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# Avoiding Tunnel Vision in the Study of Higher Education Costs

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## Abstract

Much of the literature on the causes of rising costs in higher education focuses on specific features and pathologies of decision-making within colleges and universities. We argue that this inward-looking focus on the specifics of higher education as an industry is a form of tunnel vision that can lead to poor public policy decisions. In this paper we show that cost disease and capital-skill complementarity are two crucially important causes of rising costs in higher education. These two economy-wide forces are something higher education shares with other skilled-labor-intensive services.

**JEL Codes**: I22, I23

**Keywords**: cost disease, capital-skill complementarity

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The idea for this article started over a year ago when we first read David Longanecker's article, "A Tale of Two Pities: the Story of Higher Education Finance in America," in the January/February 2006 issue of ***Change***. Longanecker describes a standoff between state legislators and representatives of state-supported colleges and universities. The state legislators argue that they are doing their share by pointing to data showing that appropriations per student to colleges and universities have grown more rapidly than the inflation rate. Representatives of state-supported colleges and universities argue that, on the contrary, state legislators are letting them down. They point to data showing that state appropriations are a declining percentage of college and university revenues. The data are accurate in both cases, and it does not take a rocket scientist to understand how this can be so. The two observations are explained by the fact that costs per student in public higher education have risen much faster than the price of goods and services in the indexes we use to measure inflation.

With this explanation in hand, the next obvious question is: why do costs in higher education rise more rapidly than the overall inflation rate? There is a long and rich literature in higher education finance addressing this question. In this article we argue that the vast majority of this literature is incomplete because, by focusing exclusively on higher education, it suffers from a kind of tunnel vision.

The study of costs in any industry, higher education included, should focus on two questions: First, what are the factors or industry characteristics that drive costs in that particular industry? Second, what are the factors that make costs in that industry similar to costs in other industries? Most of the studies of cost pressures in higher

education address the first question. They examine the special features of colleges and universities that have put upward pressure on costs. We argue that the inward focus of these studies leads to an incomplete understanding of the forces that drive costs in higher education. As a result the policy prescriptions flowing from these studies may be seriously flawed.

In brief, we show that higher education has experienced cost pressures quite similar to other services, and especially to services that depend on a highly educated labor force. In part this is the familiar "cost disease" argument whose importance we think is underappreciated in the higher education literature. But the cost pressures buffeting higher education also reflect another characteristic called 'capital-skill complementarity' that is common to many industries. Within colleges and universities highly educated labor is displacing less well-educated labor. This labor use pattern is also visible in the legal services industry and in physicians' and dentists' offices. All three of these industries also have experienced a sustained rise in the value of the capital equipment they use relative to the value of other assets like buildings. This tendency of capital and skilled labor going together can push up measured costs in service industries. Understanding these economy wide factors that push up cost is essential if we are to design policies that are effective in the institutional context of higher education.

**Explanations of Costs in Higher Education**

We will not pretend to do a thorough review of the literature on higher education costs, but a good starting place for any brief review is the 1980 book by Howard Bowen in which he presents his oft-cited "revenue theory of costs." Bowen argues that as nonprofit institutions colleges and universities try to maximize their revenue, and they

spend every dollar they raise. As a consequence an institution's revenues determine its costs. This is clearly a higher education-specific explanation for rising college costs. According to Bowen, the factors that determine costs in higher education are the determinants of higher education revenue such as the appropriations given to state-supported institutions, earnings on endowments, revenue from research grants, and earnings from tuition and fee charges. The clear implication of this reasoning is that cost control in higher education comes from revenue control.

As a second example, in 1991 Malcolm Getz and John Siegfried listed six potential explanations for rapid cost increases in higher education. Five of these explanations are higher education-specific: (1) cost increases arising from a change in the product mix toward more expensive disciplines, (2) cost increases arising from shortages of higher education inputs, (3) cost increases arising from faculty and administrators in charge having inflated desires for quality, (4) cost increases arising from poor management in higher education, and (5) cost increases arising from government regulations creating expanded duties for colleges and universities.

