

DO FACTORS ASSOCIATED WITH THE INCREASES IN HIGHER EDUCATION COSTS AFFECT AVERAGE NET PRICE AT FOUR-YEAR PUBLIC INSTITUTIONS?

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Students and their families evaluate net price when determining whether they can afford a college. But what affects net price? There are factors, such as instructional inefficiencies, administrative expenses, federal financial aid, and state appropriations, that have been noted in the literature that have an impact on costs and tuition. This study looks at the relationship between average net price and those factors. The findings of this study note that there is a relationship between average net price and said factors.

Introduction

Higher education tuition and fees have escalated, making affordability a point of contention. Over the past five years alone, tuitions and fees have risen for four-year public institutions by 13% (Ma, Baum, Pender, & Bell, 2015). Over the past 20 years, the numbers are even more substantial—after inflation, four-year public in-state net tuition and fees increased by 62% (trends.collegeboard.org, n.d.). In addition, state funding has decreased by 20 to 30% at all types of public

institutions as compared to 2008 (Mitchel & Leachman, 2015; Desrochers & Hurlburt, 2014, 2016; Heller, 2013b). Given the rise in tuition and fees and decrease in student state and local funding per student, students and their families have been absorbing more of the cost of higher education, with 68.8% of the 2014 graduating class borrowing money for their education (ticas.org, 2015).

In response to out-of-pocket expenses rising for higher education to students and their families (see Table 1),

Table 1. Out-of-Pocket Net Price Change from 1999–2000 Academic Year to the 2011–2012 Academic Year

	Out-of-Pocket Net Price		Percentage Change
	1999/2000	2011/2012	
Public Four-Year Institutions			
Overall	\$9,780	\$11,800	21%
Lowest 25%	\$6,400	\$7,100	11%
Lower Middle 25%	\$9,470	\$9,900	5%
Upper Middle 25%	\$11,040	\$13,900	26%
Highest 25%	\$13,360	\$16,800	26%

Source: National Center for Educational Statistics; amounts are inflation adjusted to 2011 dollars; percentage change calculated by the author.

four factors in the literature that have been blamed for the increases were pinpointed: the lack of efficiency on the instructional side of higher education (Archibald & Feldman, 2008; Bowen, 2012; Eckles, 2010; Immerwahr, Johnson, & Gasbarra, 2009; Martin & Hill, 2013, 2014); the increase in administrative spending (Bain & Co., 2009; Greene, Kisida, & Mills, 2010; Hedrick, Wassell, & Henson, 2009; Vanderbilt University, 2015; Vedder, 2007); the decrease in state appropriations per student full-time equivalent (FTE) at public institutions (Hiltonsmith, 2015; Koshal & Koshal, 2000; Raisanen & Birkeland, 2015); and the increase in federal financial aid at colleges and universities (Bennett, 1987; Epple, Romano, Sarpca, & Sieg, 2013; Gillen, 2012; Gordon & Hedlund, 2016; Lau, 2014). This study was designed to determine whether these factors have a relationship with average net price. Each of these factors is discussed below.

The first factor has to do with the intricacies involved in higher education institutions' attempts to become efficient within the academic and instructional arena (Baumol, 1996; Bowen, 2012). Inefficiencies affect net price. That is, if costs go up due to inefficiencies, the net price for a student will also increase because the increase needs to be covered by revenues for a balanced budget. Some, if not all, of these funds will be obtained through the increase in net prices of schools to students and their families.

Research suggests that colleges/programs have various levels of efficiency—suggesting that instructional

expenditures might vary across colleges with similar outcomes (Eckles, 2010; Kao & Hung, 2008; Tauer, Fried, & Fry, 2007), thus affecting net price. Higher education institutions employ highly specialized faculty and, as such, have difficulty trying to employ those individuals in other areas (Heller, 2013a). Although there is good intention behind trying to improve efficiencies, administrators have articulated concern about the pushback from faculty that would be received if the suggestions were implemented (Immerwahr et al., 2009), and some argue this is rightfully so (Calcagno, Bailey, Jenkins, Kienzl, & Leinbach, 2008; Chapman & Ludlow, 2010; Cuseo, 2007). But is it just efficiencies that need to be reviewed to keep higher education costs in check?

Some authors would say that it is not the inefficiencies of higher education but the increase in administrative spending that have caused part of the increase in higher education costs (Curtis & Thornton, 2014; Desrochers & Kirshstein, 2014; Jacob, McCall, & Stange, 2013; Vedder, 2007). For the same reasons that instructional inefficiencies affect net price, so do increases in administrative expenses, with the result being more out-of-pocket dollars for students and their families.

Administrative growth, which includes academic support expenses, student service expenses, and institutional support expenses, has exceeded growth in instructional expenses (Greene et al., 2010; Hedrick et al., 2009). However, few studies define the specific type of administrative expense. In addition, administrative expenses across institutions are different, suggesting that administrative expenditures fluctuate across colleges, with similar outcomes affecting net price. For example, is it the government mandates to which every school is required to comply or is it the growth-driven demand or academic specialization that vary among entities? Or maybe it is a combination of these factors, which can differ by institution. If it is one of these or all of these, the end result will lead to an increase in net price if dollars are not found elsewhere to cover the increase in these costs.

In addition to inefficiencies and increased administrative spending, state funding per student FTE hit a decade low in 2011 (Desrocher & Hurlburt, 2014), and is still well below the pre-recession

per-student amount (Mitchel & Leachman, 2015). Thus, it has also been considered a cost-driving factor when looking at the increases in the prices of higher education. Instead of the state investing in higher education, there has been an increase in spending for K–12, the prison population, and social services (Desrocher & Hurlburt, 2014). This has caused more out-of-pocket dollars for students and their families.

Federal financial aid is the last cost-driving factor; it addresses the increase in the costs of higher education. Financial aid is supposed to lower the out-of-pocket expenses to students and their families. In addition, there is research that has shown that with the help of financial aid, students are more likely to select schools other than their in-state options and that recent high school graduates are more likely to enroll in college (Abraham & Clark, 2006). Financial aid helps students and their families access money to fund college. If the financial aid funds were not available, they might not be able to find funds elsewhere and might not be able to finance college as a result. But are higher education institutions capturing financial aid, thereby increasing the cost of higher education to students and their families?

