The Race for Increasing College Costs

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Abstract

As higher education continues to shift to be more progressive, providing access to more students of different backgrounds, it currently is facing an obstacle. The escalating cost of tuition is growing to be a significant concern for access to higher education. The government has prioritized increasing federal financial aid to improve accessibility. However, this intervention may paradoxically worsen the rise of the cost of college, as suggested by William Bennett's famous hypothesis. As the higher education landscape evolves, a nuanced examination of tuition rise drivers is essential. This study utilizes cross-sectional data from the National Center for Education Statistics to evaluate Bennett's hypothesis, focusing on the impact of government financial aid and institutional aid on costs at public and private nonprofit colleges in the US. The study is structured around an institution's charging variance and determinants of financial aid. The analysis reveals evidence supporting Bennett's Hypothesis, indicating a correlation between financial aid and tuition costs across various institutions.

Keywords: Bennett's Hypothesis, Tuition, Financial Aid

THE RACE FOR INCREASING COLLEGE COSTS

The accessibility of higher education has been a topic for centuries. From its origin of being only accessible to the wealthy, it has since become a progressive system. Initially, higher education was only accessed by a few. Only wealthy men and elites were the only students in its earliest forms. Early forms of higher education operated differently. Students hire their professors, and professors only get paid when they find their courses substantial. Students who can afford a professor are the only ones who can receive an education. Lower-income students can only access education through sponsorships from philanthropists. Since then, as education became more popular, it became more progressive. It led to the developing of academic disciplines and education purposes integrated into systems to provide education efficiently. Financial aid systems were also created. Institutional financial aid systems led by Harvard University enabled more people to access college (Fuller, 2014). In its middle years, higher education became more accessible to women. In later years, not too far from today, it became more accessible to racial minorities such as black people and immigrants (Institute for Higher Education Policy, 2010; Parker, 2015).

The government's involvement accelerated higher education's accessibility. Recent history records the attempts to make higher education more accessible to a larger population. The introduction of the GI Bill in 1944 is considered the first government involvement in financial aid. Since then, the government has become more involved in providing student financial aid with the legislation of the Higher Education Act of 1965 and providing efficiency to Federal Financial aid through the Free Application for Federal Student Aid (FAFSA) (Fuller, 2014). The government's involvement in student financial aid made higher education more progressive by enabling lower-income students to attend college.

As higher education becomes more accessible, its demand increases, and more colleges open. The increase in the number of colleges gave rise to more competition. Unlike firms in the market, college institutions have different measures of financial success. Howard Bowen contemplated what success for colleges is. In his Bowen's Rule, he introduced the five laws of higher educational costs. The five laws mainly state that institutions aim to achieve educational excellence, prestige, and influence. In pursuit of these goals, they could potentially spend unlimited amounts on what appear to be beneficial educational initiatives. Institutions strive to raise as much funding as possible and typically spend all they acquire. The natural outcome of these behaviors is a continuous increase in expenditures (Bowen, 1980; Gillen, 2012).

The government's involvement in financial aid seems to fuel an unintended consequence for college affordability. Knowing the cost behavior of colleges, government aid could potentially provide an opportunity for colleges to gain more revenue. This was the concern of the Former Secretary of Education, William Bennett. In his notable theory, Bennett's Hypothesis, he worries that federal student aid might inadvertently fuel tuition increases. His theory suggests that college institutions might capture the aid provided by the government by raising tuition prices (New York Times, 1980).

As Bennett hypothesized, the rise of tuition costs has been increasing. U.S. News and World (2023) reports the increasing tuition trend across all sectors. In addition, financial aid has also been increasing over time in all aspects, including federal, state, and institutional (CollegeBoard, 2023). However, research findings yielded mixed results. Andrew Gillen (2012) became interested in this discourse, which led to his revision of Bennett's Hypothesis, incorporating Bowen's Rule to help explain the mixed empirical evidence and better understand the relationship between tuition and financial aid.

Incorporating both theories raises the problem of the government's effectiveness in improving college accessibility. Are the government's efforts to provide better access to higher education enabling college institutions to increase college costs? Are colleges using government aid as an opportunity to be more competitive? In addition, with the recent FAFSA Simplification Act (FSA) legislation to provide better access to federal financial aid, would this policy hurt college accessibility and affordability?

This study investigates higher education pricing behaviors to help answer this question and establish a relationship between tuition and financial aid that contributes to the ongoing discourse of Bennett's Hypothesis. The Ordinary Least Squares (OLS) method analyzes the relationship between financial aid and tuition costs using the latest cross-sectional data from the National Center for Education Statistics. The result of this study aims to provide a ground for the complexity of higher education dynamics, aiding in forecasting the effects of future financial aid policies.

FAFSA

Before the FAFSA Simplification Act (FSA), the process for determining eligibility for federal financial aid was determined by the Expected Family Contribution (EFC) formula. Students apply to the Free Application for Federal Student Aid (FAFSA) to request federal aid, with the federal government employing the data provided to calculate the EFC. This calculation considered variables such as family income, assets, family size, and the number of family members attending college. The government's formula aimed to gauge the financial aid a student would need to cover the cost of college education by subtracting the EFC from the Cost of Attendance (COA) at the student's chosen institution. The COA, an estimate determined by

educational institutions, represents the comprehensive cost for a student to attend for an academic year and sets the upper limit for aid allocations (Federal Student Aid, 2019).