William F. Massy and Andrea K Wilger (1992) produce a similar list. It contains four higher education-specific explanations: (1) regulation, micromanagement, and cost shifting – the increase in regulation and reporting requirements faced by higher education: (2) the growth force – costs increases caused by college and universities continued attempts to increase quality or prestige; (3) the administrative lattice – increases in costs caused by the ever increasing size and complexity of academic

administration, and (4) the academic ratchet – per student cost increases caused by faculty devoting less time to teaching and more time to research.[1]

The 2006 book by Robert Zemsky, Gregory R. Wenger, and William F. Massy, ***Remaking the American University: Market-Smart and Mission-Centered*** provides an excellent restatement of the academic lattice and the faculty ratchet. The administrative lattice refers to the growth over time in administrative support for all kinds of activities at colleges and universities, some of which are new, such as the expansion in the kind and quality of student services, and some (like advising) that were once were performed almost exclusively by faculty. The academic ratchet refers to the process by which full-time faculty have redefined their role in the institution to suit their own desires. The most important supposed effect of the ratchet is the notable reduction in teaching loads won by faculty members over time. The lattice and the ratchet are clearly related and both are offered as drivers of cost per full-time student in higher education. This argument is intuitively quite appealing, yet like Bowen's "revenue theory" it is based on descriptive analysis of what is going on in higher education and higher education alone.

The question that these studies do not address is whether any of the processes they describe also are underway in other industries, or alternatively whether there are any strong forces affecting costs in higher education common to other industries in the economy. By ignoring this question, these studies imply that the answer is no. Yet it is a very worthwhile question to ask, and the answers may add considerably to our understanding of the forces driving higher education costs.

[1] Both Getz and Siegfried, and Massy and Wilger discuss one factor which we would not label higher education-specific. They include the cost disease explanation in their list of potential explanations for increases in higher education costs. We will discuss cost disease in more detail below.

**Looking Outside of Higher Education**

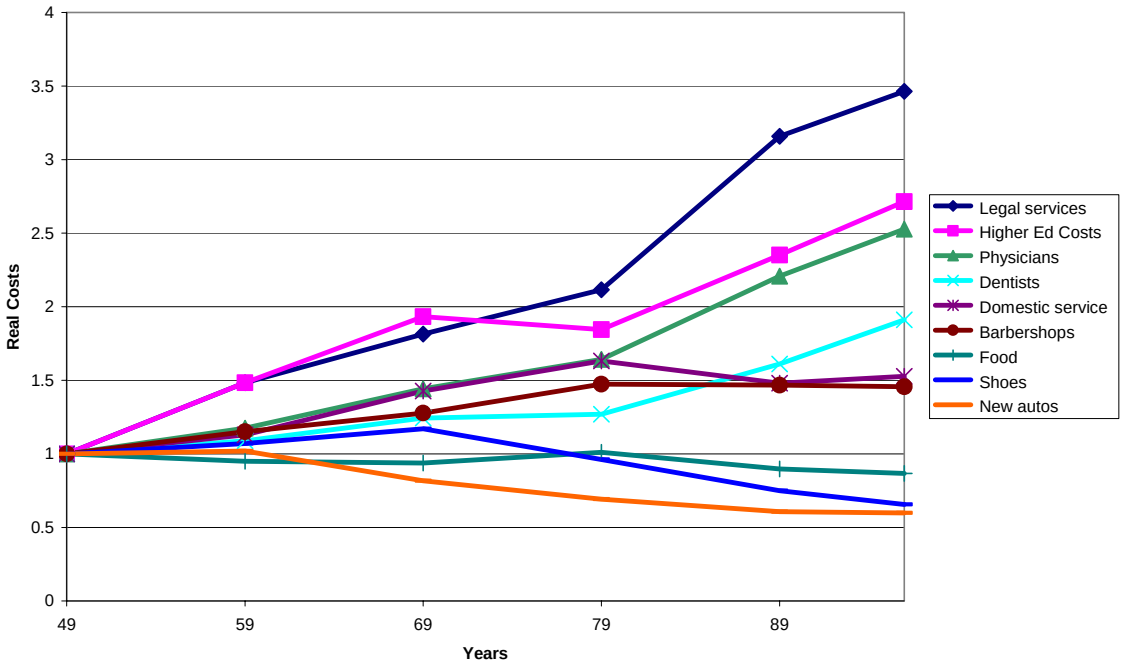
If we take seriously the notion that we can learn something about cost increases in higher education from looking at industries experiencing similar patterns of cost increase, the first step would be to find out which other industries have, in fact, experienced similar cost increases. In the detailed tables for the National Income and Product Accounts the Bureau of Economic Analysis provide data on the behavior of prices for a large number of goods and services. These data are very useful for discovering the industries whose cost behavior is similar to the cost behavior in higher education.

