

# **The Rising Cost of Higher Education:**

## **A Supply & Demand Analysis**

by

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## Abstract

The rising cost of higher education is a topic of large concern today. As tuition prices continue to grow at a quicker pace than housing prices, consumer prices and average hourly wages, it is becoming harder and harder for the average American family to afford going to college. What factors have been driving this large rise in tuition prices? This thesis aims to set up a supply and demand framework to analyze the various forces that may be driving the price of higher education to rise above the Consumer Price Index over time. After defining long-run supply and demand for the higher education market, this thesis addresses economy-wide factors and summarizes the findings of Robert Archibald and David Feldman in *Why Does College Cost So Much?*. Next, this thesis examines higher education-specific factors and specifically tests the hypothesis: The long-run supply curve for higher educations is theoretically vertical. The inability for supply to meet the increasing demand for higher education results in a supply and demand imbalance that drives up the price of higher education. After looking at both economy-wide and higher education-specific factors, it is apparent that slow productivity growth and large wage increases for professors (cost disease) and an unresponsive total enrollment (supply) in the face of rising demand are largely driving the increase in the price of higher education. In order to curb this rising prices, his thesis will offer a few policy implications and recommendations. Namely, online education and “blended” courses may offer viable solutions to increase the productivity of professors and increase total enrollment at institutions.

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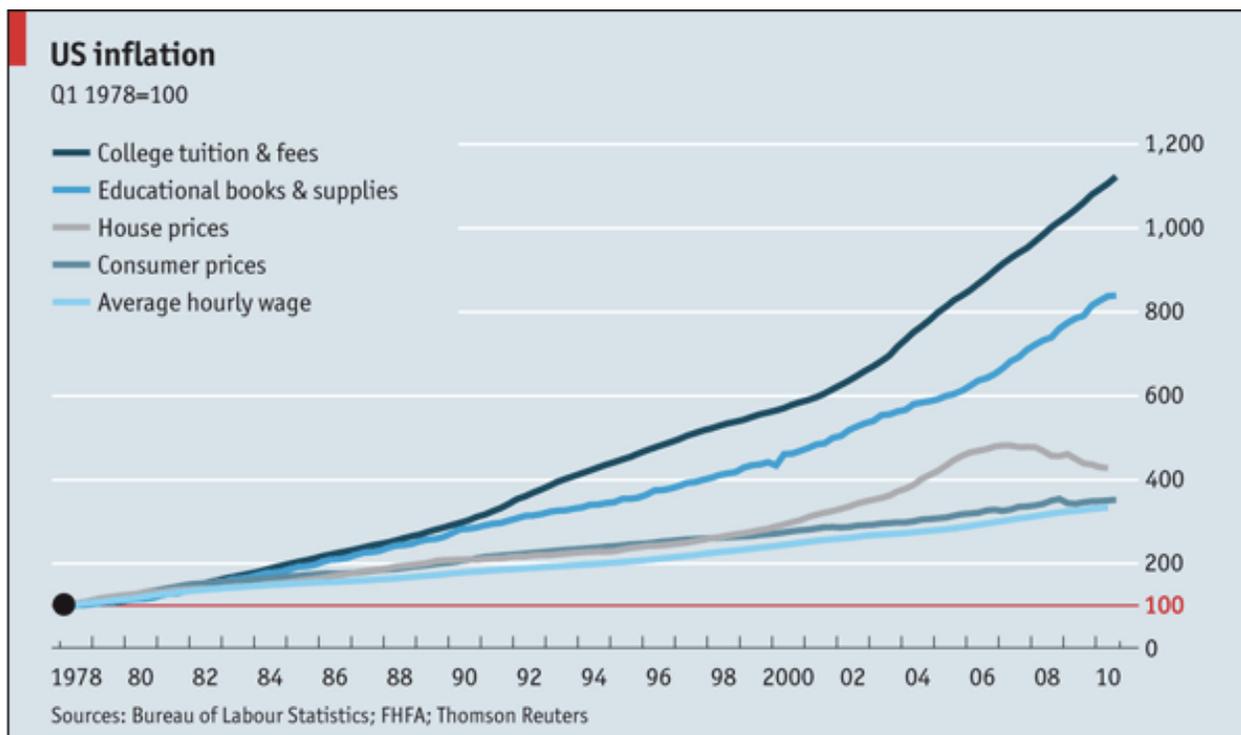
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# 1 Introduction

The rising cost of higher education is a topic of large concern for most of the American population. Many families will end up asking themselves, “Will I be able to afford sending all of my children to college?” As evidenced in Figure A below, college tuition and fees have far surpassed house prices as well as average hourly wages for the average American family. Tuition and fees have risen 12 times over the 1978 consumer price index. This means that the cost of higher education has been rising much faster than the average family’s ability to pay.

Figure A



Source: “Gallop inflation in American college fees”, The Economist, Sept. 2, 2010.  
<http://www.economist.com/node/16960438>

What has been driving up the price of higher education so persistently over the years? Using a supply and demand analysis, this thesis will examine the forces that cause the price of higher education in the United States to rise. This thesis will first demonstrate that the demand for higher education has been increasing over the past few decades; then, it will analyze

published works on the topic of the rising cost of higher education, most notably Robert Archibald and David Feldman's findings in *Why Does College Cost So Much?* and William Baumol's application of the Cost Disease to higher education, to demonstrate the factors outside higher education (namely economic and technological growth) that have caused tuition prices to steadily increase over time. Next, the paper will argue that within the higher education industry, it is the failure of supply to meet demand that drives the rising cost of higher education. The paper ends with policy recommendations and a brief conclusion.

## 2 Price vs. Cost

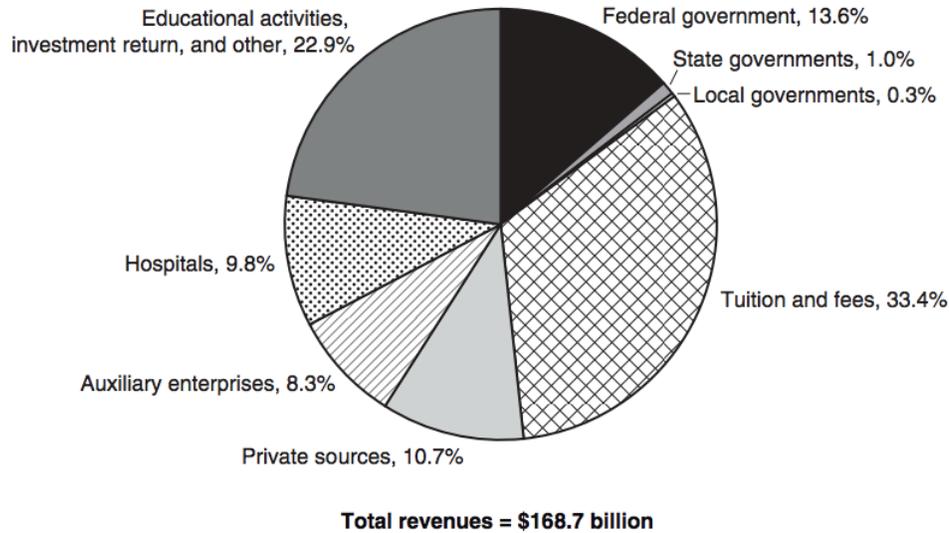
Before diving into the analysis of the rising cost of higher education, it is important to distinguish between the terms “cost” and “price” of higher education. The former term refers to the value of all the resources used to create a product or a service, such as higher education. It is how much an institution covers or spends per student. The latter term refers to the differing amounts of money people pay depending on their financial circumstances, or the amount of tuition an admitted student pays. Many people refer to the “sticker price” of education, which falls under the definition for the “price” of higher education – where the price is the full tuition minus any financial aid.

From Figures B and C below, it is evident that private universities’ revenues are made up more so of tuition and fees and private sources; whereas public universities’ revenues come mostly from state, local and federal governments, and receive about half as much revenue from tuition and fees as compared to private universities. It is important to note that despite the differences in their funding sources, both public and private not-for-profit institutions have costs that are much greater than the prices they charge their students.

As Figure D below demonstrates and for simplicity, most higher education institutions are nonprofit organizations and the tuition and fees (“price”) received from students only cover a portion of the total cost of running a higher education institution. For the private nonprofit university, tuition and fees make up only 33.4% of total revenues, leaving 66.6% of total costs to non-fee sources (Figure B); for the public university, 18.4% of total revenues are comprised of tuition and fees, accounting to 81.6% of total costs to be funded by non-fee sources (Figure C). Most universities look to additional sources of revenue – government subsidies, alumni donations, research grants, etc. – to help supplement tuition received by students.

Figure B

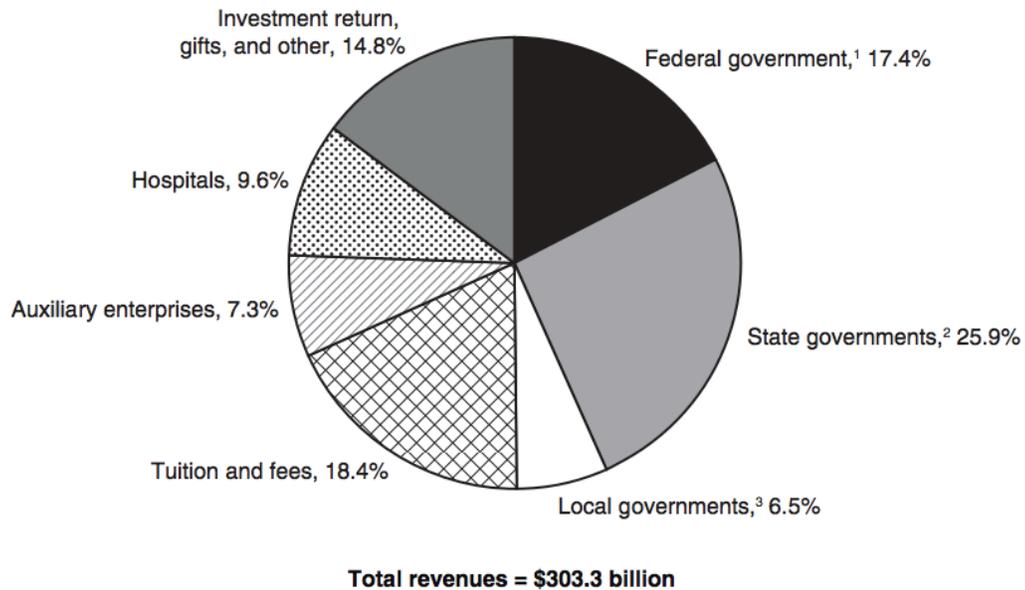
Figure 18. Percentage distribution of total revenues of private not-for-profit degree-granting institutions, by source of funds: 2009–10



NOTE: Detail may not sum to totals because of rounding.  
 SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Spring 2011, Finance component.  
 Source: National Center for Education Statistics (June 2012), Digest of Education Statistics 2011, pg. 287  
<http://nces.ed.gov/pubs2012/2012001.pdf>

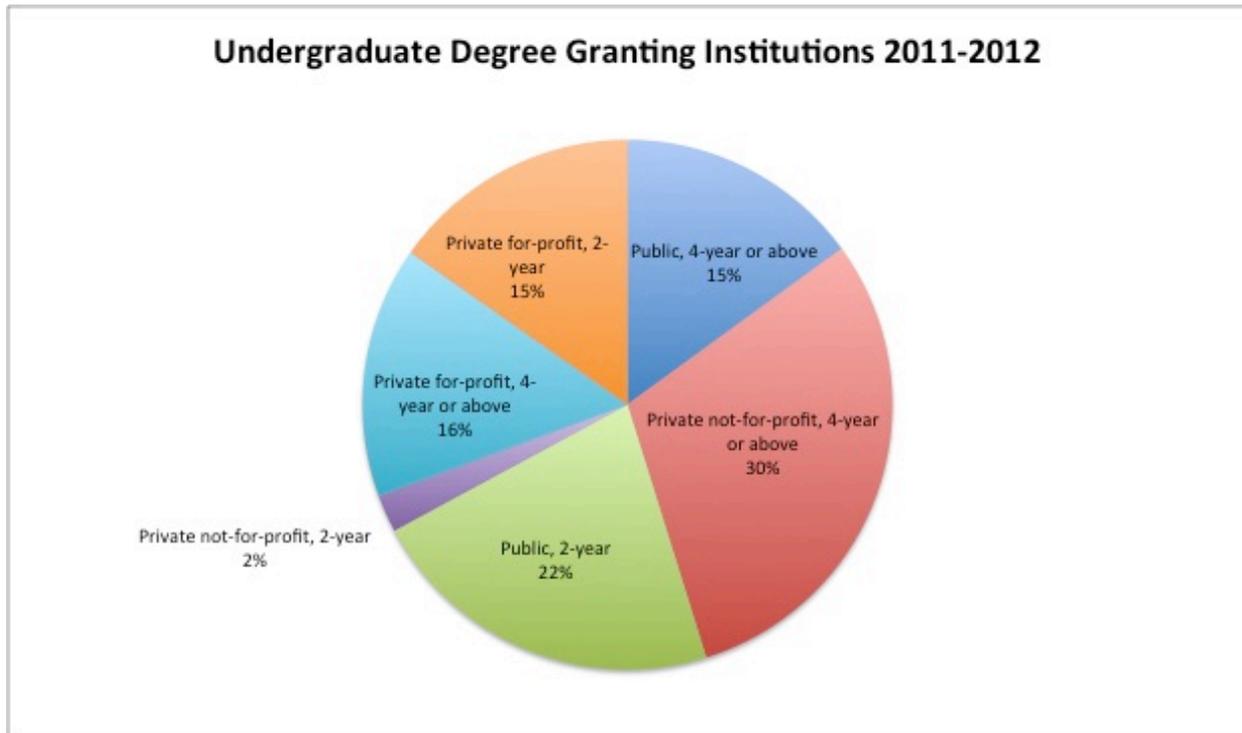
Figure C

Figure 17. Percentage distribution of total revenues of public degree-granting institutions, by source of funds: 2009–10