The demonstrated level of financial need was critical in determining the amount of aid a student received. For instance, the Pell Grant, funded by the government, is capped by Congress and awarded proportionately to the student's COA and enrollment status. If the Pell Grant maximum is $6,000 and the COA is $10,000, a student with an EFC of $0 would be eligible for the full grant amount, while a student with an EFC of $6,100 would not qualify. An increase in the maximum Pell Grant to $7,000 would then enable the latter student to receive $900, illustrating how adjustments in grant limits directly affect aid eligibility (Federal Student Aid, n.d.-a; Federal Student Aid, n.d.-b).

Federal student loans, which are also influenced by factors such as a student's dependency status, EFC, and COA, come in three main types: subsidized, unsubsidized, and PLUS. Subsidized loans, targeted at those with financial need, have their interest covered by the government if the student is enrolled. Unsubsidized loans, available to all students regardless of financial need, attempt to bridge the gap between a student's grant and their COA. PLUS loans, which necessitate a credit check, permit students to borrow up to the full COA minus any other financial aid received (Federal Student Aid, 2019b).

State governments complement federal efforts by offering additional financial aid, typically following a similar methodology incorporating EFC values derived from FAFSA submissions. States such as Pennsylvania and California leverage FAFSA data to determine eligibility for their need-based grant programs, showcasing the shared reliance on EFC and COA for guiding government aid decisions (Federal Student Aid, n.d.-a).

The introduction of the FSA marked a pivotal shift in determining aid eligibility, replacing the EFC with the Student Aid Index (SAI). Notably, the SAI omits consideration of the number of family members in college, thereby simplifying the aid determination process. This revision enhances Pell Grant accessibility by associating eligibility with family size and the federal poverty level, expands aid opportunities to incarcerated students, and reinstates eligibility for students affected by school closures (Weisman, 2023).

Review of Literature

Intuitively, Bennett's Hypothesis seems plausible in economic theory. In addition, the theory suggests that enhanced financial aid availability could intensify the demand for higher education. Given the inelastic supply due to limited seating capacity and institutional selectivity, such a demand surge inevitably leads to higher tuition costs (New York Times, 1980; Li, 2013).

Subsequent research has validated that financial aid exerts a significant positive demand shock on college enrollment. For instance, studies have shown that financial aid notably influences demand elasticity, with aid-eligible applicants demonstrating higher responsiveness to changes in price compared to their ineligible counterparts (van der Klauw, 2002; Mello, 2020). Studies have highlighted merit and need-based effects on demand. Cornwell et al. (2006) found that the HOPE scholarship increased enrollment and declined student migration. The Pell Grant has been spotlighted for boosting enrollments, underscoring the demand-stimulating effects of financial aid (Cellini, 2010; Schwartz, 1985; Turner, 2011).

The validity of the effects of financial aid on the demand curves creates conditions for the Bennett Hypothesis. However, researchers found conflicting findings. Initial investigations by McPherson and Schapiro (1998) highlighted a correlation in line with the Bennett Hypothesis in public institutions, a trend not mirrored in private settings. Conversely, Li (1999) documented a

positive relationship between Pell Grants and both sticker and net tuition across public and private institutions. Further reinforcing this perspective, Acosta (2001) observed that both forms of federal aid—grants and loans—were associated with tuition increases, with loans specifically impacting private institutions more. Rizzo and Ehrenberg (2004) narrowed their focus to the impact of maximum Pell Grants on flagship public universities, noting a positive effect on in-state tuition without a corresponding rise in out-of-state tuition. Singell and Stone (2007) expanded the discourse by identifying a positive relationship between average Pell Grants and out-of-state tuition for public and private institutions, without a similar effect on in-state tuition. Studies on State-level financial aid also yielded mixed findings. The Georgia HOPE scholarship program positively influenced tuition rates, with Long (2004) noting a specific increase in sticker tuition at private institutions. Curs and Dar (2010) differentiated between need-based and merit-based scholarships, finding the former positively correlated with tuition increases and the latter inversely related.

However, not all findings align completely with the Bennett Hypothesis. The National Center for Education Statistics (Cunningham et al., 2001) and research by Archibald and Feldman (2011) found no significant correlation between aid variables and tuition changes, with the latter observing a negative relationship in private universities when examining maximum Pell awards. Amidst these conflicting outcomes, Gillen (2012) introduced Bennett Hypothesis 2.0, refining the original theory to account for the nuanced realities of financial aid, including factors like selectivity, tuition caps, and institutional strategies for price discrimination, all within the context of Bowen's theory on institutional motives. This revised hypothesis posits that Pell Grants and need-based aid, targeted at low-income students, might not significantly elevate tuition, a view substantiated by Gioiosa (2017), who found no increase in net tuition due to Pell

Grants. However, federal student loans, which can exceed Pell Grant amounts, exhibit a distinct dynamic, particularly in private institutions. Lucca, Nadauld, and Shen (2017) noted a positive relationship with tuition. Similarly, Cellini and Goldin (2014) found that for-profit institutions eligible for federal aid charged significantly higher tuition than their ineligible counterparts. International evidence from Brazil (Mello, 2020) echoed that increased financial aid eligibility could lead to tuition hikes.