We need to dispense with one technical detail before we present these data. Since our focus is on costs in higher education, we would like to have data on costs in other industries. Unfortunately, we do not have cost data. We have price data. Pricing in higher education is very unusual. Price is cost per student minus the subsidy (from state appropriations, endowment earnings, and other sources) per student. Price in other industries is cost per unit plus the profit margin per unit. The assumption that allows us to compare the time series behavior of costs in higher education and prices in other industries is the assumption that there have not been major changes in the profit margins that confound the comparison. In general, competitive forces should limit the change in profit margins making our assumption reasonable, but there may be some industries for which our assumption does not hold, at least in certain time periods.

Figure 1 shows the behavior of costs in higher education and prices in a selected group of product categories from the price indexes for components of Personal Consumption Expenditures in the National Income and Product Accounts. We created indexes for each product category that started in 1949 with a value of 1.00. The values in

the figure are the real price of the product category, and the real costs of higher education.[2] For example, the value of 1.5 for Legal services and Higher Ed Costs in 1959 says that the prices of legal services and the cost in higher education both rose 50% faster than the price of all goods and services included in Personal Consumption Expenditures between 1949 and 1959. The right-hand edge of the figure shows how much higher in real terms prices and costs were in 1995-96 than they were 1949. For example, the value of 2.0 for Physicians indicates that the price of the services of physicians has increased twice as fast as prices in general, and the value of roughly .6 for New Autos indicates that the prices of new autos have not increased as rapidly as prices in general.

**Figure 1 Time Path of Real Costs, Selected Industries**




[2] The data for the individual price indexes comes from in Table 2.4.4 on the Bureau of Economic Analysis website. The data for costs in Higher Education are for Educational and General Expenditures per student and come from the ***Digest of Educational Statistics***, ***2000*** Table 339.

Figure 1 is extracted from a much larger analysis.[3] The detailed data for product categories for Personal Consumption Expenditures has 69 product categories for the level of aggregation we are using, and our figure only includes 8 of them. Our eight product categories are selected to be representative of the findings from a broader analysis. The first finding they illustrate is that the prices of services rise much more rapidly than the prices of goods. The price indexes for the services of lawyers, physicians, dentists, domestic servants, and barbers all rise relative to the average (1.00), while the prices of the goods (food, shoes, and new autos) all fall relative to the average. This is consistent with the aggregate data. From 1930 to 2000 the average price of durable goods rose by a factor of 4.12, the average price of nondurable goods rose 8.24 times, and the average price of services rose 11.11 times. The second finding the figure illustrates is that after 1980 the prices of services that rely on highly educated labor (lawyers, physicians, and dentists) rise much more rapidly than the prices of services that rely on less well educated labor (domestic servants and barbers).

The similarity between the behavior of higher education costs and the prices of legal services and physicians, and to a lesser extent, dentists, might simply be a coincidence. Clearly there are important changes specific to these industries. For example, federal rule making and funding of Medicaid and Medicare have clearly affected the costs and prices of physicians' services, and the advent of fluoride treatment has affected the demand for dentists. Still, it is not a coincidence that the prices of services have increased more rapidly than the prices of goods, and it is not a coincidence that the prices of services that rely on highly educated labor have similar time paths.

[3] See Archibald and Feldman (forthcoming).