There are different types of financial aid—for example, Pell grants and student loans. Depending on the financial aid type, as well as school type, there have been a variety of studies done to determine whether the financial aid was captured by the institution in the form of increased tuition. That is, since the institution was aware of the increased financial aid to the student, the institution would react to it by increasing tuition (Bennett, 1987). There are research studies that support the Bennett hypothesis, but there are also those who do not find evidence that higher education institutions capture financial aid dollars, thereby increasing the cost of higher education to students and their families.

The most recent studies affirm the Bennett hypothesis (Lau, 2014; Lucca, Nadauld, & Shen, 2015). Lucca et al. (2015) determined that schools increased tuition as a result of increased Pell grants, subsidized loans, and unsubsidized loans by 55%, 65%, and 30%, respectively. One study found that the increase in financial aid affects only certain types of tuitions, such as four-year out-of-state tuition at a four-year state school

(Singell & Stone, 2007). Yet there are other studies that note that although financial aid did not increase tuition, it did increase out-of-pocket expenses to students and their families. For example, Long's (2004) study determined that although the increase in financial aid did not affect tuition, it did cause an increase in room-and-board costs (Long, 2004). The net effect would increase net price for students and their families.

Gillen (2012) noted that the Bennett hypothesis is usually viewed as an all-or-nothing approach. That is, financial aid as a whole either impacts tuition or it does not. However, Gillen (2012) noted that all financial aid is not created equal and should not be studied in that fashion. For example, federal student loan effects on tuition (or, in this case, net price) should be studied separately from Pell grant effects. To further extrapolate Gillen's (2012) concept, the cause for the increase in net price should not be pinpointed to one factor alone; for example, net price has increased only as a result of increase in financial aid or only because of the decrease in state appropriations. All four factors discussed above should be taken into account in one study to determine the effect on the outlay to students and their families. As such, all four cost-driving factors are included in this study, which has significance because researchers suggest that students and families focus on net price when evaluating affordability (Monaghan & Goldrick-Rab, 2016).

Research Questions

At four-year public institutions, do instructional inefficiencies have a relationship with average net price while controlling for average endowment assets per student FTE, selectivity, the percentage and number of undergraduate students, institutional grant aid, the percentage of in-state students, primary tuition-setting authority, and political affiliation of the governor and the legislature for each state?

At four-year public institutions, do administrative expenses have a relationship with average net price while controlling for average endowment assets per student FTE, selectivity, the percentage and number of undergraduate students, institutional grant aid, the percentage of in-state students, primary tuition-setting authority, and political affiliation of the governor and the legislature for each state?

At four-year public institutions, do state appropriations have a relationship with average net price while controlling for average endowment assets per student FTE, selectivity, the percentage and number of undergraduate students, institutional grant aid, the percentage of in-state students, primary tuition-setting authority, and political affiliation of the governor and the legislature for each state?

At four-year public institutions, does federal financial aid have a relationship with average net price while controlling for average endowment assets per student FTE, selectivity, the percentage and number of undergraduate students, institutional grant aid, the percentage of in-state students, primary tuition-setting authority, and political affiliation of the governor and the legislature for each state?

Data and Instrumentation

A panel data regression analysis was performed to determine the relationship between average net price for four-year public institutions and instructional expenses, administrative expenses, state appropriations, and federal financial aid. The amounts were adjusted for inflation using the Bureau of Labor Statistics' Consumer Price Index and the regression was calculated in 2014 dollars.

Similar to the budget process in organizations, which takes into account the review of past expenses to create the next year's budget (Larkin & DiTommaso, 2015), so, too, is tuition set with the review of the previous year's financial information. Therefore, the average net price variables were lagged by one year. For example, 2007–2008 expense information was used to set the 2008–2009 academic year's net price, so the panel data regression analysis was calculated for the relationship between the 2007–2008 independent and control variable data as it related to the 2008–2009 average net price, the independent variable. The average net price data for the purpose of the study included the academic years 2009 through 2014, whereas the remaining variables included the data for academic years 2008 through 2013.

Four sources were used to obtain the information: the Integrated Postsecondary Education Data System (IPEDS), the State Tuition, Fees, and Financial

Assistance Policies for Public Colleges and Universities reports for 2005–2006 and 2010–2011, and the National Conference of State Legislatures and National Governors' Association websites.

IPEDS is considered the primary source of information for American colleges and universities and is administered by the National Center for Education Statistics (NCES), which is the main federal entity for collecting and analyzing the data (nces.ed.gov, n.d.a). All of the variables, with the exception of a state's tuition-setting policy and legislative and political partisan controls, were obtained from IPEDS. Each state's tuition-setting policy, which is a control variable in the study, was found in the State Tuition, Fees, and Financial Assistance Policies for Public Colleges and Universities report, which is published by the State Higher Education Executive Officers.

VARIABLES

Each of the four cost drivers has associated variables, which are the independent variables in this study. In addition to these independent variables, there is the dependent variable: average net price. There are certain variables, based on the literature, that may affect the outcomes, so they were included as control variables. Each of these variables is described below.

Instructional Inefficiencies

Instruction expenses per student FTE, which included both undergraduates and graduates, were utilized to measure instructional inefficiencies. Instruction expenses include general academic instruction; occupational and vocational instruction; community education; preparatory and adult basic education; and regular, special, and extension sessions.

Archibald and Feldman (2008) noted that higher education is similar to a service company that utilizes a highly educated labor force that receives substantial benefits. As a result, it is considered difficult to become efficient (Baumol, 1996; Bowen, 2012), and this is why instructional inefficiencies are to blame for the increase in higher education costs. Generally, the way to contain expenses would be to focus on improved productivity and efficiency (Archibald & Feldman, 2008; Immerwahr et al., 2009). However, when addressing efficiency in higher education, concerns about quality

in teaching and learning arise (Archibald & Feldman, 2008; Immerwahr et al., 2009). In addition, in other industries, technology is usually associated with streamlining processes and improving efficiency; this is not the case in higher education, where technology is used enhance instruction, not to improve its efficiency (Bowen, 2012).