However, contradictory findings persist, making it difficult to reach an academic consensus. For instance, Frederick et al. (2012) discovered minimal evidence supporting the hypothesis, while Gioiosa (2017) found none. The narrative shifts when focusing on graduate schools; Kelchen (2017) observed an absence of the Bennett Hypothesis within law schools, and subsequent research by Kelchen (2019) into medical and business schools also revealed little evidence. Most of the literature provides consistent support for Bennett's Hypothesis, but the results are often conflicting and mixed, attributable to various factors. Given the diversity in how institutions price tuition for students, identifying the precise impact of financial aid on the cost of college presents a challenge. Studies that have explored various types of tuition across different variables may not fully capture the influence of financial aid on tuition, indicating the necessity for more accurate matching to understand this relationship better. Certain factors may dilute or reinforce this link, suggesting that a more targeted approach to research is essential. As the landscape of higher education finance grows increasingly diverse and complex, there is a clear need for more detailed analysis to accurately assess financial aid's effects on tuition.

Research Question

Given the constraints on federal and state financial aid, which caps the maximum award per student, a discrepancy frequently arises between the aid provided and the total Cost of

Attendance (COA), leaving students to confront a financial shortfall in affording their college education. To mitigate this disparity, educational institutions endeavor to provide additional financial support. Typically, these institutions utilize the data from the Free Application for Federal Student Aid (FAFSA) to determine eligibility for need-based awards. In contrast, merit-based grants are awarded based on the academic achievements and prowess of students. Such merit-based aid reflects the diverse standards and criteria individual institutions uphold, with all institutional grants being confined by the overarching limit of the COA, ensuring that the total financial aid package does not exceed the COA. Consequently, a student's financial capacity to fund their education can be encapsulated by the formula:

$$COA \geq Government\ Aid + Institutional\ Aid + Other\ Aid$$

This gap in funding highlights the critical role that institutions play in not just awarding grants based on need or merit but also in their strategic decisions influenced by their unique missions, values, and competitive standing within the higher education landscape. The allocation of institutional grants is intricately tied to an institution's objectives and the competitive environment within which it operates, analyzing such allocations a complex endeavor. It is observed that institutions are driven by competition, a dynamic that has been suggested to contribute to escalating college costs. The premise that higher costs signal superior quality and educational outcomes, from exceptional student achievements to significant research contributions, fuels this competition. This not only enhances an institution's prestige but also its attractiveness to prospective students.

However, the high costs associated with quality education can deter students from eagerly seeking such opportunities, leading institutions to offer competitive financial aid packages to solve this problem as students respond to economic theory (Dynarski et al., 2022).

Thus, the capacity of an institution to effectively bridge the financial gap significantly influences a student's decision, becoming a pivotal factor in the rising costs of higher education. Given the autonomy institutions have in setting their COA, it raises an important question about the determination of COA: Could the drive to offer more competitive financial aid packages, against the backdrop of equating higher prices with higher quality, lead institutions to inflate their COA?

This paper posits the hypothesis that an increase in government aid pressures institutions to augment their financial aid offerings, constrained as they are by the COA. In response, institutions may strategically inflate their COA to expand their capacity to award institutional grants, thereby enhancing the competitiveness of their financial aid packages. This hypothesis explores the interplay between government aid, institutional grant allocations, and the determination of COA within the context of the competitive landscape of higher education.

Model and Framework

This study explores the hypothesis that financial aid impacts the Cost of Attendance (COA) across different higher education institutions. It aims to delineate the relationship between various forms of financial aid and the COA. In undertaking this investigation, the study aspires to shed light on the dynamics of higher education pricing, offering valuable insights that could inform future research and influence policy development within the realm of higher education.

The analysis will be conducted on various public and private institutions across the United States, leveraging cross-sectional data from four-year degree-granting institutions. Employing the Ordinary Least Squares (OLS) method, the study will regress government financial aid and institutional grants against the COA. Recognizing the distinct pricing strategies of public and private institutions, the analysis will proceed separately for each sector. This

distinction allows for a nuanced examination of how different types of institutions respond to and are influenced by financial aid, incorporating controls that reflect each sector's unique characteristics and circumstances.

To isolate the impact of financial aid on the COA, the study will integrate a comprehensive set of control variables, categorizing them into financial, institutional, and competitive factors. Financial controls will consider an institution's core revenues and expenses, which could significantly affect the COA. Institutional controls will examine the attributes and characteristics of institutions that may influence their COA. Additionally, competitive behaviors within the higher education market will be examined, acknowledging how competition among institutions for prestige and student enrollment can drive changes in COA.

