University Press, 2011), we show that the industries whose price growth looks most similar to higher education tend to be personal services, not goods, and most personal services have experienced very slow labor productivity growth.

The tendency for service prices to grow more rapidly than goods prices is well known. It can be traced back to the work of David Ricardo in the 19th century, and in higher education it's called Baumol's cost "disease." (See William Baumol and Sue Anne Blackman, "How to Think About Rising College Cost," *Planning for Higher Education*, Vol. 23 [Summer 1995]). Any industry that experiences slower productivity growth than the national average is likely to experience higher than average price growth because that industry still must pay national wage rates for its labor, but without the cost-reducing benefit of high productivity growth.

Second, in many personal services the workforce is highly educated compared to the national average. This is quite true in higher education. When the premium on educated workers is growing, all industries with a highly educated labor force face extra cost pressures. The wage premium on college-educated labor has grown steadily since the early 1980s. Lastly, many personal service industries do not just adopt new technology when it lowers cost. They are driven to adopt new techniques because their service must evolve to meet new needs, even if this raises cost. In higher education, much like in medicine, an evolving standard of care drives the adoption of new and often expensive technologies. These three broad economic forces that have reshaped the global economy offer a story for why higher education costs have risen more rapidly than the overall inflation rate.

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