<sup>1</sup>Revenues from the federal government include operating grants and contracts, funds for independent operations, nonoperating revenue appropriations, and nonoperating grants.  
<sup>2</sup>Revenues from state governments include operating grants and contracts, nonoperating revenue appropriations, nonoperating grants, and capital appropriations.  
<sup>3</sup>Revenues from local governments include operating grants and contracts, funds for independent operations, nonoperating revenue appropriations, and nonoperating grants.  
 NOTE: Detail may not sum to totals because of rounding.  
 SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Spring 2011, Finance component.  
 Source: National Center for Education Statistics (June 2012), Digest of Education Statistics 2011, pg. 287  
<http://nces.ed.gov/pubs2012/2012001.pdf>

Figure D

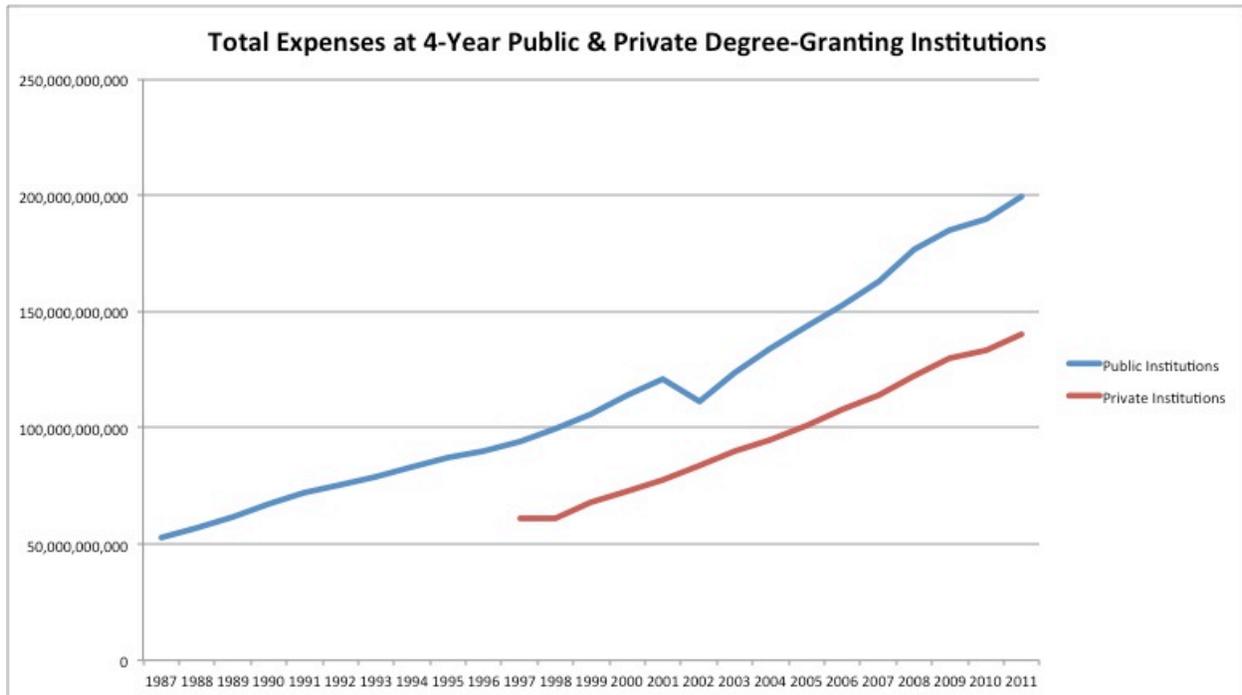


Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)  
Note: Institutions selected include 4,454 degree-granting institutions in the United States

The cost and price of higher education are very much interrelated. If total costs for an institution increase, tuition charged may also have to increase to cover the extra costs if no additional revenue can be attained for other sources.

As Figure E indicates, over the years, both the cost and price of higher education have increased. Taking into account the relationship between the cost and price of higher education, this thesis aims to address why the “price” or tuition charged by an institution (or the cost to the average American family) has risen dramatically over the past few decades.

Figure E



Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS), Finance component  
Note: Institutions selected include only 2,284 degree-granting 4-year and above public and private not-for-profit institutions in the United States

### 3 Supply & Demand Analysis

Before defining supply and demand in the higher education framework, it is important to note that the market for higher education is very different from the market for wheat or any other good. Most notably, one of the biggest differences between the wheat market and the higher education market is that prices do not ration one's access to the goods in the higher education market. The wheat market does not care who ends up buying the wheat, but universities care a great deal about the students who attend their university. This is because peers learn and interact with each other, and universities want to create a stimulating and educating environment for the entire incoming class. Just because a family can pay the full tuition price for an education does not mean the student will be accepted and receive an education from the institution. The higher education market actually turns away many buyers through the admissions process. Thus, the price used in the higher education framework is the effective price, the price charged only to students who are admitted, not to any student who is willing to pay the going price. In addition, as stated in the previous section, the higher education market sets its price below cost. For any market (wheat or higher education), this implies that a price set below the market-clearing price will generate excess demand for the good or service, regardless of the slope of the supply curve.

To setup the framework of the supply and demand of higher education, one must first define supply and demand. Supply and demand in the context of higher education can be quite difficult to define and definitions may vary. Previous work on the topic of the supply and demand of higher education has made some suggestions for the measurements for supply and demand. Rothschild and White (1993) acknowledge that a university's "production levels" – or supply – is "the number of students to admit" – or enrollment spaces available. In order to broadly define the supply of higher education, one must aggregate the "production levels" at

each university and take into account the number of universities available; thus in the context of this paper, supply is measured by the total number of higher education institutions available in the United States and total enrollment available at each of these institutions.

On the other hand, demand is measured by high school completion rates, the number of college applications, the number of students who take the SAT, and “the trends in the relative earnings of college and high school graduates.”<sup>1</sup> These are good indicators of the desire of high schoolers to receive post-secondary education, thus defining the demand for higher education. Overall, there are various ways of measuring and defining supply and demand for data; however, given the availability of data, this thesis will use the definitions stated above, as they are the best way of representing the large and diverse market of higher education.

It is important to note that when discussing a supply and demand framework for the multi-decade long increase in the cost of higher education, the appropriate model is the long-run supply and demand model, where suppliers (higher education institutions) and buyers (the average American family) have time to fully adjust to changes in prices.

### **3.1 Long-Run Demand**

In the long-run, a family can decide to send their child to different universities, depending on the required tuition at the various schools. Because of the ability to switch to lower-cost options for education given time to plan, the long-run demand curve is downward sloping; in the long-run, higher prices will cause people to demand less higher education.<sup>2</sup> In addition, the demand curve for each individual university is relatively elastic; if the tuition price increased from year to year, families can rather easily opt to send their children to a different school. On the other hand, the demand curve for all universities, or the aggregate demand curve for higher

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<sup>1</sup> Robert M. Hauser (1991), Trends in College Entry, *Studies of Supply and Demand in Higher Education*, pg. 62

<sup>2</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 31

education is more inelastic; as the price of education increases overall, demand for higher education will decrease, but to a smaller degree. Over time, as tuition prices increase, many families will continue to send their children to college to reap the benefits of having a degree, but some families will choose not to send their children to college, creating a long-run downward-sloping demand curve.

### **3.2 Long-Run Supply**

The long-run supply curve is a little more difficult to analyze. In the long-run, universities can adjust their production or supply by increasing the number of facilities, faculty members, classes, physical buildings, and the number of students served. There are many arguments that the long-run supply curve is either upward sloping, horizontal or vertical; this paper focuses on the latter two. For the long-run supply curve to be upward sloping, if a university decides to increase production, in this case increase total student enrollment or the number of faculty or facilities, then the cost per student would have to increase. According to Darrel R. Lewis and Halil Dunder (2001), “Evidence from economies of scale studies over the past sixty years indicates that, generally, unit costs for two-year and four-year institutions decline with an increase in the number of students, and after a certain size, become relatively constant.”<sup>3</sup> Studies have not shown that costs per student increases with production, so using an upward sloping long-run supply curve is not pertinent in this analysis.

In *Why Does College Cost So Much?* Robert Archibald and David Feldman analyze the external factors that drive up tuition prices and indicate the long-run supply curve for higher education is horizontal and flat (discussed in Section 4). Section 5 examines the supply and

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<sup>3</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 32

demand imbalance within the higher education industry and provides empirical evidence that the long-run supply curve has been relatively vertical and fixed in the past few decades.

This thesis will detail various factors of demand and supply that may drive up the cost of higher education. Specifically, this thesis will analyze the rising tuition trend in two different ways: from the outside perspective, examining external factors such as economic growth, technological progress and William Baumol's Cost Disease that may have driven tuition to increase over the years, as well as internally, looking at specific factors within higher education, specifically a supply and demand imbalance that may have caused tuition to rise.

### **3.3 The Rise in Demand for Higher Education**

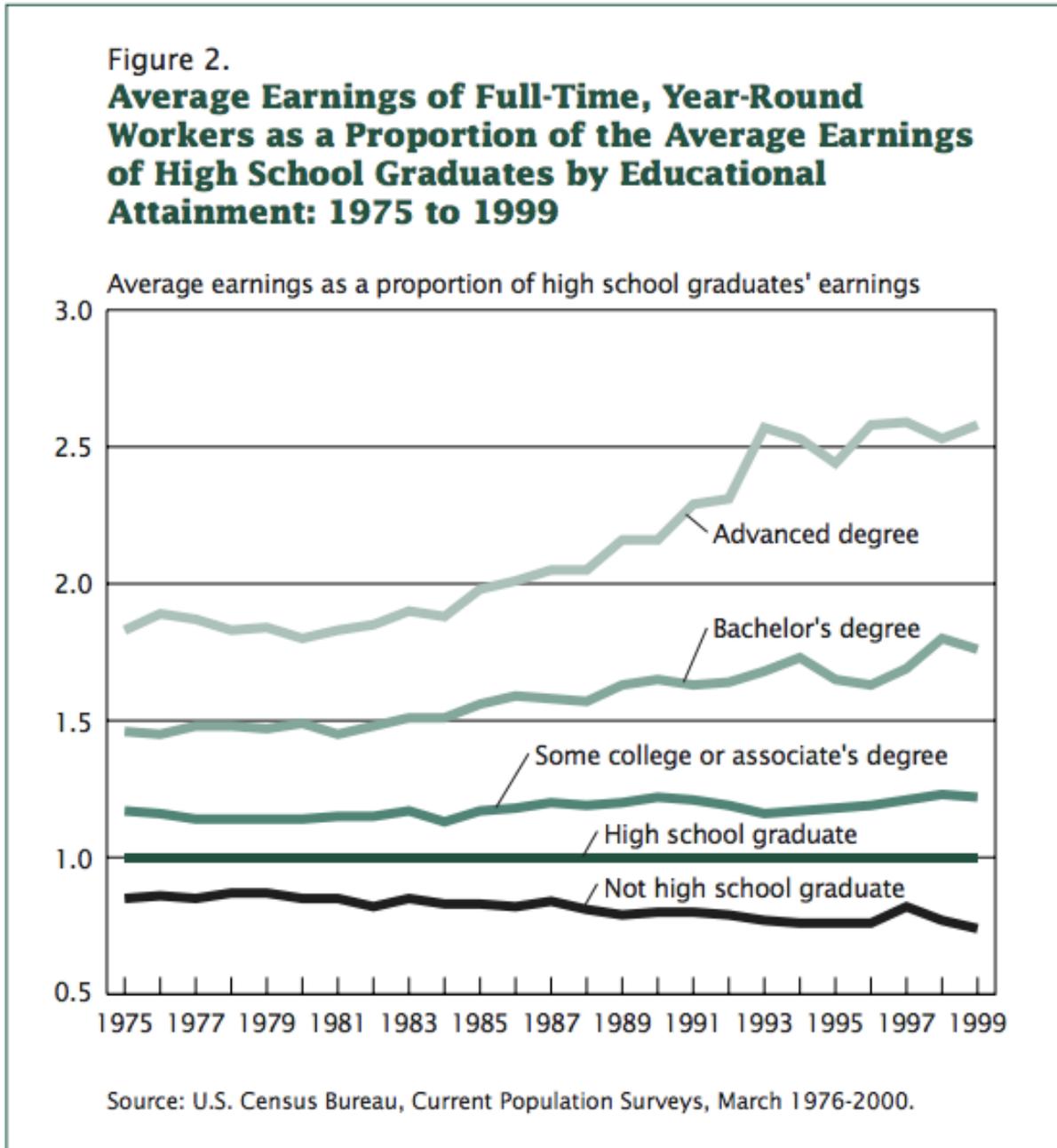
Empirically, it is evident that the demand for higher education has been increasing over the past few decades. As stated earlier, the demand for higher education can be measured by high school completion rates, the number of college applications, the number of students who take the SAT, and the increasing wage differentials between college and high school graduates.

Figure F shows the average earnings of full-time, year-round workers as a proportion of the average earning of high school graduates by educational attainment. Figure G measures high school completion rates for adults aged 18-24 by ethnicity/race. Figure H demonstrates the participation and performance of SAT takers from 2008 to 2012. Figure I illustrates the number of applicants to public and private not-for-profit 4-year universities.

First, as Figure F shows, there has been a growing gap in the wage differentials of workers with different levels of education attainment. In 1975, a worker with a bachelor's degree earned 1.5 times a worker with a high school diploma; by 1999, that number had soared to 1.8 times. This wage differential gap continues to grow today. In addition, at the same time, the relative wages of workers without a high school diploma fell. Because of the rising gap in the

wage differentials of workers with different educational attainment, more and more high school graduates are applying and entering college, increasing demand for higher education.