The methodological approach includes a regression formula specifically for analyzing the COA in public institutions, accounting for whether students are in-state or out-of-state. This formula is expressed as:

$$COA = \beta_0 + Government\ Aid + Institutional\ Grant + \Sigma\ Control\ variables + \epsilon$$

To enhance the precision of the analysis, the study will employ logarithmic transformations of tuition and relevant variables. This transformation aids in estimating the elasticity effects, significantly improving the accuracy of the model, the linear fit, and the stabilization of variances. Such a methodological choice ensures a more detailed and insightful data analysis, allowing for a clearer understanding of the relationships at play.

This structured approach, with its focus on methodological rigor and comprehensive controls, aims to provide a detailed examination of the role of financial aid in shaping the COA at higher education institutions. It offers critical insights for policymakers, educational leaders, and scholars interested in the economics of higher education.

Data and Descriptive Statistics

The study's primary dataset was obtained from the National Center for Education Statistics (NCES), the leading federal entity responsible for collecting and analyzing educational data in the United States. The Integrated Postsecondary Education Data System (IPEDS) was the primary source, a comprehensive system that compiles data from all institutions engaged in federal student financial aid programs.

The dataset contains cross-sectional data from college institutions across the U.S., all of which participate in Title IV degree-granting public and private nonprofit programs. The data reflect tuition and other critical financial variables for the 2021-2022 academic year. Institutions with missing data on critical variables are omitted to ensure the integrity of the analysis. Utilizing STATA for descriptive statistical analysis, the results are displayed across two tables, differentiating between private (table 2) and public (table 3) institutions.

Dependent Variables

This study explores the cost of attendance within private and public educational sectors. The published COA data from the NCES contained missing data imputed through a methodological approach. This involved aggregating published tuition and fees, costs for books and supplies, and boarding expenses—each component individually sourced from NCES—to calculate the institution's complete COA.

The summary statistics reveal variances in the dependent variables, highlighting the financial distinctions between private and public institutions. The data illustrates that private institutions report a higher average COA at $42,845.63, in contrast to their public counterparts, which stand at $22,058.07. This difference reflects the premium pricing often associated with private education.

The standard deviation of $20,320.80 for private institutions versus $13,602.97 for public ones reveals a broader variance in COA within the private sector. This variance suggests more complex charging structures, potentially reflecting the unique financial dynamics and diversity of educational offerings within private education.

Notably, COA's minimum and maximum values further highlight the contrasts between the sectors. Private institutions have a minimum COA of $3,300, somewhat lower than the public sector's minimum of $3,520. Conversely, the maximum COA in the private sector reaches up to $86,984, significantly surpassing the public sector's maximum of $71,227. This maximum-value difference highlights the broader pricing spectrum within private education, from relatively affordable options to high-end, premium-priced institutions.

Explanatory Variables

The set of explanatory variables selected for the study focuses on aid from the government and institutional grants to private and public institutions. The government aid variable is the average aid awarded to first-time, full-time undergraduate students from both federal and state. I calculated this variable by adding the federal loan and state grants awarded to first-time, full-time students obtained from NCES. It is important to note that The federal loan does not cover the Parent Plus Loan offered by the federal government. The institutional grant is the average amount awarded to first-time, full-time students. These two explanatory variables are hypothesized to inflate and influence COA for both sectors.

Private institutions report a mean of $14,086.712 for average government aid with a standard deviation of $4,074.971, signaling a significant variability in student government aid. This variability ranges from a minimum of $100 to a maximum of $34,163. In contrast, public institutions present a slightly lower average government aid of $12,135.553, with a narrower

standard deviation of $3,328.879, and their range spans from $1,340 to $24,657. The difference in the means could stem from various factors, notably the higher cost of attendance (COA) at private institutions. This likely compels students to seek the maximum possible need-based government grants. The broader standard deviation in private institutions reflects their higher COA and the diverse socioeconomic backgrounds of their students, who have varying financial needs. This diversity necessitates more complex financial aid packages. The difference is also evident in the minimum and maximum values; the lower minimum in private institutions may suggest fewer federal need-based aid qualifiers compared to public, while the higher maximum underscores the influence of the higher COA in private institutions.

For average institutional grant aid, private institutions report a mean of $17,921.455 with a standard deviation of $12,727.914, demonstrating substantial variability in the grant amounts awarded to students. This variability extends across a range from $149 to $61,290. In contrast, public institutions exhibit a considerably lower average grant aid of $3,292.559, with a standard deviation of $2,675.846, suggesting more consistency in the grants provided. Their range, from $19 to $22,920, is notably narrower than private institutions. The marked difference in mean values indicates the need to bridge the gap between COA and government aid. As private institutions have a higher mean for government aid, the summary statistics predict early that private institutions might be subject to raising COA to be able to provide more institutional grants. The wider standard deviation in private institutions underscores the nature of their financial aid packages tailored to meet the wide-ranging needs of their students. This contrasts with the public sector, where the narrower variability and range indicate a more standardized approach to grant aid, possibly due to tighter budget constraints or more uniform tuition rates.

Control Variables

To analyze the impact of financial aid on the cost of attendance, I incorporated a range of controls to ensure the precision of the estimates obtained. These controls were categorized into three broad areas: financial controls, characteristics controls, and competitive controls, each selected to account for the nature of factors influencing the provision of financial aid and the determination of COA.