Administrative Expenses

Administrative expenses are considered expenses that are not directly related to instruction and include costs related to academic support services, student services, and institutional support. Academic support services include those expenses that support the primary mission of the institution. Student service expenses are those expenses related to admissions and registration and activities that contribute to the student's emotional and physical well-being, such as cultural events, student organizations, and intramural sports programs (surveys.nces.ed.gov, n.d.). Institutional support services include those related to the day-to-day operations of the institution, such as legal and fiscal operations. This study was consistent with Greene and colleagues' (2010) grouping of administrative expenses.

State Appropriations

State appropriations refers to those dollars provided by the state. To measure this category, revenues from state appropriations per FTE were used. States allocate monies to public higher education institutions for the purpose of providing financial support to students (Cheslock & Hughes, 2011; Delaney, 2014). It can come in the form of direct payment to college or financial aid to students, and it pertains to public institutions only.

Financial Aid

The studies (Gillen, 2012; Lau, 2014; Lucca et al., 2015) that tested the Bennett (1987) hypothesis include Pell grants and federal student loans, and, as such, this study included the same. The average amount of Pell grants received by full-time first-time undergraduates and average amount of federal student loan aid received by full-time first-time undergraduates were utilized as the variables associated with the financial aid factor. Full-time first-time undergraduate information was utilized because this is the information available from

IPEDS. The average amount of Pell grants received by full-time first-time undergraduates was multiplied by the percentage of students receiving Pell grants to obtain the dollar amount of Pell revenue per student to match the Bennett (1987) hypothesis literature.

Average Net Price

Average net price for full-time, first-time degree/certificate-seeking undergraduates was calculated by subtracting the average amount of federal, state, local government, institutional grant, and scholarship aid from the total cost of attendance (nces.ed.gov, n.d.b). For public institutions, this represents the net price for in-state students. In addition to studying the overall average net price, included was the average net price per income strata, which is the average net price for students who received Title IV federal student aid, such as federal grants and federal loans. There were five different income levels: less than \$30,001 (level 1), \$30,001 to \$48,000 (level 2), \$48,001 to \$75,000 (level 3), \$75,001 to \$110,000 (level 4), and over \$110,000 (level 5).

Control Variables

This study controlled for variables that may impact average net price, such as average endowment assets per student FTE, selectivity, and the percentage and number of undergraduate students. Lucca et al. (2015), whose study supported the Bennett (1987) hypothesis, noted variation among their results based on selectivity, so this study controlled for selectivity with the percentage of students admitted variable. Since FTEs include both undergraduate and graduate students, this study controlled for the percentage of students who are undergraduates. In addition, this study controlled for the total number of undergraduate FTEs to address the issue of economies of scale that was identified in the literature (Desrochers & Kirshstein, 2014; Vanderbilt University, 2015).

There are certain variables that may affect in-state average net price such as the number of out-of-state students (Kelchen, 2016) so they were controlled for in this study using the percentage of in-state students variable, which accounts for the percentage of those students who live in the same state as the school. The literature also notes that tuition is more likely to

increase when individual institutions have tuition-setting authority (Kim & Ko, 2015; Knott & Payne, 2004; Lowry, 2001). As a result, those schools that have primary tuition-setting authority were controlled for. Finally, the political control of a state's legislature affects higher education funding (McLendon, Hearn, & Mokher, 2009; Weerts & Ronca, 2006, 2012); as such, this study controlled for the political affiliation of both the governor of each state and the legislature.

Population and Sampling Frame

The studies conducted do not take a systemic approach—that is, they do not focus on all four-year public institutions. The studies that exist include only one part of the population. For example, spending per FTE was analyzed by Greene et al. (2010) on 198 public and private research institutions. Another example includes the financial statement analysis done (Bain & Co., 2009) at the University of North Carolina at Chapel Hill (only one institution). Neither of these studies includes all institutions, with the issue of increasing administrative expenses. This study includes all four-year public higher education institutions.

For the purpose of this study, those institutions on IPEDS that are four-year public institutions (725) were selected. Only those institutions with a Carnegie Classification (CC) of 15 through 22, which includes research universities, doctoral/research universities, master's colleges and universities, and baccalaureate colleges for all 6 years (remaining = 540), were included. Those schools that were removed had a CC of 0 (not classified) through 14 (private for-profit four-year primarily associate's) and 23 (baccalaureate/associate's colleges) through 33 (tribal colleges). Also included in the ranges that were removed were theological seminaries (CC24), medical schools (CC25), and schools of engineering (CC27). All schools that had multiple campuses that did not have data for each campus were removed to ensure the data was consistent with those institutions that were included in this study (remaining = 500) (Jaquette & Parra, 2014). In addition, graduate schools were removed (remaining = 498). Legislative control was a control factor for the institutions in this study. The legislature of Nebraska is not comparable to the other 49 states in the United States because its legislature is unique in that it is unicameral; that is, it has a single-

house system (nebraskalegislature.gov, n.d.). Therefore, all public institutions in Nebraska were removed (remaining public = 491). Political affiliation was another control factor in this study. Since the University of Guam and the University of the Virgin Islands, although listed in IPEDS within this group, have different political systems from that of the United States, they were removed from the population (public = 489). In addition, the United States Air Force Academy, United States Coast Guard Academy, United States Merchant Marine Academy, United States Military Academy, and United States Naval Academy were excluded from the population because, although they are public institutions, they do not charge tuition (public = 484).

Descriptive Statistics

The mean for the average net price overall was \$12,382. The mean for the lowest income level, that is, those students whose families earn less than \$30,001, had the lowest average net price in the panel data of \$9,467. This number incrementally increased as the income level increased. The second income level (\$30,001 to \$48,000) had an average net price of \$11,051, with the following three income levels ranging from \$14,401 to \$17,626.