Figure F

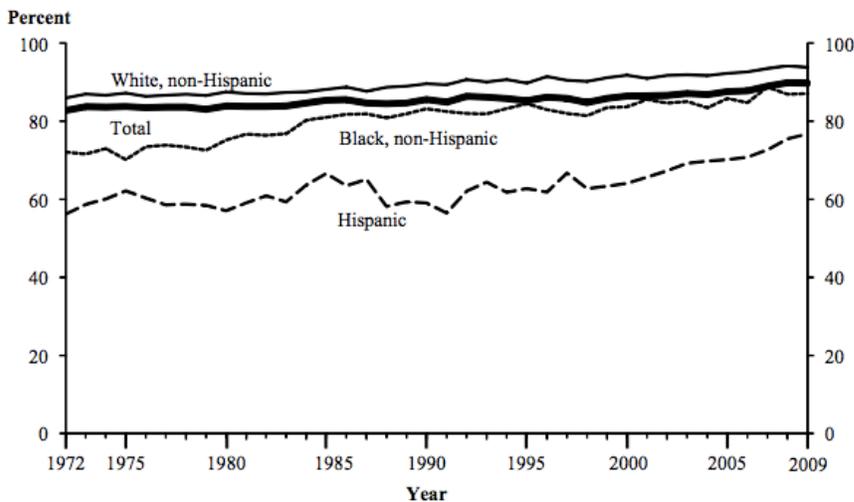


Source: Day and Newburger (July 2002), "The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings", pg. 3 <http://www.census.gov/prod/2002pubs/p23-210.pdf>

In addition, according to the National Center for Education Statistics and Figure G, “Overall, [high school] status completion rates have increased since 1972 but during the 1970s they exhibited no consistent upward or downward trend. Since 1980, the rate has shown an upward trend, starting at 83.9 percent in 1980 and rising to 89.8 percent in 2009.”<sup>4</sup> Having more students complete high school indicates that more students may be enrolling in college, increasing the demand for higher education. As seen in Figure H, since 2008, the number of SAT takers has increased by 6%, reaching an all-time high of 1.66 million takers in 2012. As high school graduation rates and the number of SAT takers increase, so does the demand for higher education. Lastly, the number of college applications has been on the rise in the last decade (Figure I), further indicating a demand increase. This increase in the demand for higher education coincides with a shift in the demand curve to the right, driving up higher education costs and tuition prices (given no subsequent shift in supply).

*Figure G*

**Figure 4. Status completion rates of 18- through 24-year-olds not currently enrolled in high school or below, by race/ethnicity: October 1972 through October 2009**

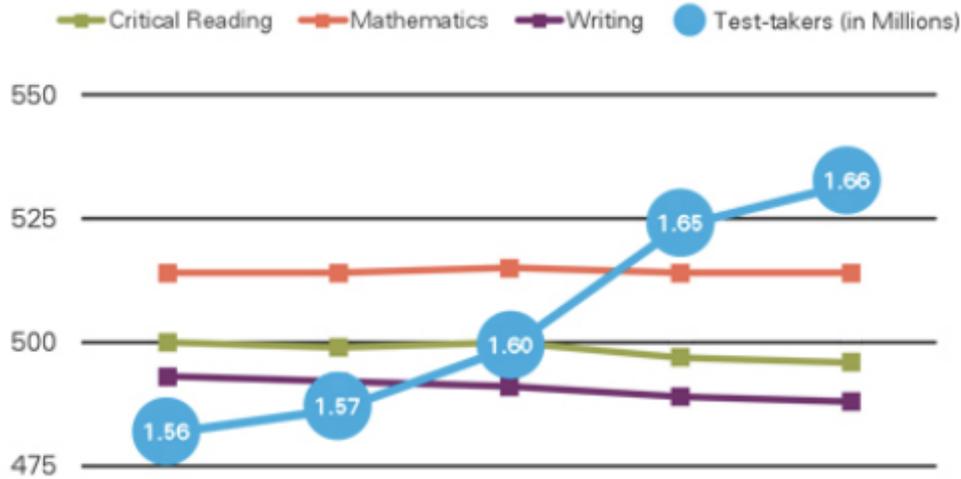


Source: National Center for Education Statistics (Oct. 2011), “Trends in High School Dropout and Completion Rates in the United States: 1972–2009”, pg. 23, <http://nces.ed.gov/pubs2012/2012006.pdf>

<sup>4</sup> National Center for Education Statistics (Oct. 2011), “Trends in High School Dropout and Completion Rates in the United States: 1972–2009”, pg. 10

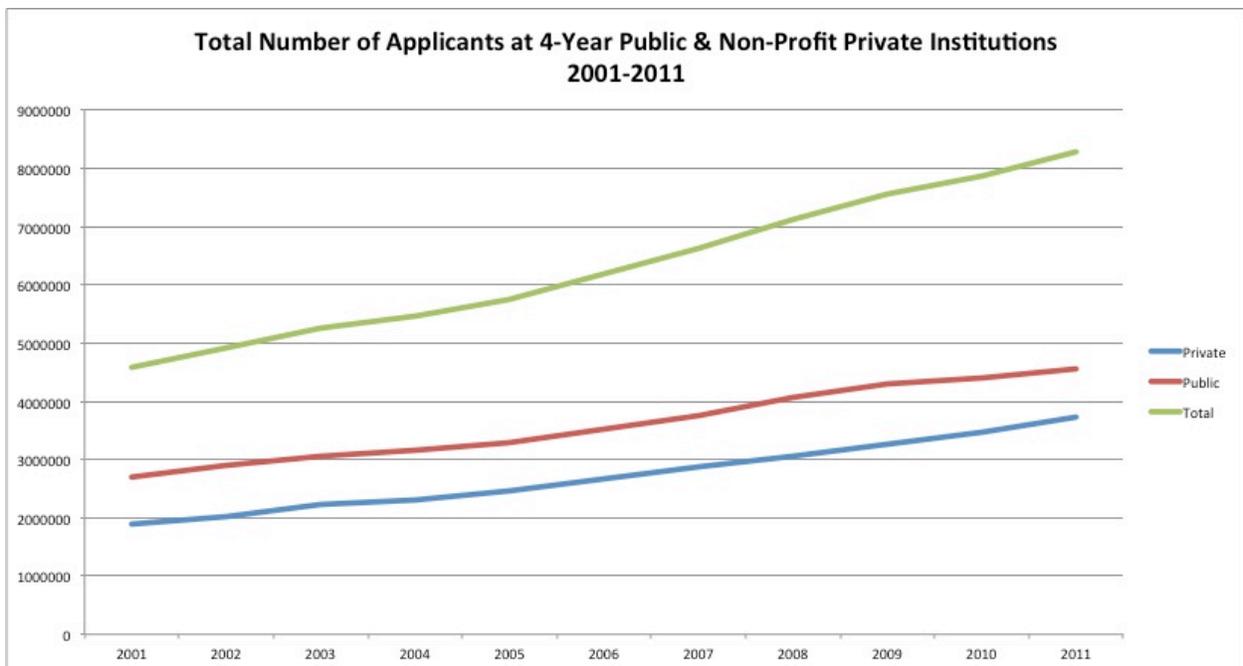
Figure H

## PARTICIPATION AND PERFORMANCE — 2008-12



Source: The College Board (2012), “The SAT® Report on College & Career Readiness: 2012”, pg. 27  
<http://media.collegeboard.com/homeOrg/content/pdf/sat-report-college-career-readiness-2012.pdf>

Figure I



Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)  
 Note: Institutions selected include 1,900 4-year and above public and private not-for-profit degree-granting institutions in the United States

## 4 Flat Long-Run Supply Curve Analysis

The central argument of Archibald and Feldman in *Why Does College Cost So Much?* is that the main driver of rising tuition prices is economic growth itself. They argue that instead of looking at higher education-specific factors, there are economy-wide factors that affect all service industries that require highly skilled workers and that have caused the prices in all these industries to rise.

In *Why Does College Cost So Much?* Robert Archibald and David Feldman argue that the long-run supply curve is flat and that the noticeable rising cost of higher education (upwards shifting of the long-run supply curve) can largely be attributed to economic growth and technological advance. They base their argument on that foundation that the long-run supply curve for education is flat, meaning that institutions can increase total enrollment and facilities infinitely in the long-run and at no extra cost to students. They claim that a surge in demand would therefore have no affect on cost, and costs could only have increased if the long-run supply curve has shifted up over time.

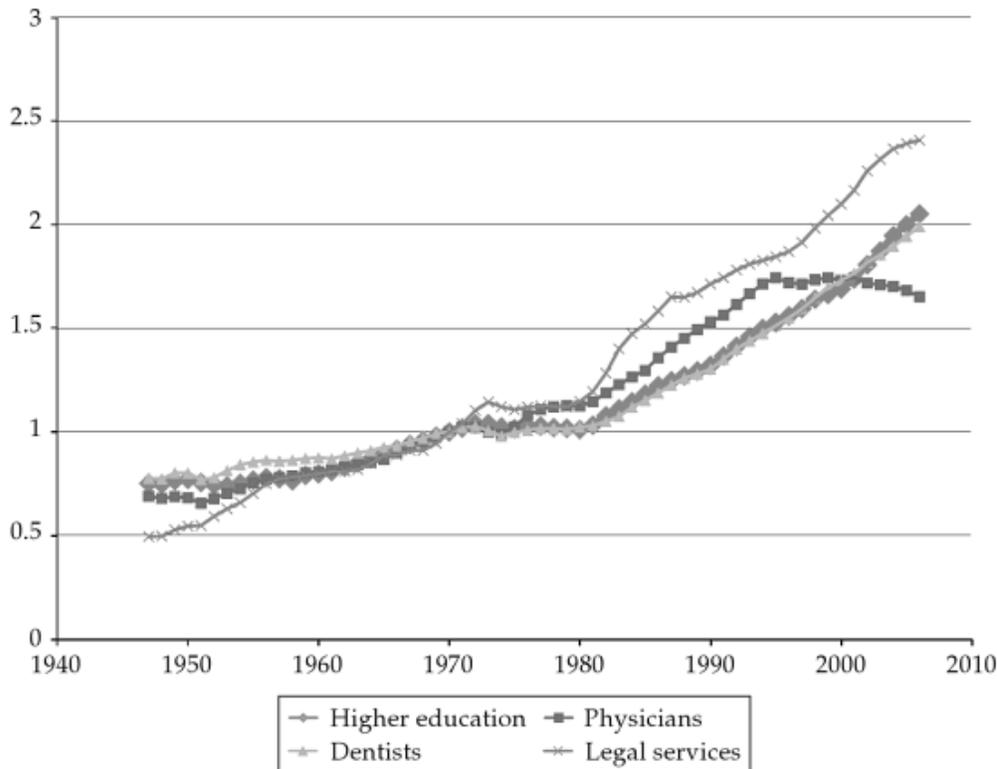
### 4.1 Economic Growth & Technological Advance

Archibald and Feldman claim, “higher education is an industry that is similar to several others, and that the characteristics it shares with other industries explain a great deal about the experience of higher education costs.”<sup>5</sup> After comparing time series of higher education prices to prices of durable and non-durable goods, services from buildings (rent) and services from less-skilled workers (barbers) and finding little to no correlation, they compared higher education prices to prices of dentists, physicians, and legal services and found the most similarity, as shown in Figure J below.

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<sup>5</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 48

Figure J



**Figure 2.4** The Real Price of Higher Education Compared to the Real Price of the Services of Physicians, Dentists, and Lawyers, (1970=1)

Source: Archibald and Feldman (2010), *Why Does College Cost So Much?*, Figure 2.4, page 25

Although today's university can be viewed as a "multi-product" firm with "undergraduate teaching, graduate training, individual mentoring, basic and applied research, policy analysis, and public service," the price of higher education is found to behave most similarly to "the prices of most personal services offered by highly educated service providers."<sup>6</sup> These industries are similar in that they have all experienced a dramatic increase in the cost and price of their service.

Archibald and Feldman claim that there are three factors that have caused the flat long-run supply curves of these industries to rise slowly over time. First, technological progress is known to reduce costs and increase efficiency, but it is not evenly spread out across industries.

<sup>6</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 27

Technological advance has shown the biggest impact on manufacturing industries while service industries such as higher education often face lags in technological advances. With new technology, the cost of manufacturing goods has gone down when compared to the costs of service industries with skilled labor such as higher education and legal services. As other industries experience decreasing costs and are able to pay higher wages, universities must pay professors a rising wage to remain competitive, thus increasing costs; such a phenomenon is known as the “cost disease,” discussed in further detail in the next section. As costs increase rapidly and revenues from various other sources do not increase as well, the price of higher education will increase, shifting the supply curve upward.

Second, as demonstrated earlier in Figure F, all else equal, having a bachelor’s degree will allow one to receive a higher wage than without a bachelor’s degree. Much of this trend in wages can be explained by the supply and demand for skilled labor. Technological advances tend to favor more educated workers, and in more recent decades, the educational system has not been able to supply enough new graduates as the demand for these highly skilled workers increased over time. This increase in the demand for skilled labor drives up their wages. The higher education industry depends the most on highly skilled labor, as being a professor implies being highly educated. In the case of higher education, the cost of hiring professors has increased, driving up the overall cost of higher education over time.

Lastly, Archibald and Feldman argue that technological advances actually raise costs in higher education instead of lowering them. For the manufacturing industry, technology reduces costs; for service industries dependent on highly skilled labor, technology is used to differentiate services and increase quality, not necessarily decreasing costs at all. Technological advances affect higher education in many ways. First, “rapid changes in technology in the world around us

force these changes in what colleges and universities teach and in how they teach it.”<sup>7</sup> Just as a hospital needs to keep buying the latest medical equipment to increase its quality of care for patients, universities must continually purchase the latest technology to increase the quality of education. Not only must the curriculum change to reflect new technology, students must learn to use the new technology in class to be prepared for the work force. Universities must stay up-to-date with the latest technology and cannot teach the same way professors were taught decades ago, increasing the quality of education while largely increasing costs. In addition, technology has not increased productivity in universities as measured by “students taught per labor hour”<sup>8</sup> because doing so would decrease the perceived quality of education in the classroom. Overall, technological advance, as argued by Archibald and Feldman, has actually increased costs of the higher education industry.