Financial controls were implemented to adjust for the varying levels of resources available to institutions, encompassing variables such as average government aid, institutional grants, and other forms of financial assistance. This consideration is crucial, as financial aid policies and the resources backing them can significantly affect an institution's pricing strategy and, consequently, its cost of attendance. Undergraduate body size is included as FTE includes all students.

Characteristic controls aimed to capture the unique aspects of each institution that might influence its cost structure or financial aid offerings. These included factors such as the state's median income in 2021 from Statista, the institution's level (e.g., two-year vs. four-year), and the degree of urbanization of the institution's location. By accounting for these characteristics, the model could more accurately isolate the effect of financial aid from other institutional attributes that might also impact the cost of attendance.

Competitive controls were introduced to account for the competitive environment in which institutions operate, particularly concerning student admissions. Understanding that an institution's competitive positioning can influence its financial aid strategies and pricing policies, I incorporated measures such as the percentage admitted reflecting the selectivity and attractiveness of institutions. Specifically, I leveraged the institution's open admission policy for the percent admitted variable to impute additional data. This approach allowed for a more

comprehensive representation of an institution's competitive stance by enriching the dataset with inferred admission rates where direct data was unavailable. These controls formed a robust framework for analyzing the nuanced relationship between financial aid and the cost of attendance, enabling a more refined understanding of how different types of financial aid, institutional characteristics, and competitive pressures collectively shape educational costs.

Empirical Results

In examining the hypothesis that financial aid impacts the Cost of Attendance (COA), I conducted regression analyses using STATA. The regression incorporated both dependent variables and a comprehensive set of explanatory and control variables to discern the nuanced relationships at play. To enhance the robustness of the findings, the analysis was structured in a nested format, progressively introducing additional controls to assess their influence systematically. This approach facilitated a comparative insight into how including different variables affected the overall results. The analysis employed the natural logarithm for several variables, enabling the coefficients to be interpreted as elasticities.

This methodological choice allows for a more nuanced understanding of the data, where the coefficients represent the percentage change in the COA in response to a one percent change in a predictor variable, all else being equal. Such an interpretation of the coefficients, as elasticities, offers a detailed view of the relative impact of each variable on the COA, providing a clear and precise understanding of how government aid, institutional aid, and other factors influence educational expenses. This analytical strategy tests the hypothesis more precisely and yields insights directly relevant to policy considerations and institutional planning.

This research investigates the relationship between government financial aid, institutional grants, and the cost of attendance at private institutions through a nested regression model framework.

Private COA

The results of private institutions align with the hypothesis, showing a significant correlation between the explanatory variables—government aid and institutional grants—and the cost of attendance. Specifically, the regression outcomes delineate that a one percent augmentation in government aid is associated with a 0.224 to 0.143 percent escalation in the natural log of the COA. In contrast, a comparable increase in institutional grants correlates with a more pronounced 0.437 to 0.387 percent rise. These insights underscore the pivotal role that both government and institutional aid play in sculpting the pricing strategies adopted by private educational entities.

Notably, the impact of institutional grants on COA has a more substantial influence across all models, indicating a strategic adjustment of COA by private institutions to enhance their financial aid offerings as government aid increases. This strategic maneuvering suggests that private institutions may intentionally inflate their COA to craft a more appealing financial aid package, potentially boosting enrollment and enhancing their competitive edge in the educational marketplace.

The addition of control variables into the regression models elevates the model's explanatory power. Financial factors, particularly expenses, demonstrate a robust positive correlation with COA, suggesting that increased expenditures on the part of the institutions necessitate higher tuition fees. Conversely, an intriguing inverse relationship emerges between institutional revenues and COA, potentially reflecting a financial cushioning effect where

institutions endowed with substantial core revenues find less need to increase COA. Among institutional characteristic variables, the level of the institution gains prominence with the inclusion of competition variables, hinting at a nuanced dynamic where four-year institutions might benefit from economies of scale and financial cushioning. Furthermore, the degree of urbanization exhibits a pronounced positive correlation with COA, insinuating that institutions in urban settings have higher COA. The inverse correlation between the percentage of Pell Grant recipients and COA subtly suggests that institutions with a higher concentration of low-income students endeavor to maintain a lower COA. However, the effect is small. The significance of competition variables further illuminates the intricate linkage between the competitive positioning of private institutions and their COA, highlighting a strategic interplay aimed at optimizing institutional appeal.

Collectively, the model is a robust fit and progressively amplifies its explanatory power as control variables are added, capturing the determinants of COA in the private education sector. The analytical exploration of the explanatory variables resonates with the hypothesis, revealing a consistently positive correlation with COA across all models.

Public Cost of Attendance

Similarly to private institutions, the results for public institutions also align with the hypothesis, showing a positive correlation between government aid and institutional grants and the cost of attendance across all models. Government aid coefficients indicate that a one percent increase in government aid is associated with an increase in the natural log of the COA, ranging and diminishing from 0.681 to 0.363 percent across the models. Similarly, a one percent rise in institutional grants is linked with an increase in COA, though the effect diminishes from 0.426 to

0.183 percent as more variables are introduced. These results highlight the influence of both government and institutions on the pricing strategies of public educational institutions.