The average Pell grant and federal student loans received by full-time first-time undergraduates, which were the independent variables related to the financial aid factor, were \$1,618 and \$5,484. The average Pell grant per student FTE increased by 75% from the 2007–2008 academic year to the 2012–2013 academic year (see Table 2), while the average federal student loans for the study time frame increased by 30% (see Table 2). The instructional inefficiency factor, which was instructional expense, had a mean of \$8,513 per student FTE, with an increase of 20% over the study period (see Table 2). Those independent variables related to the administrative expense factor—that is, academic support, student services, and institutional support services—had a mean of \$2,211, \$1,704, and \$2,525, and increased during the study period 24%, 30%, and 18%, respectively. State appropriations, which was its own factor, had a mean of \$6,977 with a decrease of 24% from the 2007–2008 to 2012–2013 academic year (see Table 2). The mean for the control variables of institutional grant aid, endowment assets

Table 2. Factor Dollar and Percentage Change from 2007–2008 to the 2012–2013 Academic Year

	2007/2008	2012/2013	Percentage Change
Instructional expenses per student FTE	\$7,577	\$9,060	20%
Academic support expenses per student FTE	\$1,937	\$2,397	24%
Student services expenses per student FTE	\$1,458	\$1,888	30%
Institutional support expenses per student FTE	\$2,289	\$2,699	18%
State appropriations per student FTE	\$8,145	\$6,192	–24%
Federal student loans	\$4,393	\$5,730	30%
Pell grant	\$1,053	\$1,838	75%

Source: IPEDS Data; average amount percentage based on population in the study and calculated by the author.

per student FTE, the percentage of students admitted, and the percentage of in-state students equaled \$4,160 and \$8,898, 67% and 83%, respectively. The mean for the last of the control variables for these institutions is 10,879 and 84%, which represents the number of undergraduate students and the percentage of undergraduate students, respectively. Tuition-setting policy was categorical data and had a possible value of 0 or 1. For tuition-setting policy, the institution was assigned a value of 0 if it had primary tuition-setting authority and 1 if it did not. Legislature control–Democrat was categorical data and assigned where Democrat equaled 1 and not Democrat, which in this case was either Republican or split, equaled 0. Legislature control–Republican was also categorical data and assigned so that Republican equaled 1 and not Republican, which was either Democrat or split, equaled 0.

Research Design

This study takes into account six years of data for four-year public institutions and performs a panel data regression analysis to determine whether there was a

significant relationship between the dependent variable (average net price) and the four factors (instructional expenses, administrative expenses, federal financial aid, and state appropriations) while controlling for certain variables (average endowment assets per student FTE, selectivity, the percentage and number of undergraduate students, institutional grant aid, the percentage of in-state students, primary tuition-setting authority, and political affiliation of the governor and the legislature for each state).

The subjects of this study were four-year public institutions from the academic years 2008–2009 through 2013–2014 for average net price. As noted, there was a one-year lag in data for the independent variables, so the following variables were obtained for the academic years 2007–2008 through 2012–2013: average amount of Pell grants received by full-time first-time undergraduates; average amount of federal student loan aid received by full-time first-time undergraduates; average state appropriations per FTE; academic support expenses per FTE; student service expenses per FTE; institutional support expenses per FTE; instruction expenses per FTE; percentage of students admitted; percentage of in-state students, undergraduate enrollment; total student enrollment (which was used to calculate undergraduate percentage of students); percentage of full-time first-time degree/certificate-seeking undergraduate students who received Pell grants; average endowment assets per FTE; and average institutional grant aid per FTE. The percentage of undergraduates was calculated by dividing the number of undergraduates enrolled by the total number of students enrolled. The tuition-setting policy and legislative and political partisan control were assigned to each school.

After the data was downloaded and compiled, it was reviewed for completeness utilizing the missing value analysis available in IBM SPSS version 23. The data's missing variables ranged from the lowest being 0% for the number of undergraduates and percentage of undergraduates enrolled, governor's and legislature's political affiliation, and tuition-setting authority, to the highest amount of missing data, which was 199 cases and equaled 6.9% for the percentage of students admitted variable. The listwise case diagnostic noted that 2,508 cases out of a possible 2,904 cases

were complete. For longitudinal data, often the last value is used to replace the missing value (Waal, Pannekoek, & Scholtus, 2011). The linear interpolation feature in SPSS was utilized to replace missing values using the last valid value before the missing value and the first valid value after the missing value (ibm.com, n.d.). If the first or last case in the series has a missing value, the missing value is left blank (ibm.com, n.d.). After the linear interpolation was completed, the number of listwise cases equaled 2,892 out of a possible 2,904 cases. This accounted for 99.6% of the cases being included. The only variable with any missing data after the linear interpolation was the percentage of students admitted to an institution, which consisted of 12 cases and accounted for 0.4% of the population.

The data was considered to have institution (within) and fixed effects (between years) variations. For four-year public institutions, a panel data regression analysis was performed, solving for the equation:

$$ANP_{it} = \beta_0 + \text{Instructional Inefficiencies}_{it} \beta_{I,t-1} + \text{Administrative Expenses}_{it} \beta_{AE,t-1} + \text{State Appropriations}_{it} \beta_{GF,t-1} + \text{Federal Financial Aid}_{it} \beta_{FFA,t-1} + \mu_{it} + \varepsilon_{it}$$

where

ANP_{it} equals average net price per income level for i (institution) for t (academic year);

β_0 equals beta;

Instructional Inefficiencies $_{it} \beta_{I,t-1}$ equals instruction expense per FTE for i (institution) for $t - 1$ (academic year - 1) times $\beta_{\text{Inefficiencies}}$;

Administrative Expenses $_{it} \beta_{AE,t-1}$ equals academic support, student services, and institutional support expenses per FTE for i (institution) for $t - 1$ (academic year - 1) times $\beta_{\text{Administrative Expenses}}$;

State Appropriations $_{it} \beta_{GF,t-1}$ equals average state appropriations for i (institution) for $t - 1$ (academic year - 1) times $\beta_{\text{State Appropriations}}$;

Federal Financial Aid $_{it} \beta_{FFA,t-1}$ equals average Pell grant and federal loan aid for i (institution) for $t - 1$ (academic year - 1) times $\beta_{\text{Federal Financial Aid}}$;

μ_{it} equals the between entities error for i (institution) for t (academic year); and

ε_{it} equals the within entities error for i (institution) for t (academic year).