**Cost Disease**

Economists have known the reason that the prices of services rise more rapidly than the prices of goods since the work of David Ricardo in 1817. The reason is that productivity growth is very difficult in many services, particularly personal services. When you purchase a personal service like a haircut, you are purchasing the time of the barber, and there are limited things he or she can do to shorten the experience that will not be perceived as a reduction in the quality of the haircut. The possibility of productivity growth in the production of goods is not similarly limited. In 1966 William J. Baumol and William G. Bowen explained this phenomenon, which is typically called "cost disease," with reference to performing arts. The most frequently quoted example comes from a 1967 article of Baumol. He notes, "a half hour horn quintet calls for the expenditure of 2.5 man hours, and any attempt to increase productivity here is likely to be viewed with concern by critics and audiences alike."[4]

Many have pointed out the applicability of cost disease to higher education.[5] Like other personal services, some productivity improvements will be perceived as quality reductions. If a college or university increases the number of students in its average class or raises the number of classes each instructor teaches, then productivity measured as students taught per faculty-year would grow. Bigger classes are not likely to lead to a better education, and more time teaching might well come at the expense of research or public service. These plausible consequences of reallocating university effort represent what is arguably a reduction in the overall performance of the institution, which

[4] See Baumol (1967) page 416.
[5] Baumol and Sue Ann Blackman (1995) is perhaps the best known paper of this type in higher education. Also, in the discussion above we highlighted the higher education-specific explanation in Getz and Siegried's and Massy and Wilger's lists. In both studies cost disease was also included.

is why this path of 'productivity enhancement' is one that colleges and universities generally have resisted. Massy and Wilger argue that the faculty ratchet has moved universities in the opposite direction. Whether that ratchet has been the driving force of costs is unclear, since much the same effect is at work in other service industries with very different internal dynamics.

Figure 1 also shows that the time path of costs in higher education is much more similar to the time path of the prices of personal services that rely on highly educated labor than it is to the time path of services that do not rely on highly educated labor. This difference is explained by changes in the return to higher education that can be observed in national data. The period from the end of World War II to the late 1970s saw a significant leveling of the income distribution.[6] Starting in 1980 the income distribution started to widen -- in relative terms, the rich got richer and the poor got poorer. Much of this widening of the income distribution can be attributed to a rise in the returns to higher education. The divergence of the time paths of prices of legal services, physicians' and dentists' services, and costs in higher education from the time path of the prices of domestic service and barbershops is consistent with this explanation.

**Explaining Changes in Higher Education Costs**

We began this article by saying that any explanation of costs in an industry should focus as much on the similarities among industries as on the particular features that cause it to be distinct. We think that the discussion of cost trends in higher education often misses or downplays economy-wide economic factors and that this omission has consequences. An exclusive inward focus on the specific features of higher education

[6] Claudia Goldin and Robert A. Margo (1992) call this time period the "Great Compression."

paints a very incomplete picture of the industry and can lead to poor public policy choices.

A more complete explanation of higher education costs has to start with the fact that higher education is a service industry. Costs of service industries behave very differently from costs in goods industries. Any explanation of costs in higher education that misses that point is focused on the trees and has missed the forest.

Recognizing that higher education is a personal service industry helps us sort out the disagreement between state legislators and representatives of state-supported colleges and universities discussed by David Longanecker. Three facts explain the information given. First, higher education is a personal service industry. Second, costs in service industries, particularly personal service industries, will rise more rapidly than costs in goods-producing industries. Third, any broad index one might use to measure inflation will mix together the prices of goods and the prices of services. As a result, state appropriations that keep up with a broad measure of inflation will not keep up with costs in a personal service industry such as higher education.

There is no doubt that there are peculiarities of higher education, but one has to be very clear whether or not the features of higher education on which one places importance are really peculiarities of higher education and not manifestations of some broader phenomenon. Let us return now to the argument that the growth of the administrative lattice is an important part of the explanation for rising costs in higher education. If one takes the position that studies of costs should look both inside and outside the industry under study, the question surrounding the administrative lattice is whether a similar phenomenon can be found in other industries. While we have not done

an in-depth study of this question, something similar to the expanding administrative lattice may be going on in other industries whose cost behavior is similar to higher education.