Ultimately, Archibald and Feldman argue that the higher education industry (as well as other services that require highly educated service providers) has seen the greatest rise in prices over the decades primarily due to its dependence on highly skilled labor and the effects of technological advance on increasing the cost of skilled labor. Given that demand for higher education has been increasing and shifting over time, for these three stated above reasons, Archibald and Feldman argue that economic growth and the technological advances that come with it are key drivers in pushing up the long-run supply curve over time and increasing the cost of higher education.

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<sup>7</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 70

<sup>8</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 71

## 4.2 The Cost Disease

The cost disease is commonly described by William Baumol and William Bowen in a classic example regarding a quartet: “A half 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.”<sup>9</sup> When applied to higher education, they argue that higher education, along with many other service industries, experiences slower productivity growth in its labor force than that of other industries or the economy as a whole; however, in order to remain competitive as other more productive labor forces earn higher wages, higher education and other service industries must also increase wages. The salaries of professors have had to increase to match increases in the alternative employment options of these highly skilled workers. This “cost disease” has largely driven the rising cost of higher education over the past few decades.

Looking back at Figure J, it is evident that the prices of higher education, physicians, dentists, and legal services peaked around 1973 and declined or remained stagnant for the rest of the 1970’s. The cost disease provides an explanation for this phenomenon centered on productivity in this decade. Global productivity began to slow down in the 1970’s; between 1960 and 1972, “output per labor hour in manufacturing grew at an annual rate of roughly 3.0 percent... That rate slowed to 1.85 percent from 1973 to 1981 before rising again to 3.2 percent between 1982 and 1995.”<sup>10</sup> With reduced productivity in the manufacturing sector (where productivity gains are greatest), the cost disease states that overall costs in all service industries should also decrease, which is evident in Figure J. Because of the consistency of the relationship between productivity and prices over time, Archibald and Feldman argue that technological

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<sup>9</sup> Baumol and Bowen (1967)

<sup>10</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 86

advance and the cost disease are the most viable reasons for why tuition prices have been increasing over time.

However, many may argue that with the creation of online learning, technology has increased the quality of education and the productivity of professors. Theoretically, the cost disease would not exist to such a great extent in a world where online learning and classroom learning were complements to each other. However, as it currently stands, online learning is seen as a substitute to classroom instruction; therefore, theoretically, the cost disease still exists today where online learning is inferior to classroom learning. This thesis will address the implications of online education in further detail in Section 7.

Cost disease can be illustrated in the supply and demand framework as an upward shift in the flat long-run supply curve, driving up the cost of higher education over time independent of demand. Overall, “costs in higher education must rise faster than the general inflation rate as long as productivity growth at colleges and universities lags behind productivity growth in the rest of the economy.”<sup>11</sup>

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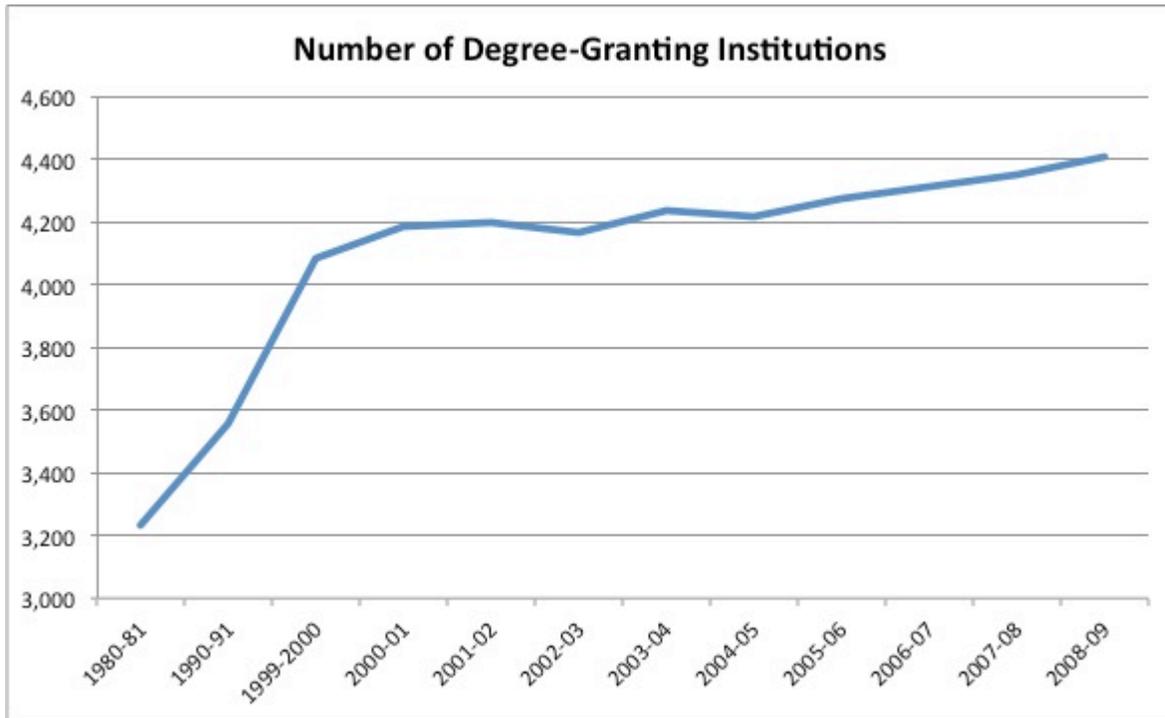
<sup>11</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 114

## 5 Vertical Long-Run Supply Curve Analysis

Thus far, this thesis has focused on economy-wide factors and a flat long-run supply curve and analyzed how technological advances and the cost disease have been drivers pushing up the supply curve over time, driving up the cost of higher education. This section focuses on higher education-specific factors and uses empirical evidence to argue that the long-run supply curve is theoretically vertical, much like the supply of all land in the world. Although many other higher education-specific factors such as wasteful spending caused by competition between schools that drive up construction and administrative costs, redefining faculty and administrative roles, etc. may drive up tuition, this section specifically focuses on the universities' decision to increase total enrollment (supply). This section tests the hypothesis that because of the inability for supply to meet the increasing demand for higher education, the long-run supply curve is theoretically vertical, resulting in a supply and demand imbalance that drives up the price of higher education.

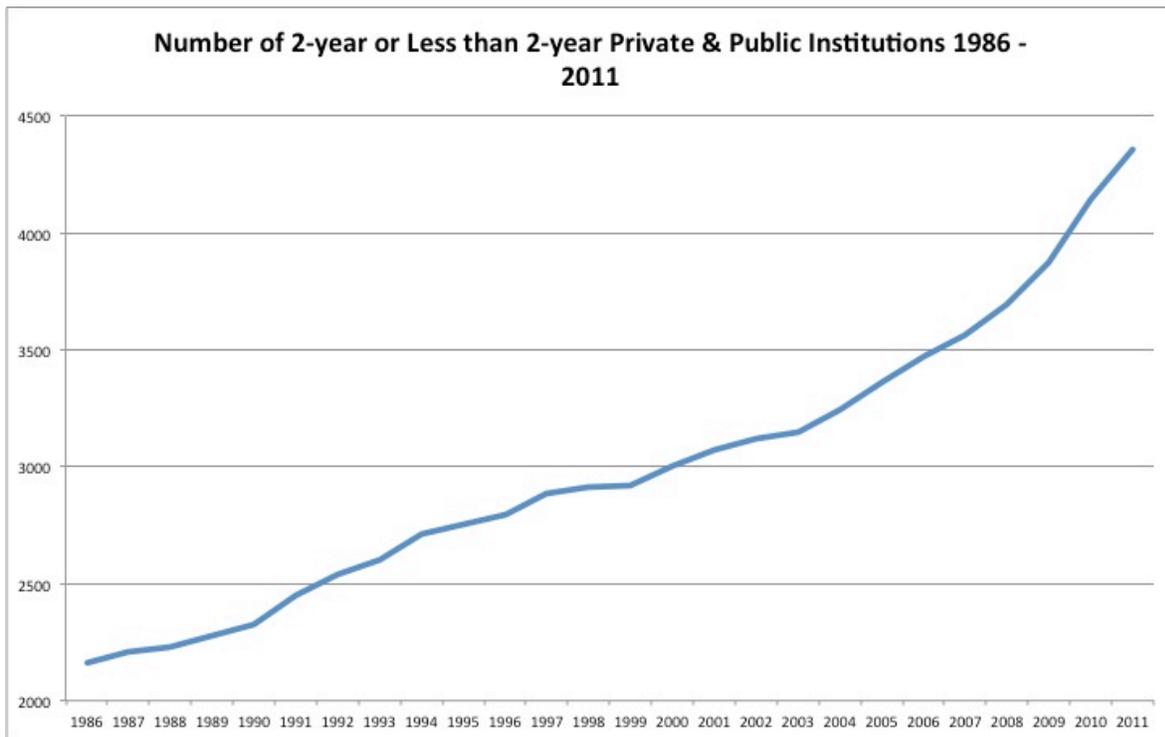
In order for the price of higher education to remain constant as the demand increases, supply must react and also increase to accommodate the increasing number of students electing to enroll in college. This is where a lag begins and the costs rise. Figure K indicates that the number of degree-granting institutions has in fact been increasing since 1980, with a small increase in the number of institutions each year. However, the increase in the supply of degree-granting institutions largely reflects the new 2-year community colleges and small private for-profit universities that have been recently on the rise, as reflected in Figure L. From Figure M, it is evident that total enrollment at all higher education institutions has been increasing steadily over the years, implying that the vertical long-run supply curve has been shifting to the right over time to respond to the increase in demand.

Figure K



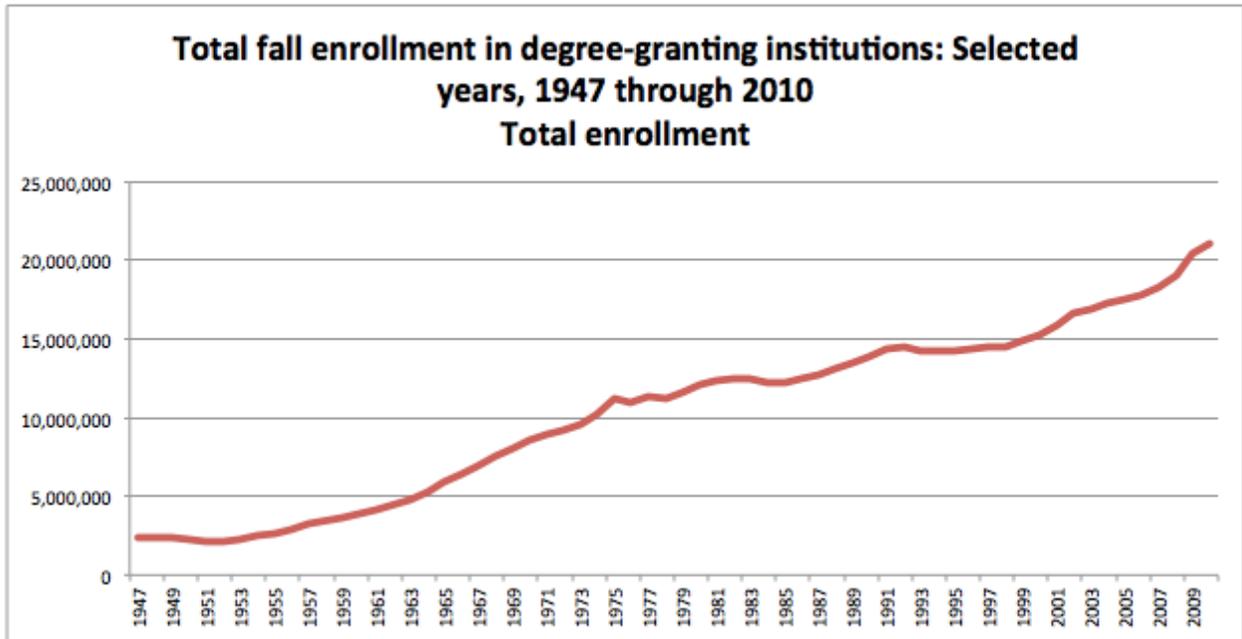
Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)  
Note: Data available before 1999 only collected at beginning of each decade

Figure L



Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

Figure M



Source: U.S. Department of Education, National Center for Education Statistics, *Biennial Survey of Education in the United States; Opening Fall Enrollment in Higher Education*, 1963 through 1965; Higher Education General Information Survey (HEGIS), "Fall Enrollment in Colleges and Universities" surveys, 1966 through 1985; and Integrated Postsecondary Education Data System (IPEDS), "Fall Enrollment Survey" (IPEDS-EF:86-99); and IPEDS Spring 2001 through Spring 2011, Enrollment component. (This table was prepared September 2011.)

Note: Data through 1995 are for institutions of higher education, while later data are for degree-granting institutions. Degree-granting institutions grant associate's or higher degrees and participate in Title IV federal financial aid programs. The degree-granting classification is very similar to the earlier higher education classification, but it includes more 2-year colleges and excludes a few higher education institutions that did not grant degrees.