Limitations of the Study

This study tried to identify whether there was a significant relationship between the average net price of four-year public institutions and any or all of the four factors noted in the literature. Average net price was calculated in a different fashion than average net price by income level. The former included undergraduates who received grant aid or scholarship aid from federal, state, or local government or the institution, whereas average net price per income level included only those undergraduates who received Title IV federal student aid. As a result, the interpretation of the relationships between the dependent variables (average net price and average net price per income level) and the independent variables were not identical.

Another limitation of the study was that average net price was calculated per undergraduate FTE, whereas the cost drivers, such as instructional expense, were calculated per student FTE, which included undergraduates and graduates. The percentage of undergraduates per institution was controlled for to address this concern.

This study included those institutions with a Carnegie Classification of 15 through 22 in an effort to look at all four-year public institutions. That being said, it should be noted that research universities have higher academic student support services expenses per student FTE (\$3,150 for 2013) (Desrochers & Hurlburt, 2016) as compared to public master's (\$1,670 for 2013) and public bachelor's (\$1,638 for 2013). As noted earlier in the descriptive statistics, the average academic support services per student FTE for the three types of institutions combined was \$2,211. The student services expense per student FTE were more comparable among the institution types with an average student services expense per student FTE of \$1,590, \$1,636, and \$1,911 for 2013 at public research, public master's, and public bachelor's, respectively (Desrochers & Hurlburt, 2016). The mean student services expense per student FTE for this study was \$1,704. The institutional support services expenses per student FTE were also comparable among the three institution types with institutional support services expenses per student FTE for 2013 at \$2,695, \$2,212, and \$2,669 at public research, public master's, and public bachelor's, respectively (Desrochers &

Hurlburt, 2016). The average institutional support services expense for this study was \$2,525.

The source of most of the data was IPEDS, and as a result, it was limited to the data available on IPEDS for four-year public and not-for-profit private institutions and was based on using IPEDS survey respondents and only on the information they supplied. This was a potential issue because the information was supplied by different individuals and may be interpreted and grouped differently. The data for this study was limited to the 2009 through 2014 academic years for average net price and the 2008 through 2013 academic years for all other variables and was the only data included in this study. This study was completed utilizing the data as input by the end users of the IPEDS data, and as a result, the data utilized was only as accurate as the data that was input into the system. Three pieces of information were obtained from sources other than IPEDS and are only as accurate as the data listed in the State Tuition, Fees, and Financial Assistance Policies for Public Colleges and Universities literature published by the State Higher Education Executive Officers and on the National Conference of State Legislatures and National Governors' Association websites.

Results

INSTRUCTIONAL INEFFICIENCIES

When looking at the results of the panel data regression analysis, it was surprising to find an inverse significant ($p < .05$) relationship between overall average net price and instructional expenses, where for every \$1 increase in instructional expenses, the average net price decreased by almost 7 cents (see Table 3 for results) while controlling for average endowment assets per student FTE, selectivity, institutional grant aid, the percentage and number of undergraduate students, the percentage of in-state students, primary tuition-setting authority, and the political affiliation of the governor and the legislature. Baumol (1996) noted that it is difficult to become more productive in higher education, given its highly educated workforce. However, with respect to overall average net price, it does not appear that instructional expenses would be an area in which inefficiencies need to be addressed. However, when looking at average net price at income levels 4 and

5, there are different findings. Instructional expenses had a significant positive relationship ($p < .05$, $p < .001$, respectively) with average net price for income levels 4 and 5, that is, where students and their families' average net income was from \$75,001 to \$110,000, and, over \$110,000, respectively. At income level 4, for every \$1 increase in instructional expenses, there was an increase in average net price of almost 8 cents. For income level 5, for every \$1 increase in instructional expenses, the increase in average net price was approximately 14 cents. Since there was a positive significant relationship only at the higher income levels, an explanation of the increases more likely has to do with the willingness of students and their families at the higher incomes to pay the higher average net price that may come with a lower student-to-faculty ratio and not instructional inefficiencies, or that high-income families are asked to foot the bill regardless of efficiency or quality of teaching.

ADMINISTRATIVE EXPENSES

Overall, the findings do not support the idea of administrative bloat, however, when looking at the panel data regression analysis results for income levels 4 and 5, academic support services and student support services expenses suggested it might. Administrative expenses had a positive significant relationship with average net price at income levels 4 and 5 with respect to academic support service ($p < .05$ for both income levels) and student support services expenses per student FTE ($p < .05$ for income level 4 and $p < .01$ for income level 5) (see Table 4 for results). For income level 4, for every \$1 increase in academic support service and student support services expenses, average net price increased just about 10 cents and 32 cents, respectively. For income level 5, the increase was approximately 11 cents and 50 cents, respectively. For it to be considered administrative bloat, it would more likely impact average net price for all income levels as well as overall average net price. However, it is possible that it is administrative bloat with the lower-income-level students (who received more grants and financial aid) being shielded from the implications and that those students with the higher income levels are absorbing the costs in their average net price. The increases may also be caused by students at the higher income level

Table 3. Average Net Price Regression Results for Four-Year Public Institution—Instructional Inefficiencies