**Capital-Skill Complementarity**

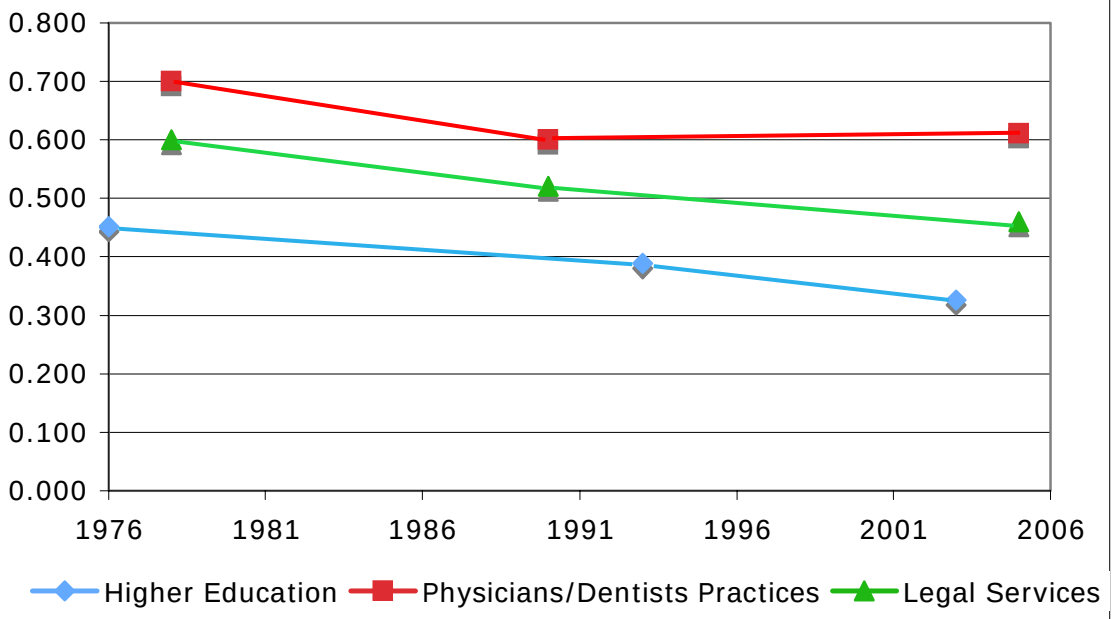
There is some direct evidence of an administrative lattice effect in higher education. The percentage of full time equivalent employees classified as Executive, Administrative or Managerial grew from 6.4% in 1976 to 6.7% in 1993 and then to 7.3% in 2003.[7] This is certainly an increase, but is not as significant as other staffing changes in higher education. The more fundamental and substantial changes in employment patterns are changes higher education shares with other industries that display similar cost behavior such as physicians & dentists and legal services. In each of the industries the percentage of non-professional workers in the industry's workforce has declined substantially over the last thirty years. Non-professional workers are defined as those whose job category does not require a university degree. Of the three industries, higher education has experienced the greatest shift away from less skilled labor in its workforce. These data are presented in Figure 2.[8]

The evidence in Figure 2 is broadly consistent with the phenomenon known as capital-skill complementarity. First hypothesized by Zvi Griliches (1969), capital-skill complementarity is present if increased physical capital usage raises the demand for skilled labor (a complementary factor) more than the demand for unskilled labor. Goldin

[7] ***Digest of Educational Statistics 2005*** Table 222.
[8] The data for all three years for higher education come from ***Digest of Educational Statistics 2005*** Table 222. Data for Physicians/Dental Practices and Legal Services for 1980 come from ***Occupational Employment in Selected Non-manufacturing Industries*** Bulletin 2088, U.S. Department of Labor, Bureau of Labor Statistics, March 1981. Data for 1990 come from tables provided by the Bureau of Labor Statistics, and data for 2004 come from the Bureau of Labor Statistics web site (http://www.bls/oes/current/oessrci.htm).

and Katz (1998) have found evidence that capital and skilled labor to go together in U.S. manufacturing for much of the 20th century, especially as new technology is introduced in the production process. We think this effect likely is present in service industries like higher education as well.