Comparingly, the sensitivity to financial aid is inversed from private. The effect of government aid on COA is more pronounced than institutional grants, suggesting a higher sensitivity of public COA to changes in government aid. This suggests that public institutions may adjust their COA in response to fluctuations in government aid, potentially to enhance or sustain their financial aid offerings, thereby affecting their overall competitiveness and appeal to prospective students.

The addition of control variables in the regression models enhances their explanatory capacity. Financial factors, particularly institutional expenses, strongly correlate with COA, indicating that higher operational costs necessitate increased tuition fees. In contrast, like private, revenues reveal an inverse relationship with COA, suggesting financial cushioning. The variables representing institutional characteristics, such as the level of the institution and the degree of urbanization, demonstrate significant effects on COA, with urban institutions and those with higher educational levels typically displaying higher COA. Interestingly, the percentage of Pell Grant recipients shows a negative correlation with COA, albeit small, implying efforts by public institutions to remain accessible to low-income students. Competition variables also play a role, underlining the complex relationship between institutional competitiveness and COA.

The model presents a good fit and progressively refines its explanatory power by including control variables, adeptly capturing the nuanced factors influencing COA in the public education sector. The systematic examination of the explanatory variables against the backdrop of the hypothesis unveils a consistently positive correlation with COA across the models. These findings offer insights into the intricate dynamics governing tuition pricing strategies within

public institutions, emphasizing the substantial impact of government and institutional aid on educational affordability and access.

Robustness Check

In examining the model's fit, the models demonstrate strong explanatory power, as indicated by high R-squared values across both sectors. For private institutions, R-squared values ascend from 0.789 in the simplest model to 0.863 in the most comprehensive model, illustrating an impressive fit that accounts for a significant portion of COA variability. Similarly, public institutions' models exhibit R-squared values ranging from 0.507 to 0.667, affirming strong explanatory capacity. These high R-squared values across models signify that the explanatory and control variables effectively capture the factors affecting COA in both sectors.

Private's sum squared error (S.E.E.) gradually decreases as controls are added affirms the model's robustness. However, the S.E.E. for the public increases as controls are added. This could be due to the significant decrease in the sample size. The number of observations across models varies, with private having a larger dataset (up to 1223 observations) compared to public (up to 1460 observations in the simplest model, reducing in more complex models). This variance provides a broad basis for analysis, though the drop in observations in more detailed models highlights the trade-off between model complexity and available data. The robust standard error adjustment indirectly addresses concerns related to error distribution by ensuring our estimates remain valid under potential deviations from normality.

The regressions employ robust standard errors to address potential heteroskedasticity and ensure the reliability and precision of the estimates. The adjustment is crucial for interpreting the impact of government aid and institutional grants on COA. The robust standard errors for government aid and institutional grants across all models remain relatively low, indicating stable

and reliable estimates that support confidence in the findings. The variance inflation factor diagnostic in STATA reported values below 5, indicating a moderately acceptable correlation. The distinct significance levels and the logical consistency of the coefficient signs across models suggest that multicollinearity is likely not severely distorting the estimates.

The pattern of diminishing coefficients for key explanatory variables as control variables are introduced remains evident even with the application of robust standard errors. This pattern underscores the complex interplay of factors influencing COA and suggests that other institutional and market characteristics moderate the initial strong impact of financial aid. Addressing heteroskedasticity through robust standard errors strengthens the model by making our inference more reliable, especially in the face of non-constant error variance. The assumption of linearity, intrinsic to the regression models used, is supported by the logical and consistent relationships observed between independent variables and COA. However, the real-world relationship may involve more complex, nonlinear dynamics.

The robustness checks, incorporating robust standard errors and analyzing R-squared values, diminishing coefficients, and the breadth of observations affirm the reliability and robustness of our models. While acknowledging the limitations related to the sample size effect, multicollinearity, normality of errors, and potential nonlinearities, the model provides a compelling and statistically sound exploration of how financial aid impacts COA across private and public higher education institutions.

Discussions

This study investigated the relationship between financial aid and tuition costs at private and public nonprofit colleges in the United States, using cross-sectional data and employing Ordinary Least Squares (OLS) regression analysis. The findings confirm aspects of Bennett's

Hypothesis, suggesting that increases in financial aid are associated with rises in tuition costs across both types of institutions. These results lend credence to the notion that while financial aid is intended to make higher education more accessible, it may also contribute to tuition inflation, particularly when institutions adjust their COA to capture additional available funds.

The study's results have significant implications for policymakers and educational administrators. First, the observed correlation between increased financial aid and rising tuition underscores the need to consider financial aid policies carefully. Without adequate controls, such policies may inadvertently drive up the cost of higher education, potentially negating the benefits of increased financial assistance. Moreover, the findings suggest that institutions, particularly private ones, may strategically adjust their COA in response to changes in financial aid, which can affect the affordability and accessibility of higher education.