Instructional Inefficiencies	Overall		Income Level 1		Income Level 2		Income Level 3		Income Level 4		Income Level 5	
	β coef.	Significance	β coef.	Significance	β coef.	Significance	β coef.	Significance	β coef.	Significance	β coef.	Significance
Instructional Expenses	-0.065 (0.0302)	*	0.010 (.0327)		-0.013 (.0306)		-0.078 (.0510)		0.077 (.0368)	*	0.141 (.0379)	***
Endowment Assets	0.01 (.0067)		-0.003 (.0060)		-0.002 (.0051)		0.002 (.0055)		0.002 (.0039)		0.008 (.0048)	
% of Students Admitted	5.788 (4.7207)		2.036 (3.8280)		0.469 (3.88863)		6.825 (6.3578)		-6.528 (5.4795)		1.826 (4.5117)	
# of Undergraduates	0.081 (.0218)	***	-0.027 (.0163)		-0.009 (.0162)		0.037 (.0264)		0.076 (.0191)	***	0.094 (.0246)	***
% of Undergraduates	-2.533 (20.4087)		-15.765 (13.0151)		-22.561 (12.7593)		-21.748 (25.145)		-2.043 (14.9377)		-2.955 (15.7499)	
Institutional Grant Aid	0.017 (.0447)		0.081 (.0397)	*	0.051 (.0392)		0.091 (.0566)		0.143 (.04106)	***	0.102 (.0695)	
% of In-State Students	-4.191 (5.5120)		-0.118 (5.9766)		-2.812 (4.1959)		-2.518 (6.9986)		-4.427 (4.6039)		-3.546 (4.3669)	
Political Control	55.137 (125.2541)		-50.704 (92.1504)		-7.133 (96.1873)		-178.023 (167.4698)		-137.622 (86.3641)		-146.228 (90.8617)	
Tuition-Setting Authority	248.274 (159.4176)		327.726 (159.6652)	*	68.134 (160.5122)		405.603 (287.5843)		196.544 (173.1179)		347.883 (186.2623)	
Legislative Control—Democrat	-513.176 (143.6850)	***	-503.707 (108.1175)	***	-487.057 (97.6112)	***	-967.157 (201.9623)	***	-408.338 (89.2267)	***	-336.434 (87.9231)	***
Legislative Control—Republican	261.924	*	438.015	**	320.155	**	-182.117		75.951		4.291	
Sample Size	2,892		2,892		2,892		2,892		2,892		2,892	

Source: Integrated Postsecondary Education Data System (IPEDS).
Standard error is in parentheses.
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 4. Average Net Price Regression Results for Four-Year Public Institutions—Administrative Expenses

Administrative Expenses	β coef.	Significance	Income Level 1		Income Level 2		Income Level 3		Income Level 4		Income Level 5	
			β coef.	Significance	β coef.	Significance	β coef.	Significance	β coef.	Significance	β coef.	Significance
Academic Support Services	0.058 (.0321)		-0.025 (.0364)		-0.05 (.0359)		0.078 (.0936)		0.102 (.0399)	*	0.105 (.0421)	*
Student Support Services	-0.18 (.1912)		-0.053 (.1381)		-0.13 (.1330)		-0.325 (.2462)		0.321 (.1490)	*	0.504 (.1755)	**
Institutional Support Services	-0.127 (.1269)		0.111 (.0841)		0.106 (.0829)		-0.132 (.1658)		-0.162 (.1204)		-0.002 (.1049)	
Endowment Assets	0.01 (.0066)		-0.003 (.0060)		-0.002 (.0050)		0.002 (.0052)		0.004 (.0041)		0.009 (.0056)	
% of Students Admitted	6.742 (4.8798)		2.371 (3.9049)		1.221 (3.9796)		6.731 (6.3594)		-7.054 (5.3614)		1.483 (4.4876)	
# of Undergraduates	0.079 (.0228)	**	-0.024 (.0163)		-0.008 (.0160)		0.024 (.0260)		0.08 (.0197)	***	0.111 (.0249)	***
% of Undergraduates	13.275 (21.6680)		-16.517 (12.9834)		-21.158 (12.8903)		-12.874 (23.9978)		-11.729 (14.3670)		-18.44 (15.2202)	
Institutional Grant Aid	-0.002 (.0448)		0.083 (.0406)	*	0.055 (.0398)		0.094 (.0571)		0.142 (.0406)	***	0.098 (.0669)	
% of In-State Students	-3.55 (5.5626)		0.298 (6.1022)		-2.725 (4.2710)		-2.136 (7.0009)		-4.317 (4.6724)		-3.566 (4.4192)	
Political Control	58.649 (129.8272)		-56.124 (92.9232)		-5.1 (97.5407)		-158.815 (169.0528)		-141.374 (84.8873)		-172.325 (90.1424)	
Tuition-Setting Authority	256.399 (159.6774)		365.802 (160.4471)	*	105.16 (161.6880)		418.725 (283.9205)		175.499 (172.0582)		326.717 (181.8541)	
Legislative Control—Democrat	-521.227 (146.8267)	***	-513.933 (110.2682)	***	-498.983 (99.4540)	***	-959.974 (203.1640)	***	-396.551 (87.9449)	***	-348.894 (88.4364)	***
Legislative Control—Republican	319.973 (137.6363)	*	417.292 (138.4212)	**	301.574 (110.9975)	**	-170.049 (211.6720)		83.093 (110.8697)		19.942 (105.7322)	
Sample Size	2,892		2,892		2,892		2,892		2,892		2,892	

Source: Integrated Postsecondary Education Data System (IPEDS)

Standard error is in parentheses.

*p < .05, **p < .01, ***p < .001

being willing to pay for or maybe even demanding the additional services associated with these expenses.

STATE APPROPRIATIONS

The results for state appropriations were expected, that is, having an inverse relationship with average net price (Koshal & Koshal, 2000). For three of the five income levels (see Table 5 for results), that is, for income levels 1, 2, and 5 ($p < .05$ for all), for every \$1 increase in state appropriations, the average net price decreased by almost 7, 6, and 8 cents, respectively. There was a larger reduction in average net price for income level 4 ($p < .01$), with average net price being reduced by approximately 12 cents for every \$1 increase in state appropriations. These results are expected because when state appropriations increase, it is expected that average net price would decrease. However, the initial thought would be that the reduction to average net price would be higher, but the fact that state appropriations are allotted to higher education does not mean the money will be allocated to tuition reduction (Kelderman, 2013). The dollars may be allocated to unfunded liabilities, such as pension (Kiley, 2013). These findings are consistent with the Koshal and Koshal (2000) study, which found that when a state's appropriation increased by \$100 per FTE, the tuition decreased by \$40 in tuition. However, the Koshal and Koshal (2000) study determined the effect on tuition, whereas this study looked at average net price, which takes into consideration the average amount of federal, state, local government, institutional grant, and scholarship aid.