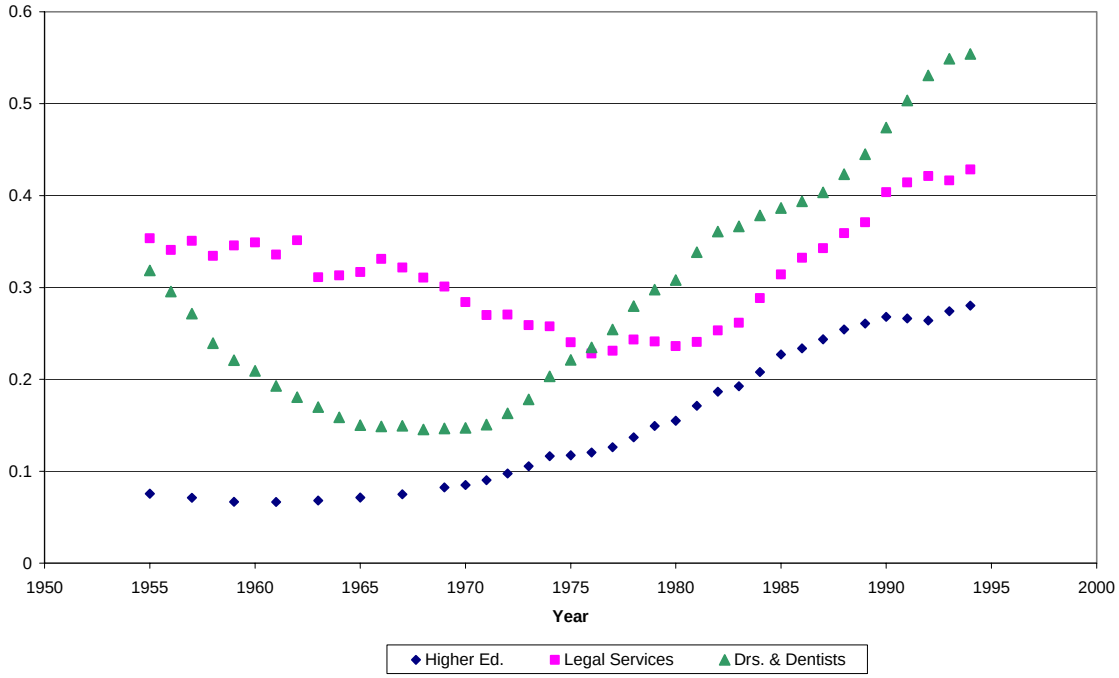
**Figure 2. Percentage of non-professional workers**




Within these three service industries the real value of equipment has been rising relative to the real value of buildings since the mid-1960s. Figure 3 presents this information. Nominal values for equipment and buildings for higher education come from the 2005 ***Digest of Educational Statistics***. The corresponding information for Physicians and Dentists and for Legal Services comes from the Bureau of Economic Analysis. To convert these data into real values we use price indexes from the Bureau of

Economic Analysis on non-residential structures to create a time series for buildings, and on equipment and software to create the time series for equipment.

**Figure 3. Ratio of Real Value of Equipment to Buildings**




The three series are not identical. The ratio in higher education, for instance, is the lowest because of the intensity of building use both for academic purposes and for living space (dormitories). Also, the upturn in the series do not occur at exactly the same time. Thus there is some scope for industry-specific effects. Nonetheless, even if it is not direct evidence of capital-skill complementarity, the clear correlation between the increased importance of physical capital in these three service industries and the increased share of high cost professional labor in the labor they use after the mid 1970s

strongly suggests that economy-wide forces again are a significant part of any explanation of rising costs in higher education.

Those familiar with economics will at this point be wondering how capital-skill complementarity can be a source of increasing costs. Holding the quality of output constant, the reason that a company would install new capital and hire the skilled workers to operate and maintain it is that production with the new capital and the skilled workers is less expensive than production with the old capital and the less skilled workers. If this were not so, there would be no economic rationale to install the new capital. Clearly such an economic rationale has been evident to managers in many industries. Adopting new technologies has been very beneficial for producers of many standardized manufactured goods (everything from glass bottles to cement). The benefits of productivity-enhancing technological progress show up directly as some combination of reduced cost per unit and higher returns to labor. Both of these effects also lead to lower costs for manufactured goods *relative* to services, which is the main conclusion of the cost disease argument.