However, a great deal of this increase in total enrollment has been from the newer community colleges and small private universities aforementioned. Education Secretary Arne Duncan pointed out that community colleges “remain one of the most consistently affordable options for higher education: The average net price of a community college increased by less than 1% between 2007 and 2009. Tuition, room and board average \$8,085 at a public, two-year institution in 2010.”<sup>12</sup> In addition, as demonstrated in Figure F, the average earnings for a worker with a bachelor's degree are higher than those of a worker with an associate's degree. Since 1999, a worker with a bachelor's degree earned 1.4 times a worker with an associate's degree and this wage differential gap continues to grow today. With this high wage differential, it can be

<sup>12</sup> Armario (2012), "Average Cost of Four-Year University Up 15%", USA Today

expected that the demand for higher education lies more within 4-year public and private institutions.

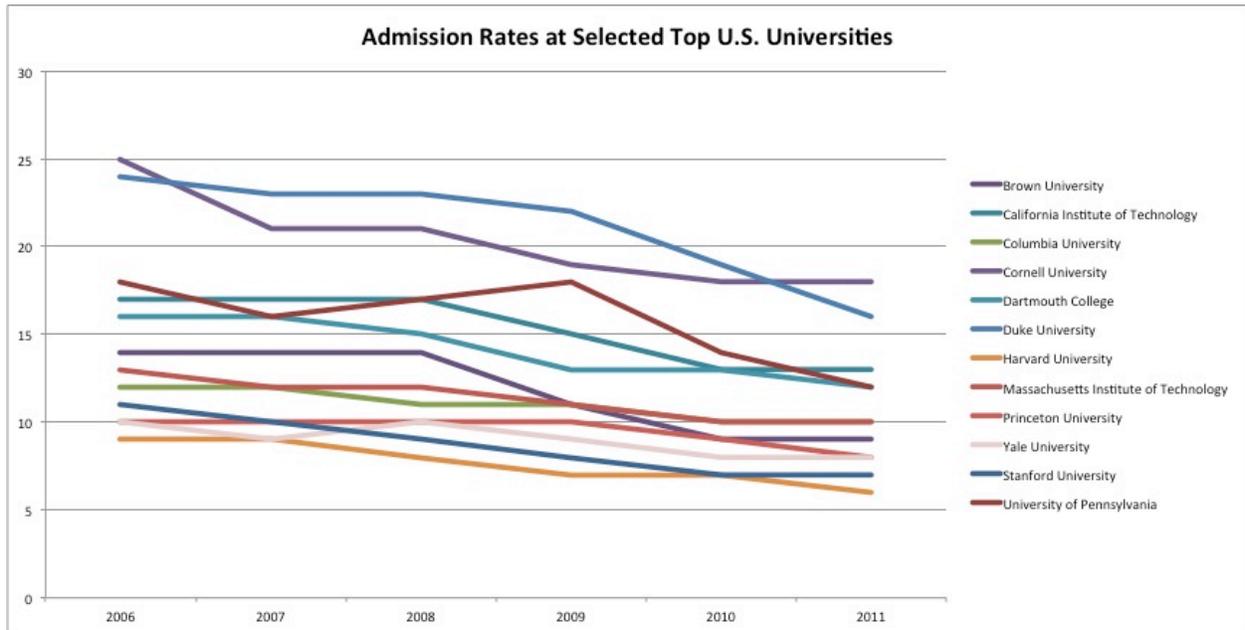
Although Figure K and M indicate that the number of degree-granting institutions and total enrollment have been increasing over the years, this increase in the supply does not accurately correspond to the increase in demand for and cost of public and private 4-year universities. This thesis will focus primarily on the supply of 4-year public and 4-year not-for-profit universities as they reflect much of the increase in demand for higher education and the surge in tuition prices.

Many of the top schools in the United States have yet to drastically increase their undergraduate size or make plans for expansions. For example, Yale made plans for expansion for the first time in 2008, adding two new residential colleges to allow a 15% increase in enrollment and a bigger incoming freshmen class starting in 2013. Prior to this expansion, Yale only saw a dramatic increase in class size when women were allowed to enroll in 1969. From 1978 to the present, Yale's undergraduate class size has only ranged from 5,150 to 5,350 students.<sup>13</sup> As Figure N demonstrates, for most of the top elite universities in the United States, admission rates have been decreasing over time and hitting all-time lows, reflecting this increase in demand (record number of applicants) and the failure of supply to meet that demand (low acceptance rate). Without plans for expansion, undergraduate college size will remain relatively stagnant, limiting the ability for supply to respond to the increasing demand for higher education.

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<sup>13</sup> "Yale to Establish Two New Residential Colleges." Yale News (2008).

Figure N

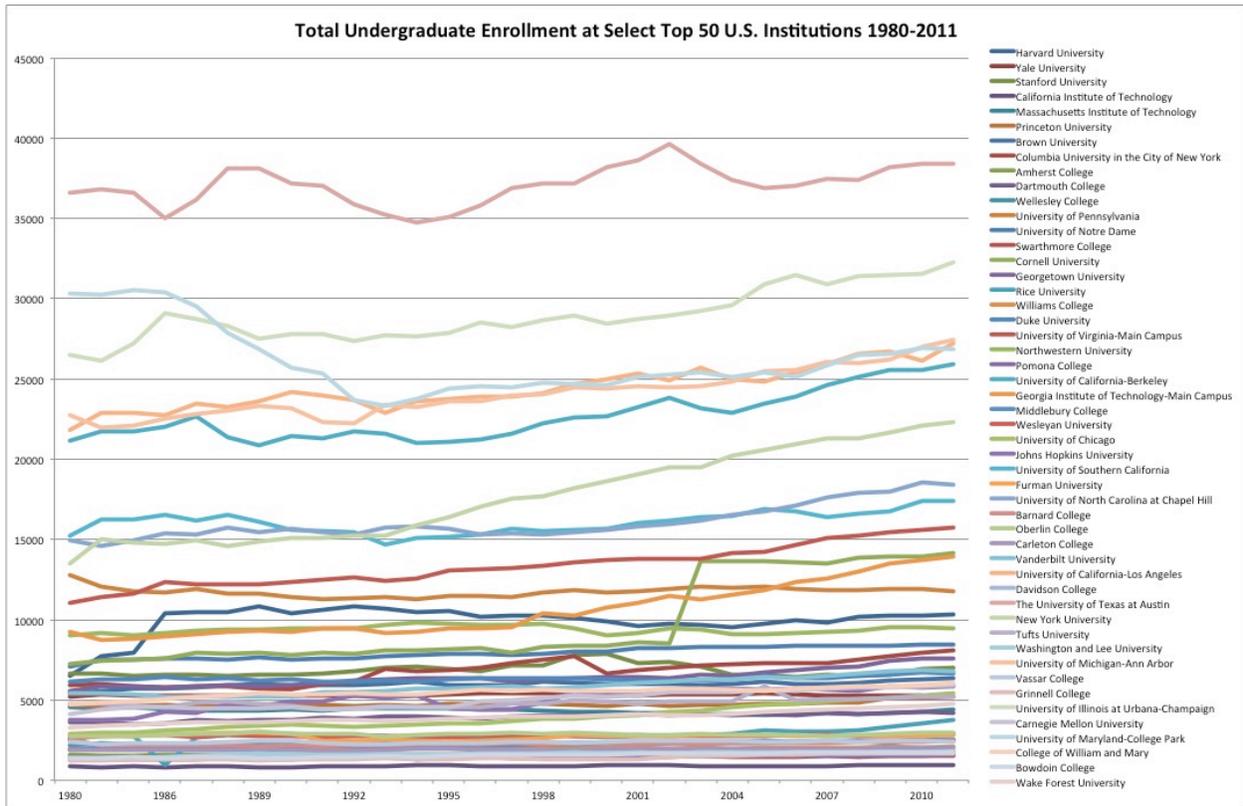


Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

The best way to measure the change in the supply of higher education is to determine if total undergraduate enrollment at 4-year private and public institutions has changed over time. The selected group of undergraduate institutions that were examined were the Top 50 schools listed in the working paper, *A Revealed Preference Ranking of U.S. Colleges and Universities*, by Christopher Avery, Mark Glickman, Caroline Hoxby, Andrew Metrick.<sup>14</sup> These institutions were chosen because they, when going head-to-head during a high schooler's college decision, are the top 50 most preferred universities and subsequently reflect the increasing demand for higher education. The total undergraduate enrollment for the selected 50 universities was plotted over time from 1980-2011 (Figure O) and aggregated (Figure P), and the results point to a few interesting facts.

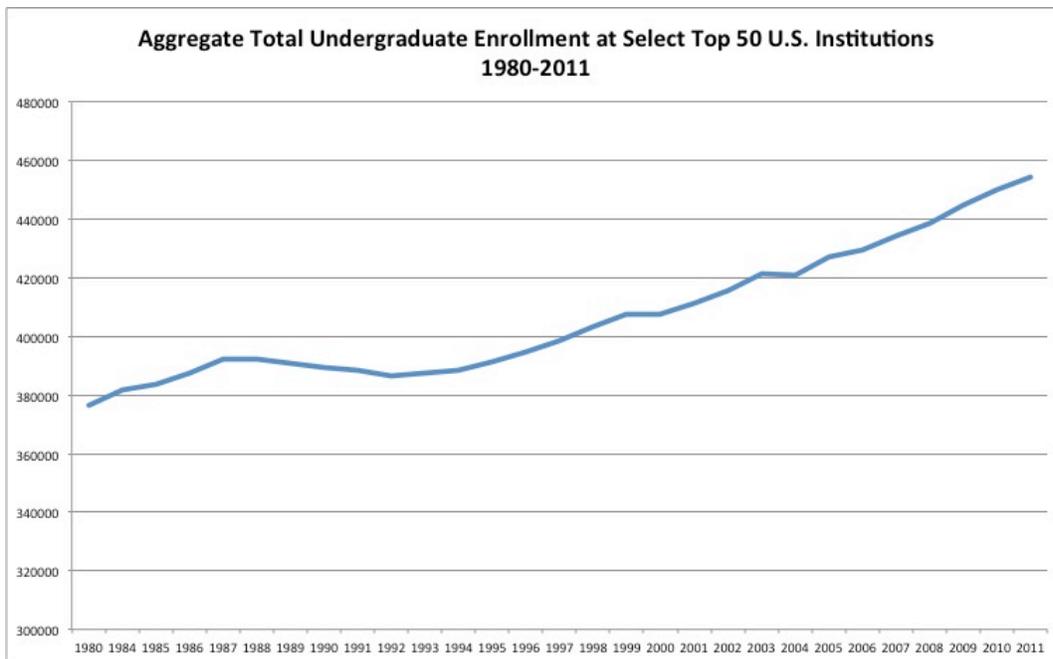
<sup>14</sup> Avery, Glickman, Hoxby, Metrick (2004), Table 3, pg. 26

Figure O



Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

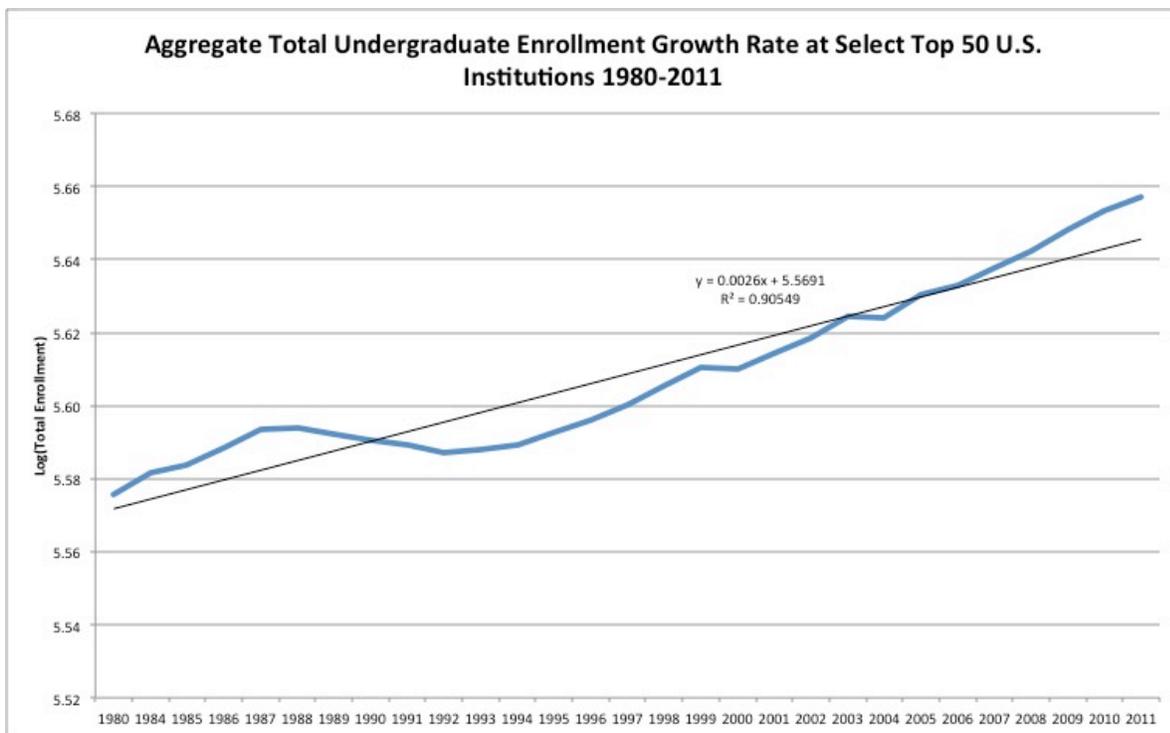
Figure P



Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

First, as a whole, it seems that total enrollment over the selected 50 universities has been increasing over the past three decades. However, the rate at which the aggregate total enrollment has been increasing at is an extremely slow rate of 0.26% (Figure Q). This slow aggregate growth rate exemplifies the fact that the supply of higher education has been rather stagnant in the past three decades and the long-run supply curve is vertical, shifting slightly rightward over the years.