FEDERAL FINANCIAL AID

Overall, the findings (see Table 6) do not support the Bennett (1987) hypothesis. For federal student loans, only income level 4 had a significant relationship with average net price, where for every \$1 increase in federal student loans, there was an increase of average net price of 15 cents. This is consistent with the Bennett (1987) hypothesis that schools are capturing federal student loans, thereby increasing the cost of higher education to students and their families, but since it is at only one income level, it is more likely to be a result of students in income level 4 willing to take out student loans in order to pay for the higher average net price, whereas income level 3 may receive more grants,

thereby diminishing the need for student loans, and income level 5 may be able to afford the cost without taking out student loans.

For Pell grants, the results (see Table 6) do not support the Bennett (1987) hypothesis either, since there was an inverse significant relationship with average net price. Pell grant monies were being captured; however, it was not to increase the cost to the student. The average Pell grant per student FTE had an inverse significant relationship ($p < .05$, $p < .05$, $p < .001$, respectively), with overall average net price and at income levels 2 and 3 (see Table 6 for results). For overall average net price, for every \$1 increase in Pell grant dollars per student FTE, there was a decrease in average net price of 25 cents. At income levels 2 and 3, the increase in \$1 of Pell grant monies resulted in a decrease in average net price of almost 22 cents and 53 cents, respectively. This is consistent with the purpose of Pell grants, that is, to reduce the overall price of higher education to the student and his or her family. However, if it was truly in compliance with the purpose of the Pell grant, there would be more likely a one-to-one ratio with average net price and not just a portion of the dollar being captured to reduce average net price. These findings are consistent with the Pell grant's purpose and with Gillen's (2012) notion that Pell grants are much less likely to be captured by colleges to increase tuition because they are awarded to low-income students, and if Pell grant dollars were captured to increase tuition, it would price the low-income students out of college.

Implications of the Study

Affordability of higher education should be of the utmost importance, given the economic benefits to the individual earning the degree and to society as a whole (Baum, Ma, & Payea, 2013; Trostel, 2010). Yet Gallup polls have shown that students and their families are concerned about whether they can afford to pay for college (pdkpoll2015.pdkint.org, 2015). This study focused on the factors that may in fact increase average net price, which would thereby affect affordability. Based on this study, average net price had a positive significant relationship (p varies) with instructional expenses and administrative expenses for those students in income levels 4 and 5. Average net price

Table 5. Average Net Price Regression Results for Four-Year Public Institutions—State Appropriations

State Appropriations	Overall		Income Level 1		Income Level 2		Income Level 3		Income Level 4		Income Level 5	
	β coef.	Significance	β coef.	Significance	β coef.	Significance	β coef.	Significance	β coef.	Significance	β coef.	Significance
State Appropriations	-0.029 (.0389)		-0.068 (.0307)	*	-0.064 (.0269)	*	0.042 (.0504)		-0.123 (.0375)	**	-0.076 (.0310)	*
Endowment Assets	0.01 (.0063)		-0.002 (.0061)		-0.002 (.0049)		0.001 (.0054)		0.007 (.0045)		0.014 (.0063)	*
% of Students Admitted	5.301 (4.8917)		1.636 (3.8450)		0.097 (3.8798)		7.089 (6.3527)		-7.158 (5.3363)		1.774 (4.5801)	
# of Undergraduates	0.079 (.0218)	***	-0.029 (.0158)		-0.012 (.0156)		0.035 (.0262)		0.075 (.0195)	***	0.096 (.0248)	***
% of Undergraduates	2.908 (21.2771)		-21.436 (12.9728)		-25.637 (12.9040)	*	-13.266 (24.8960)		-12.93 (15.3968)		-24.528 (16.0317)	
Institutional Grant Aid	0.007 (.0452)		0.08 (.0396)		0.047 (.0392)		0.079 (.0573)		0.14 (.0438)	**	0.091 (.0758)	
% of InState Students	-4.299 (5.7600)		-0.229 (6.0977)		-3.093 (4.2362)		-2.444 (6.9805)		-5.244 (4.5683)		-3.984 (4.5048)	
Political Control	82.651 (127.7862)		-38.689 (91.6202)		6.487 (94.9412)		-145.049 (171.1473)		-128.082 (91.1991)		-49.43 (95.9287)	
Tuition-Setting Authority	254.412 (157.3033)		318.959 (158.2379)	*	48.476 (158.5130)		439.892 (288.0274)		184.555 (181.5078)		340.946 (196.5427)	
Legislative Control–Democrat	-546.203 (142.7320)	***	-514.736 (109.4523)	***	-483.04 (98.1939)	***	-1000.44 (205.4464)	***	-452.002 (95.9582)	***	-349.6 (93.5828)	***
Legislative Control–Republican	278.088 (133.1978)	*	417.982 (136.4570)	**	309.966 (109.2293)	**	-150.776 (211.0643)		23.317 (116.6984)		-45.667 (113.7433)	
Sample Size	2,892		2,892		2,892		2,892		2,892		2,892	

Source: Integrated Postsecondary Education Data System (IPEDS)

Standard error is in parentheses.

*p < .05, **p < .01, ***p < .001

Table 6. Average Net Price Regression Results for Four-Year Public Institutions—Federal Financial Aid