Some of this cost-reducing effect of new technology is indeed present in higher education. Those of us who did our graduate work before the advent of the personal computer remember the typing pool that prepared everything from a professor's tests to their professional manuscripts. That pool exists only in memory. Faculty members now do all of that work themselves with the assistance of personal computers and a corps of highly educated and expensive IT specialists who manage university software systems and networks. The choice to replace the typing pool with personal computers and IT

support personnel is at least in part a decision to choose a less expensive means of production.

Yet a skill-intensive personal service industry like higher education is different from basic manufacturing industries producing a homogeneous output that is essentially unchanging over time. Its unusual nature stems in part from the fact that genuine productivity enhancements are much more difficult to achieve. As we argued earlier, forcing higher numbers of students through an existing teaching process will be seen as a reduction in quality. The other reason, and likely the more important reason for the effect of capital-skill complementarity on costs, is the fact that higher education is constantly updating its output.

The adoption of new technology and the associated use of skilled workers in higher education traces to public expectations that higher education stays current. To most people who demand these services the quality of the output is very much related to the technology that is used. Any university that decided to teach the same curriculum it did in the 1950s likely would appeal to a very small market niche. The service we provide today in higher education has undergone a profound evolution and is in many ways a very different service than the one we experienced a generation or more ago in college classrooms.

In higher education the chalk, paper, pen, and test tube world has been replaced by wired buildings, laptops, high-tech classrooms, and pulsed laser systems in physics labs, together with the specialists needed to make the systems work. This change has its roots in the fact that the outputs of higher education are the inputs of other industries. This forces higher education institutions to educate students to a standard influenced in

part by those who will hire its students. The undergraduate chemist, for instance, has to be able to understand and operate the equipment used in a modern industrial chemistry lab. Without this knowledge he or she would not be useful to the pharmaceutical industry or the bio-technology industry, industries that have themselves adopted a series of technological advancements that raise the quality of their output.[9] As a result, the motive for technological change in higher education often traces more to enhancements of the education offered than to cost control. Although the typing pool example shows how technological progress could decrease costs, the net effect of adopting new techniques has increased costs in higher education.

There is a similar dynamic at work in the offices of physicians and dentists and the offices of lawyers. Any doctor or dentist who chose to practice using only the techniques available a generation ago would soon lose his or her patient base. Patients have come to expect a standard of care, and in some cases they are required by law to receive care that meets certain standards. As a result new medical equipment does not lower the cost of medicine, it makes procedures more precise, it makes surgery less invasive, and it add to the physicians' ability to correctly diagnose certain conditions. Just as with higher education, the existence of the technology changes the service provided by the physicians and dentists.

The case of lawyers is quite similar. As Douglas E. Litowitz (1997) explains there has been an explosion in the use of technology in lawyers' offices. Because of this new technology legal clients have raised their expectations of the quality of services

[9] The presence of new equipment in industrial chemistry labs in some cases results from the research efforts of colleges and universities. In this way the new capital requirements for the education of students are a result of the activities of higher education not simply as the activities of the industry. Still, no matter who started the process, a good education has to be an up to date education, and in many fields such an education involves more and more elaborate equipment.

lawyers can provide. Clients now expect to be able to contact their lawyer almost around the clock. Because legal documents can easily be redrafted, they are customized much more than they were in the past. Because legal research has the aid of computer searches, lawyers are expected to have all of the relevant case law at their fingertips. As with colleges and universities and physicians and dentists, a law firm that practiced law the same way it had in the 1950s or 1960s would not meet the expectations of today's client.