Figure Q

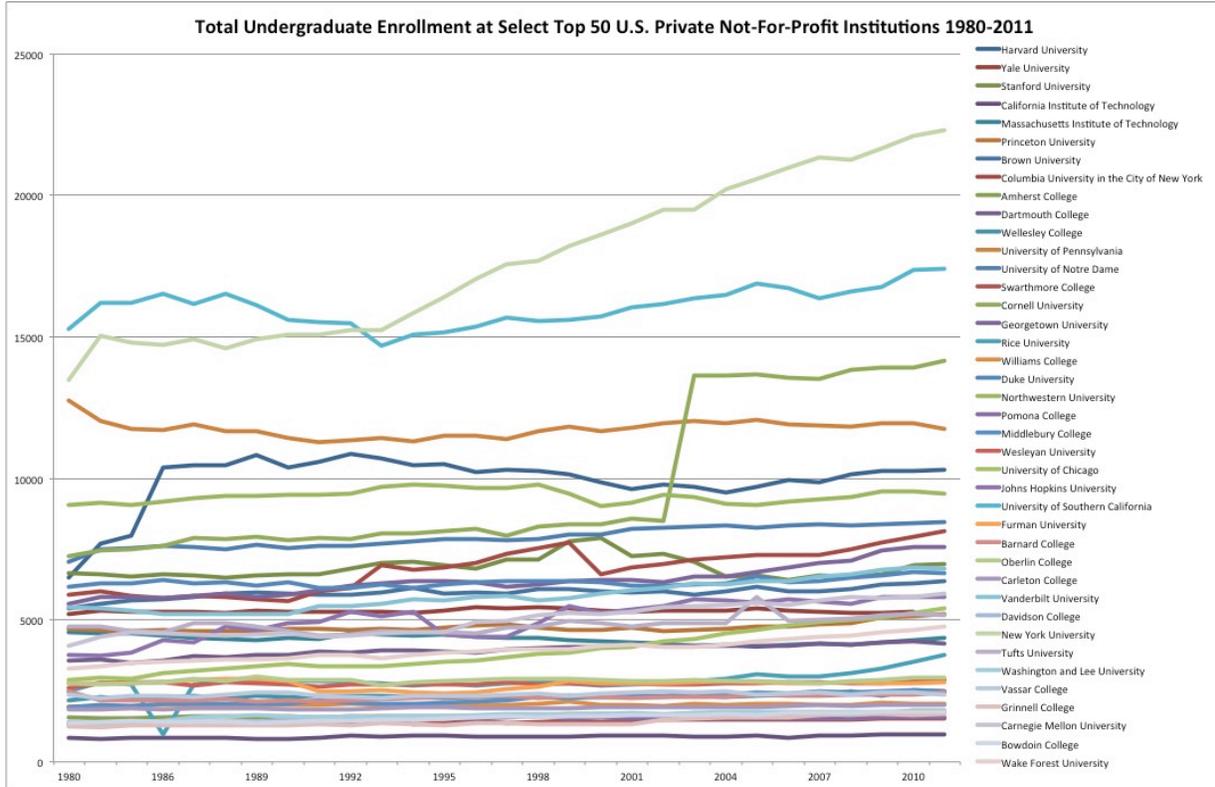


Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

Second, for all of the selected private universities shown in Figure R below, with the exception of New York University and Cornell University, there has been very little sign of significant increase in total enrollment over the specified time frame. The smaller private schools have seen little to no change in total enrollment while the larger, more established private universities have slightly increased total enrollment. For most of the private universities, total undergraduate enrollment has remained relatively limited over the past 30 years, with a growth

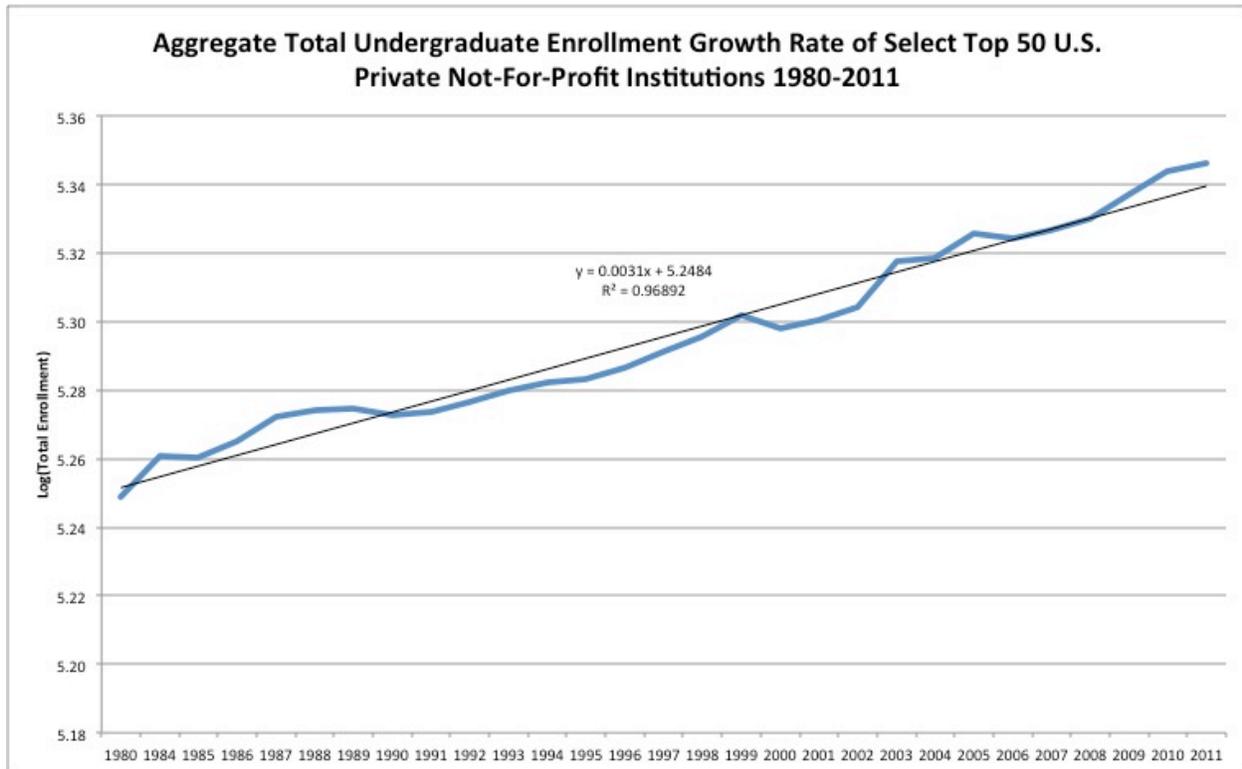
rate of 0.31% (Figure S). This finding supports the hypothesis that the long-run supply is relatively vertical and has not shifted dramatically to the right over time to reflect the increasing demand for higher education. As a result, tuition and costs have been rising.

Figure R



Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

Figure S



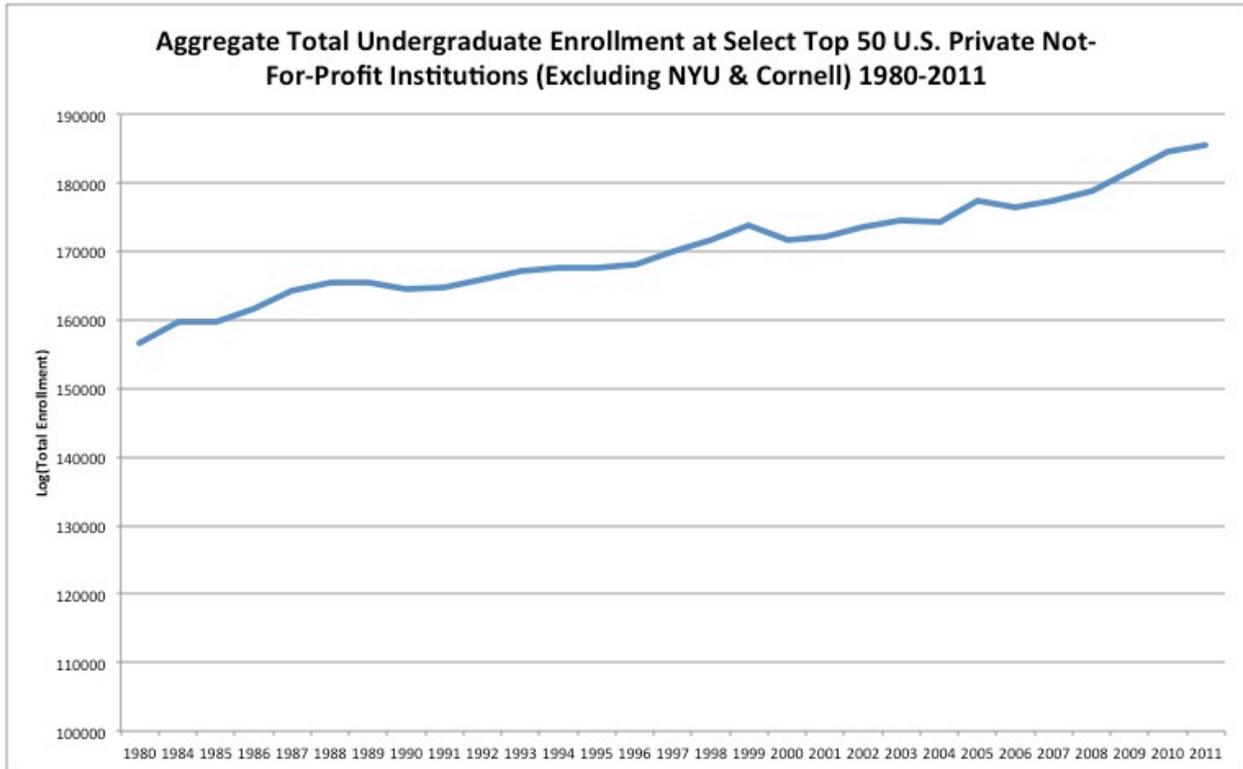
Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

Third, for New York University and Cornell University, both show larger increases in total enrollment, with NYU showing a gradual increase over time and Cornell having a large increase starting in 2003 and leveling off. Both universities have announced expansion plans over the past few decades. NYU has created campuses all around the world and added two new portal campuses in Abu Dhabi and Shanghai, largely increasing its undergraduate enrollment over time. Cornell announced in 2000 its North Campus Residential Initiative to increase undergraduate enrollment targets.<sup>15</sup> Although both universities show increases in total enrollment, tuition prices have still been rising steadily. These tuition increases may reflect increased financial aid needed by students, increased costs due to expansion, lower grants and donations, etc. Individual university efforts to increase total enrollment, while other schools do

<sup>15</sup> Alvord (2005), "Undergraduate Enrollment Trends", Cornell University

not adjust supply, will not have an effect on the overall supply of higher education and thus will not reduce the overall cost of higher education. Taking New York University and Cornell University out of the sample, the select private universities have only seen a 0.22% growth rate in total enrollment in the past thirty years (Figure T).

*Figure T*

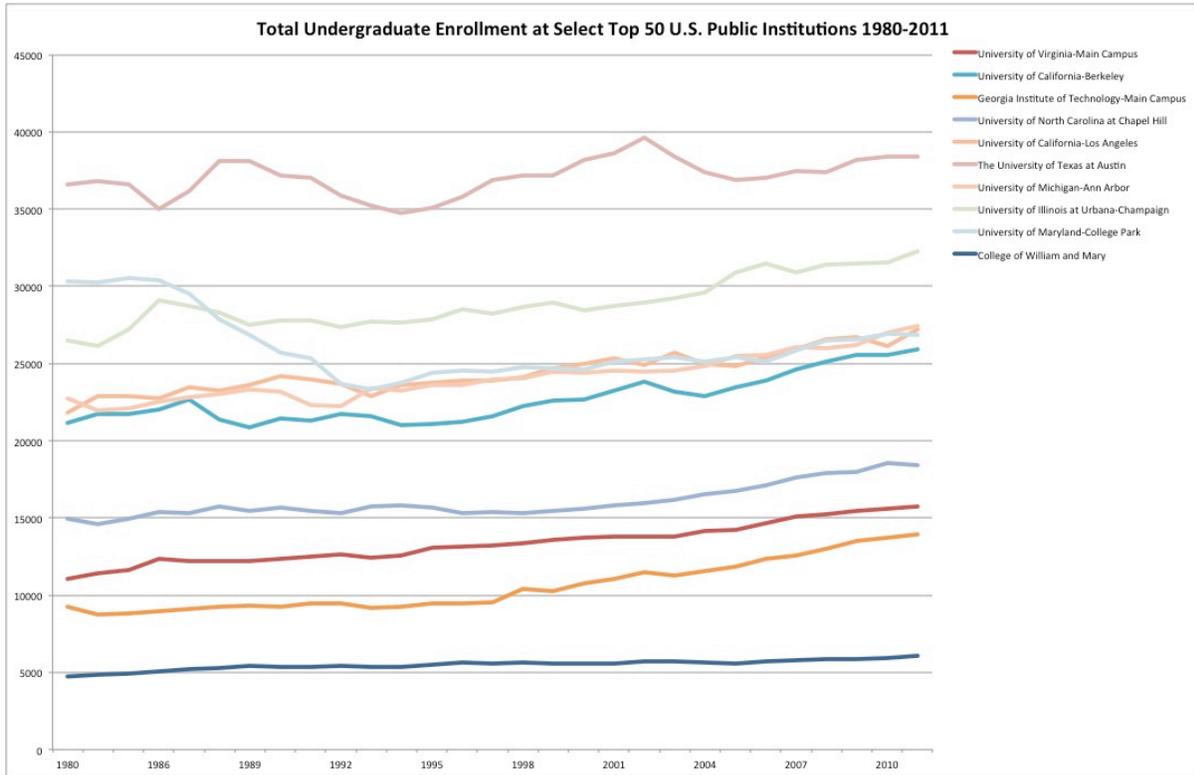


Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

Lastly as shown in Figure U, some of the large public universities do exhibit a very small gradual increase in total enrollment. As evidenced in Figure V, the percent of students enrolled in public universities has increased from 50% in 1947 to around 72% of students enrolled in a public university in 2010. Because of this large increase in enrollment in public institutions, total enrollment spaces for undergraduates at public universities have gradually increased. However, in just the past five years, the number of SAT takers has increased by 6.41% in total (Figure H), but many of the selected public universities have increased enrollment by less than 5% over the