Federal Financial Aid	β coef.	Significance	Income Level 1		Income Level 2		Income Level 3		Income Level 4		Income Level 5	
			β coef.	Significance	β coef.	Significance	β coef.	Significance	β coef.	Significance	β coef.	Significance
		Overall										
Federal Student Loans	-0.017 (.0419)		-0.021 (.0554)		-0.054 (.0507)		0.049 (.0499)		0.15 (.0510)	**	0.038 (.0578)	
Pell Grants	-0.254 (.1222)	*	-0.062 (.1196)		-0.216 (.0986)	*	-0.529 (.1051)	***	-0.181 (.1005)		-0.131 (.1152)	
Endowment Assets	0.009 (.0046)		-0.003 (.0060)		-0.005 (.0051)		-0.003 (.0043)		0.004 (.0042)		0.012 (.0058)	*
% of Students Admitted	3.96 (4.4831)		1.998 (3.8355)		0.476 (3.8856)		3.864 (4.3543)		-6.808 (5.3154)		1.468 (4.4387)	
# of Undergraduates	0.049 (.0184)	**	-0.027 (.0161)		-0.012 (.0158)		0.022 (.0166)		0.08 (.0191)	***	0.102 (.0248)	***
% of Undergraduates	-18.489 (16.3535)		-17.025 (12.8438)		-22.101 (12.5878)		-20.858 (13.5444)		-8.472 (14.0752)		-16.709 (15.6286)	
Institutional Grant Aid	0.056 (.0422)		0.083 (.0404)	*	0.059 (.0394)		0.091 (.0402)	*	0.148 (.0411)	***	0.113 (.0689)	
% of In-State Students	-3.744 (4.7400)		0.111 (5.9391)		-1.905 (4.1108)		-0.238 (4.5506)		-4.178 (4.5307)		-3.287 (4.3707)	
Political Control	16.682 (112.6971)		-54.341 (92.3569)		-13.541 (97.0992)		-144.602 (91.6920)		-144.853 (85.9755)		-112.069 (91.3956)	
Tuition-Setting Authority	241.625 (164.5959)		340.449 (160.0244)	*	80.183 (161.7935)		124.768 (200.0647)		208.752 (171.9794)		347.887 (187.4552)	
Legislative Control—Democrat	-466.667 (140.2301)	**	-506.798 (109.8077)	***	-509.777 (98.7246)	***	-620.696 (103.9431)	***	-399.678 (92.2350)	***	-320.121 (91.0232)	***
Legislative Control—Republican	112.092 (146.4722)		430.308 (135.3234)	**	321.049 (108.8300)	**	63.949 (126.9868)		78.46 (112.9863)		-14.824 (108.9313)	
Sample Size	2,892		2,892		2,892		2,892		2,892		2,892	

Source: Integrated Postsecondary Education Data System (IPEDS)

Standard error is in parentheses.

* $p < .05$, ** $p < .01$, *** $p < .001$

increased by almost 8 cents for every \$1 increase in instructional expenses for income level 4 and approximately 14 cents for income level 5. Average net price increased approximately 10 and 11 cents for income levels 4 and 5, respectively, for every \$1 increase in academic support services expenses. Average net price also increased by approximately 32 and 50 cents for income levels 4 and 5, respectively, for every \$1 increase in student support services expenses. The increases related not only to administrative expenses but also instructional expenses at income levels 4 and 5, the culmination of these increases possibly making school unaffordable or less affordable for students at those two income levels.

In an effort to keep college affordable, efficiencies should be addressed in the instructional and administrative expenses arena. The lower income did not have a positive significant relationship with average net price, suggesting that there is cost sharing occurring, with the upper two income levels possibly absorbing the costs of the lower income levels as they relate to instructional and administrative expenses. Given that, instead of trying to have the upper two income levels absorb those costs, in an effort to make college affordable, there should be more cost cutting and efficiency efforts in these areas. Knowing that administrative expenses capture many different types of expenses, it is important that each institution take an in-depth look at those expenses that affect their schools and address them individually.

In addition to the expense increases at income level 4, there was also a significant ($p < .01$) relationship between average net price and federal student loans, where average net price increased by 15 cents for every \$1 increase in federal student loans. If, in fact, the increase in student loans is a result of the increase in average net price and not the other way around, the results suggest that those students in income level 4 are again being impacted by possible inefficiencies. So the question becomes, is the school really affordable if, in fact, the student needs to take out student loans to attend?

In addition to the affordability factor as it relates to student loans, school administration should be wary of the number of students having to take out student loans because there is literature that indicates that students who take out loans are less likely to succeed at

the school of first entry than if their financial aid were merit based (Jones-White, Radcliffe, Lorenz, & Soria, 2014), which will eventually affect student retention.

Another finding of this study was that there was a negative significant (p varied) relationship between state appropriations with average net price, indicating that when \$1 of state appropriations increased, average net price decreased. This result was expected in the sense of a negative relationship. However, the reduction in average net price ranged from 6 to 8 cents for every \$1 in state appropriations. That is, less than 10 cents of every dollar of state appropriations assigned to higher education reduced average net price to students and their families, which could impact the affordability of higher education. In an effort to ensure affordability of higher education, a possible policy suggestion would be one that requires a minimum portion of state appropriations being allotted to the reduction of average net price to students and their families.

The same consideration should be given to the Pell grant. Again, the fact that there was an inverse relationship between average net price and Pell grant dollars, whether or not the relationship was significant, was expected. However, what is notable is that the amount is not a one-to-one relationship with average net price. Pell grants are expected to reduce average net price. In an effort to make higher education affordable and have the Pell grant do what it should truly be doing, the reduction in average net price should be closer to \$1, where for every \$1 of Pell grant there should be a \$1 reduction in average net price.

Suggestions for Future Research

This study looked at four-year public institutions in Carnegie Classifications 15 to 22, which included research universities with high (CC16) and very high research activity (CC15), doctor/research universities (CC17), master's colleges and universities with smaller (CC20), medium (CC19), and larger (CC18) programs, and baccalaureate colleges in arts and sciences (CC21) and diverse fields (CC22). Now that this study, which included a wide array of Carnegie Classifications under the umbrella of four-year institutions, has been completed, future research could create a subset of the population by Carnegie Classification and run the panel data regression analysis to determine if the results

vary from these findings. It would be interesting to view the results for all cost drivers studied.

Another possible way to analyze the data might be to look at each school by geographic region. Different cities have different cost-of-living adjustments (money. cnn.com, n.d.). This may or may not impact the costs of higher education. For example, does an assistant professor in New York make the same as an assistant professor in Texas? Are the state appropriations of a lower cost of living in a geographic region the same as the state appropriations of a school in a higher-cost-of-living geographic region? Should they be? Do certain geographic regions, due to a higher cost of living, capture federal student loans and not others? Along those same lines, this study could be repeated while controlling for local economic circumstances, such as the state median income or unemployment rate.

Another suggestion for further research might be to sort the schools by size because economies of scale do matter (Desrochers & Kirshstein, 2014; Stratford, 2015; Vanderbilt University, 2015). It might be beneficial to look at the relationship between average net price and the cost drivers to see if there is a disparity, depending on the school size. This study controlled for the number and percentage of undergraduate students, which takes economies of scale into account, but it would be interesting to delineate any possible variation further.

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