This research is subject to several limitations. First, the nature of cross-sectional data limits the ability to draw causal relationships. Although this study suggests associations between financial aid and tuition costs, longitudinal data would be necessary to confirm causality and observe trends over time. In addition, due to the lack of data availability, the financial aid variables are incomplete aggregates of the overall financial aid used in higher education. The aggregate government aid variable does not include financial aid such as the Parent PLUS loan or a federal work-study. The gravity of these programs' effect on tuition is unknown and could potentially alter the results when added. of the study's focus exclusively on private and public nonprofit colleges, excluding for-profit institutions, which may exhibit different financial dynamics.

Future research could address these limitations by including longitudinal analyses to track changes over time, thus providing a more dynamic view of the impact of financial aid on

tuition costs. Including for-profit institutions could broaden understanding of financial aid dynamics across different educational sectors. Additionally, research could explore the impact of specific types of financial aid, such as grants versus loans, on tuition to determine if one form of aid has a more pronounced effect on tuition inflation than others.

While financial aid is crucial for enabling access to higher education, its influence on institutional pricing strategies can lead to unintended consequences of rising tuition. This study contributes to the ongoing discourse on Bennett's Hypothesis by providing empirical evidence supporting the theory, especially within the contemporary educational and economic environment. The new understanding of these dynamics can provide insights for policymakers and educational leaders to craft more effective strategies to ensure that financial aid makes higher education accessible without contributing to escalating costs.

Conclusions

As higher education evolves to be more progressive, providing more access to the greater population, it currently is facing an obstacle to moving progressively. A culprit that researchers and I suspect is the idea of Bennett’s hypothesis and the positive relationship between tuition and financial aid. This research aimed to find the relationship between financial aid and tuition costs within the landscape of United States higher education, focusing on both public and private nonprofit colleges. Using the OLS method, I found a positive and strong relationship between financial aid and the COA of public and private college institutions. Both financial aid showed this relationship for each sector. Private colleges showed greater sensitivity to institutional aid, while public colleges showed greater sensitivity to government aid. These results indicate that the financial aid that has higher the levels of financial aid, the higher their COA is. It brings the

plausibility of my hypothesis that government aid pressures institutions' ability to competitively offer better financial aid packages due to the limitation of COA.

This scenario essentially becomes a race between the government and educational institutions to raise tuition costs. The competition to offer more attractive financial aid packages, constrained by COA limits and government aid, compels institutions to adjust their tuition strategies. The rise in tuition places a financial burden on students and families, which contradicts the purpose of financial aid.

The issue of higher education accessibility has been a topic over time, with different eras facing different obstacles. This time, it becomes more complex as the tool that is used to address higher accessibility may potentially cause counterintuitive effects. These findings hope to inform policymakers and educational leaders to carefully plan the mechanisms of how aid is distributed and regulate institutional behaviors. Moreover, it is still important to ensure the Bennett effect through future testing and research to establish more evidence. With more understanding of this complex dynamics, it can guide policymakers and educational leaders to ensure that financial aid has the intended effects on college accessibility.

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Tables

Table 1

Variable names and, definition

Variable	Definition
COAPV	Total price for students attending private institutions living on campus
COAPVLOG	Log of COAPV
COAPBOST	Total price for students attending public school living on campus
COAPBOST1LOG	Log of COAPBOST1
AVGOVAID	Average amount of government aid including Pell grant, other federal grant, state and local grants, and federal student loan awarded to full-time first-time undergraduates
LOGGOVAID	Log of AVGGOVAID
AVGINGR	Average amount of other student loans awarded to full-time first-time undergraduates
LOGAVGINGR	Average amount of institutional grant aid awarded to full-time first-time undergraduates
REV	Revenues from government appropriations, government grants and contracts private grants and contracts, investment return and other core expenses per FTE
LOGREV	Log of LOGREV
EXP	Expenses from instructional, academic, student services, public service, institutional support, and other core expenses per FTE
LOGEXP	Log of EXP
UNDFT	Amount of full-time undergraduates
SECLVL	Level of institution: 1 = 4 or more years, 0 = 2 years

PRINP	Percent of students attending institution in person
PRPELL	Percent of undergraduate students awarded with Pell Grant
MDINC	Median income of state
DOU	Degree of Urbanization. 1 = urban or suburban, 0 = rural
PRADM	Percent Admitted
GPA	GPA from secondary school required or considered to be admitted. 1 = yes, 0 = no
RNK	Rank from secondary school required or considered to be admitted. 1 = yes, 0 = no
SSCHR	Secondary school record required or considered to be admitted. 1 = yes, 0 = not
CCP	Percent admitted
REC	Recommendations required or considered to be admitted. 1 = yes, 0 = no
FDC	Formal demonstration of competencies. 1 = yes, 0 = no
ADMT	Admission test score required or considered to be admitted. 1 = yes, 0 = no