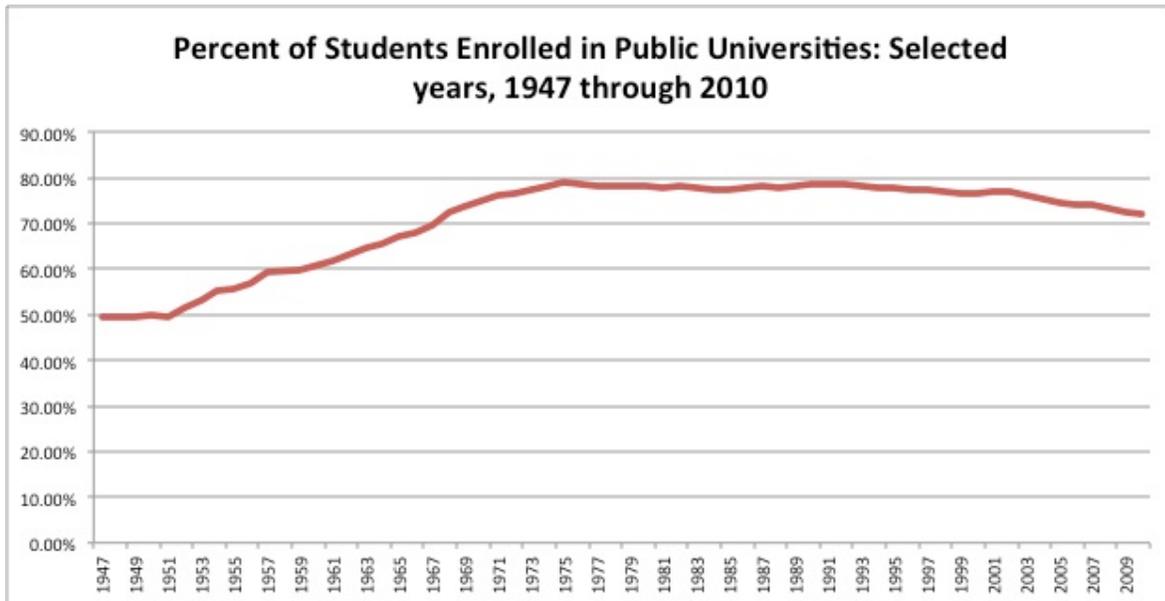
past five years and a persistent total enrollment growth rate over the past thirty years is a meager 0.22% (Figure W). This increase in supply is still not enough to keep up with the increasing demand for higher education. In addition, as state and local subsidies decline, universities may have to raise tuition to cover costs.

Figure U



Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

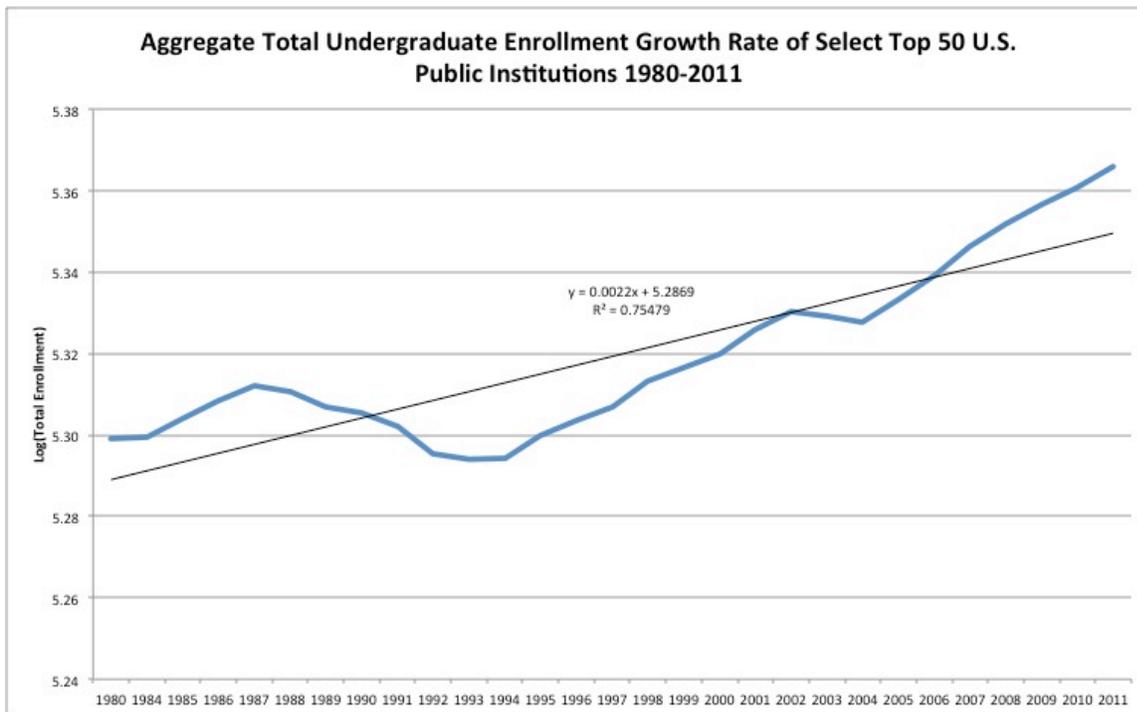
Figure V



Source: U.S. Department of Education, National Center for Education Statistics, *Biennial Survey of Education in the United States; Opening Fall Enrollment in Higher Education*, 1963 through 1965; Higher Education General Information Survey (HEGIS), "Fall Enrollment in Colleges and Universities" surveys, 1966 through 1985; and Integrated Postsecondary Education Data System (IPEDS), "Fall Enrollment Survey" (IPEDS-EF:86-99); and IPEDS Spring 2001 through Spring 2011, Enrollment component. (This table was prepared September 2011.)

Note: Data through 1995 are for institutions of higher education, while later data are for degree-granting institutions. Degree-granting institutions grant associate's or higher degrees and participate in Title IV federal financial aid programs. The degree-granting classification is very similar to the earlier higher education classification, but it includes more 2-year colleges and excludes a few higher education institutions that did not grant degrees.

Figure W



Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

It is evident from the empirical analysis shown in Figure P that most 4-year private universities and public universities are not responding to the increase in demand for higher education by significantly increasing total enrollment spaces available for undergraduates. This further proves that the supply of higher education is relatively stagnant and the long-run supply curve is vertical. With ever-increasing demand for higher education and subsequent upward shifts in the demand curve and no significant rightward shift of the vertical supply curve, this supply and demand imbalance will result in increases in the price of higher education.

## 6 Putting All of The Factors Together

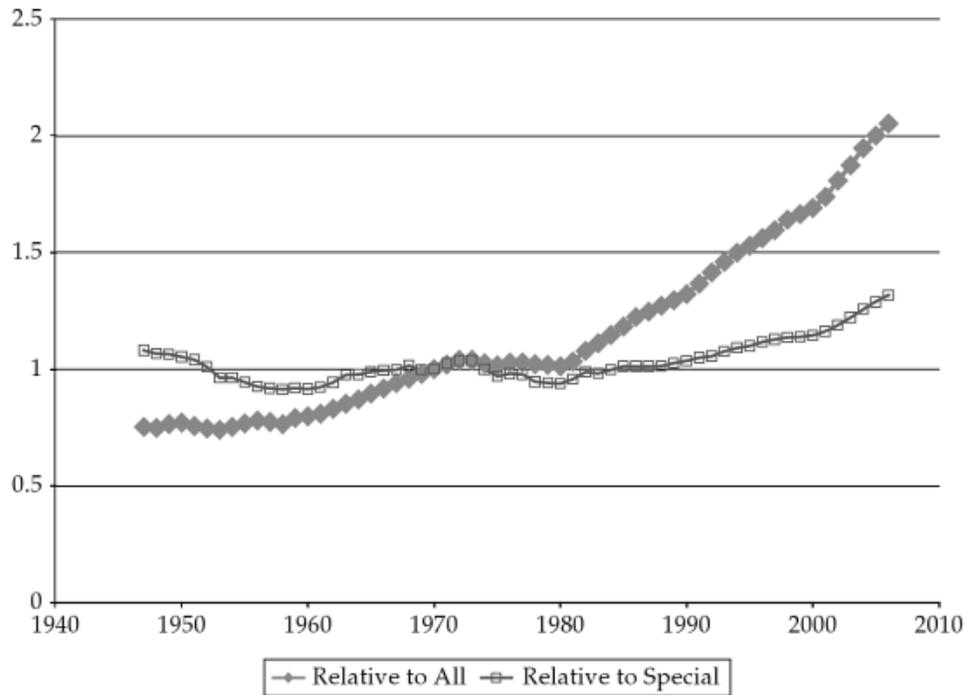
At this point, after looking at both economy-wide and higher education-specific factors, it is important to note that this thesis is not trying to distinguish and prove that one finding is more pertinent than the other. Regardless of whether the long-run supply curve is flat or vertical, the implications are identical – the sticker price of higher education is continuing to increase.

Many critics of the higher education system point to flaws within the higher education system itself, that the system itself is dysfunctional. They argue that faculty have decreased teaching loads and roles to better suit their research interests; they argue that many tasks previously delegated to professors have now been shifted to the responsibility of professional administrators. Many point to the arms race between universities to be a top-ranked institution that causes lavish spending on new buildings and facilities as a leading cause of the rising tuition prices. As stated earlier, Archibald and Feldman do not believe these higher education-specific factors explain the trend of rising tuition prices over time. In order to determine how much of the upward trend in tuition prices is attributable to both the cost disease and increased wages to highly skilled workers, Archibald and Feldman “constructed a price index just for industries that should have been affected by these same two factors” and formed “a second ‘real price of higher education’ by dividing higher education prices by the price index of presumably similar industries.”<sup>16</sup> This new “real price of higher education” is demonstrated in Figure X below.

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<sup>16</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 88

Figure X



**Figure 6.2** The Real Price of Higher Education Relative to All Prices and Relative to Special Price Indexes of Service Industries that Rely on Highly Educated Labor

Source: Archibald and Feldman, *Why Does College Cost So Much?* Figure 6.2, page 88

From the analysis shown in Sections 4 and 5, it is not surprising to see that the price of higher education is higher relative to all industries. In addition, if the price of higher education is in fact driven by the same factors as those that drive the overall economy and the prices of similar industries, the new real price of higher education should be very close to 1.00, which is true in the case of Figure X. The prices of higher education and other similar industries that use highly skilled workers have been roughly very similar in the past sixty years with the exception of a small rising gap in the recent fifteen years. Archibald and Feldman point to three reasons why the price of higher education may have risen above the prices of similar industries in the past fifteen years: first, industry-specific factors in other industries may have caused the price index of similar industries to drop relative to prices in higher education (i.e. physician fees

started leveling off in the mid 1990's); second, a decrease of government subsidies as a percent of cost may have driven up the price of higher education and lastly, higher education may employ a greater percentage of highly educated workers even when compared to similar industries.<sup>17</sup> Archibald and Feldman argue that despite the three reasons listed above, much of the overall rise in tuition is attributed to economic growth and technological change and not higher education-specific factors.

However, the empirical evidence found in Section 3.4 may provide an additional, unexplored explanation for why the price of higher education has risen over the prices in similar industries in the past fifteen years. The market for higher education, as stated earlier, is very different from the traditional market for wheat or any other good or service. Because of the large size of the higher education market, the high regulation in this market, and the fact that the market is predominantly made up of public or nonprofit organizations, the ability to increase supply (total enrollment and number of institutions) is more difficult than in other similar service industries. In other words, it may not be as difficult for similar industries to increase their supply in response to any changes in demand. If there is an increased demand for these service industries, there will be a response to this demand and one will see more law firms, dentist offices and doctor offices. For example, a recent study by the Georgetown-Peer Monitor group found that “demand for legal services increased just 0.5 percent last year, based on the number of billable hours logged by firms that report to Peer Monitor. . . The number of lawyers in U.S. firms, however, increased by 2 percent in 2012, according to the report, contributing to what the authors call an overcapacity in the market.”<sup>18</sup> While these other similar service industries face slight excess supply, the higher education market faces a constant excess demand. Perhaps it is

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<sup>17</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 89

<sup>18</sup> Randazzo (2013), *The Am Lawyer Daily*

the difficulty to increase supply in response to demand in higher education that is driving up prices in higher education relative to prices in other similar service industries.

Although the biggest weight of the rising tuition prices can be attributed to economy-wide factors, the slight recent surge in higher education prices over prices in similar service industries can be attributed to a higher education-specific factor, namely that demand has drastically increased over the years and supply of higher education has not kept up to meet this increased demand. Together, these reasons all account for the rising cost of higher education.

## 7 Policy Implications

The empirical data in Section 5 make a strong case for increasing the total enrollment at higher education institutions. On the other hand, the argument set forth in Section 4 by Feldman and Archibald that it is due to external factors, largely economic growth, that tuition prices have risen steadily call for policy changes that increase productivity at the economy and university level. It is important to note that, in the case of higher education, there is a tradeoff between price, quality of learning, and subsidies available to higher education institutions. For instance, if a university wants to reduce its price (while costs remain the same or increase), it must increase the amount of subsidies it receives or weaken the quality of classroom instruction (higher student-to-professor ratio). There will always be a tradeoff in higher education, unless costs can be reduced by an increase in productivity. A plausible solution to the rising price of higher education that minimizes this tradeoff is the use of online education and “blended” courses that mix modern technology with classic classroom learning.