In summary, our earlier claim that firms would willingly embrace technology that required more skilled-labor-intensive practices only if the new techniques reduced costs was a claim contingent on the assumption that the quality of the output was constant. This is simply not an assumption that works for many personal service industries, including higher education, the offices of physicians and dentists, and the offices of lawyers. Since quality-adjusted output in higher-education is notoriously difficult to measure, the quality improvements inherent in the changed technologies tend to go unnoticed. The cost increases per student, however, are quite visible.

The quantity and quality of research output is also one of the main areas of potential gains from this technological paradigm shift in higher education. But this will not show up in relative cost data since research output is poorly measured and hard to compare either over time or across universities. Colleges and universities also do more things for their students than they did in the past. Whether this is due primarily to an administrative lattice or faculty ratchet is unclear, given that many other industries are experiencing the same trends in hiring educated labor and capital equipment. In our view, capital-skill complementarity provides a better explanation because it is a more general theory.

**Consequences**

Our study of higher education costs has convinced us that higher education faces many of the same problems as other industries. If we accept the importance of the cost disease and the capital-skill complementarity explanations of cost increases in higher education, the interesting question becomes: how much more can we learn by adding higher education-specific factors? This is a difficult question, and we are not yet in a position to provide an answer. What we can say is that ignoring economy-wide factors such as cost disease and capital-skill complementarity is a serious error.

Ignorance of the economy-wide factors that affect costs in industries like higher education can lead to deeply problematic policy proposals. If one accepts the “revenue theory,” for instance, as an overarching explanation for rising college costs then the answer to cost control is revenue control. Governments must hold the line on public subsidies while disciplining colleges and universities that raise tuition too much. This is the logic behind recent proposals emanating from the education subcommittees of the House of Representatives. The report titled "The College Cost Crisis" asserted that wasteful spending by colleges and universities is the main cause of escalating tuition. Representative Howard (Buck) McKeon then proposed cutting off federal support to institutions whose list-price tuition goes up by more than twice the inflation rate for two consecutive years.

Price controls may seem natural as a response to seemingly irresponsible choices. On the other hand, if more fundamental forces are instrumental in pushing up costs then holding university spending constant through revenue and price controls is a recipe for reduced quality and reduced access to higher education.

## Conclusions

We should return to our primary question: why do costs in higher education rise more rapidly than prices in general? Our answer is deceptively simple. Costs in higher education rise more rapidly than prices in general because higher education is the kind of industry it is. Three factors are important, (1) higher education is a personal service industry, (2) higher education relies on highly educated labor, and (3) because of increased capital usage (and the new technologies embodied in this capital), higher education's reliance on highly educated labor has increased.

These explanations might not be appealing to some because they seem to deny agency. Costs are going up because of particular factors, not because anyone is doing anything. In contrast, higher education-specific explanations often place blame on particular actors. We don't mean to deny agency. There certainly are individual agents such as college administrators, members of boards, legislators, and governors, all of whom are responsible for decisions that affect costs in higher education. Rather than denying agents their role, our analysis highlights the constraints agents face when they make the decisions that result in higher costs. Our analysis suggests that higher education decision makers are faced with choices that result in either rising costs or declining quality. If the decision makers do not offer competitive salaries, they will not be able to attract the best workforce. If the decision makers try to increase output per worker, they may well decrease the quality of the education they provide. And if they do not provide the best equipment for their workers, they will not offer an up-to-date education or produce leading edge research. The fact that ever-increasing costs have resulted from the collective decisions of these agents suggests to us that the majority of

these choices have come out on the side of trying to preserve or increase quality as opposed to the side of decreasing costs.

The difficulty with the tunnel vision that has characterized much of the research in higher education finance is that it leaves out the possibility that what we see in higher education has roots in underlying economic processes that affect many industries. Higher education is of course different or unique in some sense, and so is every other industry. Yet the behavior of costs in some industries is close to the behavior of costs in higher education, and the similarity is not a coincidence. We can learn a great deal about the causes of rapid cost increases in higher education and the policies that might be put in place to improve the situation if we take a close look at these other industries and explore the commonalities between them and higher education. We are not apologists for the status quo, but we do recognize that there are no easy fixes for what are deep-seated problems in achieving significant cost-reducing productivity growth in an important personal service industry like higher education.

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