Table 2

Descriptive Statistics for Private Institutions

Variable	Obs	Mean	Std. Dev.	Min	Max
pvcoa	1340	42845.632	20320.803	3300	86984
logpvcoa	1340	10.517	.598	8.102	11.373
avggovaid	1321	14086.712	4074.971	100	34163
logavggovaid	1321	9.49	.417	4.605	10.439
avgingr	1246	17921.455	12727.914	149	61290
logavgingr	1246	9.422	1.024	5.004	11.023
rev	1660	46070.941	119019.93	-4049	1586024
logrev	1629	9.678	1.518	0	14.277
exp	1660	33020.693	39674.293	2670	753718
logexp	1660	10.16	.625	7.89	13.533
seclvl	1671	.922	.268	0	1
undfte	1662	1648.717	4874.196	0	121884
prinp	1662	61.377	33.644	0	100
dou	1662	.795	.404	0	1
midinc	1671	94949.434	12208.476	72866	146477
prpell	1461	36.09	18.541	0	100
pradm	1363	75.542	23.476	4	100
gpa	1141	.819	.385	0	1
rnk	1141	.257	.437	0	1
sschr	1141	.873	.333	0	1
ccp	1141	.348	.477	0	1
rec	1141	.635	.482	0	1
fdc	1141	.172	.377	0	1
admt	1141	.596	.491	0	1

Table 3

Descriptive Statistics for Public Institutions

Variable	Obs	Mean	Std. Dev.	Min	Max
pbcoa1	1543	22058.07	13602.97	3520	71227
logpbcoa1	1543	9.813	.622	8.166	11.174
avggovaid	1625	12135.553	3328.879	1340	24657
logavggovaid	1625	9.359	.322	7.2	10.113
avgingr	1544	3292.559	2675.846	19	22920
logavgingr	1544	7.783	.847	2.944	10.04
rev	1643	14243.343	40415.945	0	1522574
logrev	1595	9.248	.745	2.303	14.236
exp	530	22655.026	32630.504	2694	706466
logexp	530	9.868	.458	7.899	13.468
seclvl	1677	.463	.499	0	1
undfte	1653	7253.704	8868.409	0	86114
prinp	1653	41.263	24.421	0	100
dou	1653	.583	.493	0	1
midinc	1677	92832.792	11987.928	72866	146477
prpell	1653	32.085	12.481	0	92
pradm	1619	93.036	14.009	11	100
gpa	526	.92	.271	0	1
rnk	526	.31	.463	0	1
sschr	526	.97	.172	0	1
ccp	526	.589	.492	0	1
rec	526	.23	.421	0	1
fdc	526	.068	.253	0	1
admt	526	.724	.447	0	1

Table 4

Nested Regression for Private Institutions

	(1) logpvcoa	(2) logpvcoa	(3) logpvcoa	(4) logpvcoa
logavggovaid	.224***	.209***	.24***	.143***
	(.026)	(.027)	(.028)	(.022)
logavgingr	.437***	.432***	.392***	.387***
	(.012)	(.016)	(.018)	(.015)
logrev		-.05***	-.048***	-.036**
		(.012)	(.013)	(.014)
logexp		.163***	.146***	.119***
		(.028)	(.029)	(.03)
undfte		0	0	0**
		(0)	(0)	(0)
seclvl			.019	-.07
			(.062)	(.07)
prinp			0	0
			(0)	(0)
dou			.016	.03**
			(.015)	(.012)
midinc			0*	0***
			(0)	(0)
prpell			-.004***	-.003***
			(.001)	(.001)
pradm				0
				(0)
gpa				.087***
				(.023)
rnk				-.004
				(.011)
sschr				.189***
				(.034)
ccp				-.018
				(.012)
rec				.019
				(.013)
fdc				.04***
				(.015)
admt				.015
				(.013)
_cons	4.338***	3.361***	3.619***	4.527***
	(.244)	(.303)	(.31)	(.29)

Observations	1223	1210	1210	1051
R-squared	.789	.799	.811	.863

Robust standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table 5

Nested Regression for Public Out of State

	(1) Logpbcoa1	(2) logpbcoa1	(3) logpbcoa1	(4) logpbcoa1
logavggovaid	.681***	.549***	.37***	.363***
	(.052)	(.094)	(.094)	(.078)
logavgingr	.426***	.395***	.284***	.183***
	(.017)	(.031)	(.033)	(.032)
logrev		-.232***	-.137**	-.033
		(.074)	(.069)	(.036)
logexp		.36***	.191**	.022
		(.104)	(.081)	(.066)
undfte		0***	0	0**
		(0)	(0)	(0)
seclvl			.503***	.349***
			(.05)	(.08)
prinp			0	.002***
			(.001)	(.001)
dou			-.003	.08**
			(.042)	(.031)
midinc			0	0**
			(0)	(0)
prpell			-.001	-.004***
			(.002)	(.001)
pradm				0
				(.001)
gpa				-.031
				(.043)
rnk				-.024
				(.035)
sschr				.086
				(.082)
ccp				.083***
				(.031)
rec				.021
				(.045)
fdc				-.035
				(.103)
admt				-.061
				(.04)
_cons	.113	.22	3.131***	4.897***
	(.449)	(.939)	(.909)	(1.003)

Observations	1460	476	476	167
R-squared	.507	.512	.627	.667

Robust standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*