After looking at the empirical data in Section 5, it is evident that in order for the cost of higher education to maintain relatively stable given increases in demand, universities must look to expand and increase their supply or total enrollment. However, given the state of the recent economy and the fact that most institutions are nonprofit, there is very often little desire or incentive for a university to expand. Unlike the CEO of a for-profit company who exhibits relative power and has an incentive to make sometimes unwanted and difficult decisions on behalf of the company, university presidents may have little incentive to do so, have very little power and require the approval of faculties, the board and alumni to make major decisions for the university. An economic analysis of the incentives of an university president have been outlined by the former President of the National Bureau of Economic Research, Martin

Feldstein: “Decision makers in universities and colleges are (of course) utility maximizers whose personal utility is a function of such things as compensation, the pleasantness of their day-to-day work experience, the satisfaction of doing their job well, and the prestige of their positions. They know moreover that their future employment prospects depend on their current performance and reputation. Seeking to achieve in the institution a major change that runs counter to existing practices at that and other institutions might increase the ‘satisfaction of doing the job well,’ but it would not increase salary. It would create confrontations that reduce the pleasantness of the daily work experience, and it might create a reputation for being disruptive that would hurt the individual’s future job prospects at that or other institutions. In such a situation, the utility maximizer generally does not make major changes in the status quo or seek to depart from general practice among similar institutions.”<sup>19</sup> This analysis can be exemplified by John Sexton’s, President of NYU, unconventional plan to create more campuses around the world and to expand its current campus in New York City, resulting in a vote of no confidence from the faculty of the NYU College of Arts and Sciences.

In order to curb the rising cost of higher education, universities need to find ways to increase total enrollment and increase productivity to dramatically shift the long-run supply curve rightward to meet the rightward shift of demand over time. Online education and “blended” courses can potentially increase the productivity of professors and increase university total enrollment. It is important to note that if higher education must remain a face-to-face learning interaction, the cost disease will still remain a large driver of higher education prices; however, if distance education can provide education of similar quality, the cost disease is less prevalent and costs and prices would largely decrease.

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<sup>19</sup> Rothschild and White (1991), *Studies of Supply and Demand in Higher Education*, pg. 39

## 7.1 Online Education

Archibald and Feldman summarize some key advantages and disadvantages of online education that one must take into consideration. As for advantages, online education can be “asynchronous” allowing students to take courses at times convenient for them.<sup>20</sup> In addition, students can replay lectures and repeat classes rather easily. In face-to-face education, students can drop in during office hours or look over notes taken during class to repeat material, but distance education would make hitting the replay or rewind button on a class lecture effortless. Lastly, universities can cut down costs used to maintain classrooms or libraries such as expenditures on buying printers and warming, cooling or building facilities.

There are definitely many disadvantages that Archibald and Feldman point out as well. First, online education omits the class interaction and participation aspect needed for many courses. For example, presentation and speech courses would not be as effective without an audience. Second, the success of online education depends on the student’s discipline. Without the push for a student to make it to an 8:00am class, students must find times in their everyday lives to sit down and learn the course material on their own. In addition, it takes a great deal of effort and bandwidth to create a full course; it requires “a course’s worth of presentations, a series of exercises and problems, and other interactive learning aids to deal with questions and other issues that arise.”<sup>21</sup> Clearly, distance education cannot be comparable in quality to face-to-face education in all different types of courses. However, in whole, Archibald and Feldman acknowledge that online education “has an edge where the primary feedback from the students is

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<sup>20</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 118

<sup>21</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 120

fairly straightforward written work and when the course content is not likely to be altered by the boundaries of knowledge.”<sup>22</sup>

Online education is by no means free; there are considerable upfront costs needed to create a course. Because of these large costs and the effort needed to create a course, faculty may be reluctant to alter the course material often to reflect changing current events or new teachings. However, even though online education has large fixed costs, the cost of adding a new student to the course is relatively lower when compared to the cost of adding a student in a face-to-face educational course. With the addition of online education, universities can increase the total enrollment of students and effectively the supply of higher education at relatively low cost.

There are clearly advantages and disadvantages to online education. The biggest argument against online education is that it is still not of comparable quality to traditional classroom learning. However, distance education can be a viable solution to the growing demand for U.S. higher education from overseas students. In recent years, there has been a surge in the number of overseas college applicants; from 2013 data, “at Tufts University, international applications climbed 12 percent from a year ago and have more than doubled since 2004. The number of foreign students seeking admission to the University of California, Berkeley jumped about 22 percent this year, while the University of Pennsylvania, an Ivy League member, reported a 38 percent increase since 2010.”<sup>23</sup> If university boards and faculty are reluctant to create large university expansion plans, they are still able to increase total enrollment through distance education for overseas students.

In addition, many of the United States’ top universities have begun to offer online courses. Harvard and MIT are working together in a nonprofit initiative called edX to offer free

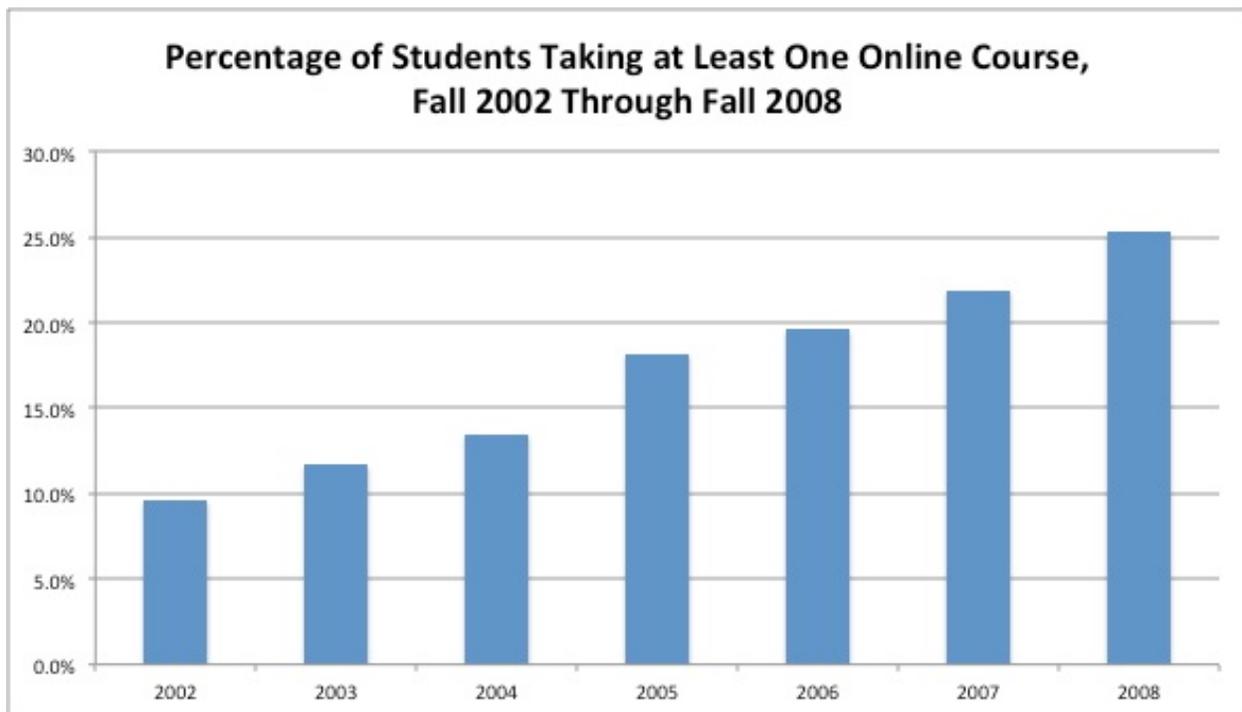
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<sup>22</sup> Archibald and Feldman (2011), *Why Does College Cost So Much?* pg. 121

<sup>23</sup> “U.S. Colleges Seek More Foreign Students To Help Bottom Line”, *The Financial Advisor Magazine* (2013)

classes from both institutions. A new company started by Stanford professors, Coursera, now offers over 350 courses with over 65 partner schools from around the world. As Figure Y demonstrates, more and more students are taking courses online, with 10% of students enrolling in at least one online course in 2002 rising to 25% in 2008. This thesis is not claiming that online education will one day replace traditional face-to-face education or that it is currently of comparable quality to the traditional classroom setting. However, if technology advanced further and online education catered to the courses in which it provided a superior learning experience, online education could definitely serve as a viable solution to increase the productivity of professors and to increase the total enrollment available at universities and shift the supply of higher education outward, allowing more students to be educated at a lower cost.

*Figure Y*



Source: I. Elaine Allen and Jeff Seaman, *Learning on Demand: Online Education in the United States, 2009*, Babson Survey Research Group and the Sloan Consortium, 2010. [http://www.sloan-c.org/publications/survey/learning\\_on\\_demand\\_sr2010](http://www.sloan-c.org/publications/survey/learning_on_demand_sr2010).

Note: Online courses are defined in the survey as those delivering at least 80% of their content online. Typically there are no face-to-face meetings in these courses. Blended or hybrid courses are not included in the figures reported here. Figures were reported by degree-granting institutions to the Babson Survey Research Group and on the College Board's Annual Survey of Colleges.

## 7.2 “Blended” Courses

A recent meta-analysis study by the U.S. Department of Education found that online education definitely has its advantages over face-to-face learning and “found that students who took all or part of their instruction online performed better, on average, than those taking the same course through face-to-face instruction. Further, those who took ‘blended’ courses – those that combine elements of online learning and face-to-face instruction – appeared to do best of all.”<sup>24</sup> Showing the greatest benefits in the study aforementioned, “blended” courses can also provide a sustainable solution to the rising tuition issue.

The meta-analysis study only conducted research on online education courses in which online learning is most conducive, not representing the scope of all online courses. Because distance education can still be viewed as being of lower quality than face-to-face education in higher-level courses and courses that require class interaction, online education, at this time, will not drastically increase productivity and reduce tuition prices.

Technology can, however, increase the productivity of the professor in the classic classroom setting. For example, Blackboard makes it easier for professors to collect assignments, post grades, and deliver announcements. Recording class lectures for students to re-watch allows students to learn at their own pace and may reduce the professor’s time needed for office hours. In this case, the technological progress that made the manufacturing sector more productive can also improve the traditional classroom setting and the quality of learning. If professors are more productive in this sense, they are capable of teaching more students, increasing total enrollment. There is a stigma that a higher student-to-professor ratio implies a lower quality of education, but if the course material taught by the professor remains the same and the way the professor teaches

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<sup>24</sup> Jaschik (2009), “The Evidence on Online Education”, Inside Higher Ed

remains the same, the quality cannot be said to have worsened solely because more students were added to the class. More research and development should be placed in the field of higher education to create ways in which the computer and technology can better perform repetitive, objective and time-consuming tasks and professors can continue to do what they do best, teach.

While this thesis it not trying to claim that online education and “blended” courses are the only solutions to the problem of rising higher education prices, if technology can increase the productivity and total enrollment of higher education, without reducing quality, tuition prices will likely decrease or remain the same given no further increase in demand. As of now, online education is still far from replacing the traditional face-to-face instruction in a classroom setting. There are still many arguments that claim that online education reduces the quality of education: one cannot gather the same soft skills or feedback from behind a computer screen; students may learn best from a physical presence and the nuances of different professors in the classroom; many courses are not adaptable or conducive to online education. Yes, this is all true. However, distance education can prove to be very efficient in courses that require little interaction and feedback and that do not reflect a constant changing curriculum. If universities continue to research ways in which technology can improve current classroom learning and create more of a “blended” educational system, the productivity of professors and total enrollment at universities would increase, and the price of higher education would decrease.

## 8 Conclusion

After analyzing both the economy-wide factors, as previously researched by Feldman and Archibald, and higher education-specific factors, this thesis found that given the substantial increase in the demand for higher education, the trend in rising tuition prices is not that unusual. With growing wage differentials between college and high school graduates, more students have elected to attend college, driving up the demand for higher education. Archibald and Feldman point to a few reasons why the price of higher education behaves much like the prices of similar service industries that also use highly skilled workers, namely those of physicians, legal services and dentists. Economic growth drives technological advancement and vice versa, which unarguably will enhance the quality of life for the average American. However, because higher education and similar industries fall victim to the cost disease phenomenon, technological advance, when not coupled with productivity growth, may inadvertently drive up costs (i.e. professor's wages). In addition, without a subsequent increase in the supply, or total enrollment, of higher education to meet the increase in demand, higher education prices must increase in response (given no additional sources of revenue).

In order to curb these rising prices, this thesis looked for solutions that would both increase the productivity of professors and total enrollment at universities. Many point to increasing financial aid or subsidies to students who need financial assistance to attend college; this would definitely decrease the price of education for these students. However, financial aid does not necessarily tackle the root of the problem, low productivity of professors and a supply and demand imbalance within higher education, and may not permanently curb the rising price of higher education. Although this thesis is not indicating that online education is of comparable quality to traditional face-to-face education, it does address the aforementioned issues. In

addition, studies have shown that students perform better in “blended” courses which increase the productivity of professors; and with enough productivity increase, institutions will be able to educate more students per professor without reducing the quality of education.

The topic of the rising cost of higher education is not an easy one to address. This thesis aimed to analyze the problem in a simple supply and demand analysis and from the greater economy perspective as well as the specific higher education perspective. Although this thesis did not comprehensively address or analyze additional higher education-specific factors, there are various other reasons for the recent increase in tuition prices and would serve as an area for further research.

Overall, the findings of this thesis support the conclusion that in order to curb the rising cost of higher education, institutions must look for ways to increase professor productivity and total enrollment to dramatically shift the long-run supply curve rightward to meet the rightward shift of demand over time; online education and “blended” courses do address these issues and serve as viable solutions.

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