Nonprofits' Tax Avoidance and Shifting Behaviors—Insights from the Net Investment Income Tax on Nonprofit Colleges

Yung-Yu Tsai*

University of Missouri

April 11, 2024

Abstract

The nonprofit sector has historically enjoyed tax exemptions for its role in providing public goods. However, scholars challenge this justification, noting that nonprofits do not always utilize tax benefits to enhance their services. This paper examines whether taxing nonprofits could benefit society more than granting exemptions by evaluating their responses to taxation. Focusing on the net investment income tax on nonprofit colleges, empirical findings reveal that taxed colleges shift the burden to students by raising tuition. This response, while not altering the overall service level, redistributes educational opportunities from historically underserved groups to international students who can afford higher tuition. Conversely, colleges with the niche to avoid the tax strategically increase student enrollment to circumvent the tax threshold related to student size. These findings highlight the potential of policy design to guide nonprofits' responses to taxation in ways that benefit society.

Keywords—Nonprofit taxation, tax avoidance, tax shifting, Net investment income tax, college endowment

*ytsai@mail.missouri.edu

1 Introduction

Nonprofit sectors have long benefited from generous tax exemptions (Simon et al., 2006; Toepler, 2018).[1] Moreover, scholars assert that indirect government support for nonprofits via tax exemption is either comparable to or even surpasses direct support through government subsidies and contracts (Brody & Cordes, 2006; Humphreys & Solomon, 2012; De Alva & Schneider, 2015; Baum & Lee, 2019). While the rationale for tax exemption is that nonprofits provide public goods (Hassan et al., 2000; Stevens, 2010; Zare et al., 2022), critics argue that nonprofits do not always use the tax benefits to enhance their services (Desai et al., 1998; Frey, 2002; Cowan, 2007; Nichols & Santos, 2016; Herring et al., 2018; Propheter, 2019). Additionally, studies indicate that larger, wealthier nonprofits tend to enjoy more tax exemptions (Cordes et al., 2002; De Alva & Schneider, 2015), potentially leading to wealth accumulation rather than societal benefit (Sherlock et al., 2018; Bird-Pollan, 2021). This raises the question of whether imposing taxation on nonprofits could generate more social benefits than granting exemptions.

Whether taxing nonprofits would lead to better outcomes depends on how they respond to taxation. Despite extensive literature exploring nonprofits' responses to taxation, existing studies overlook some key aspects of how the reactions affect the provision of public goods. Therefore, they have not yet fully addressed whether taxing nonprofits results in an overall improvement or loss of societal benefits. In particular, while previous studies have investigated whether nonprofits respond to taxation by cutting service levels (Grimm Jr, 1999; Fei et al., 2016; Herring et al., 2018), they have not comprehensively evaluated whether nonprofits would change service population or increase service fees to shift the tax burden to the public. This aspect—known as tax shifting behavior—is essential for assessing the justification of nonprofit tax exemption. Without understanding the full picture of behavioral responses, scholars would not be able to examine whether taxing nonprofits results in a reduction in their provision of public goods in one way or another.

[1] At the federal level, Brody & Cordes (2006) estimate the annual tax exemption for nonprofits amounts to \$45 billion, accounting for nearly 2% of total federal tax revenue. At the state and local level, Sherlock & Gravelle (2009) estimate the annual tax exemption for nonprofits ranges from \$31 to \$48 billion, roughly 2.4 to 3.7% of the state and local tax revenue. Breaking it down by industry, Baum & Lee (2019) estimates the tax exemption for nonprofit colleges at \$22 billion; Rosenbaum et al. (2015) finds that the total tax benefit for nonprofit hospitals is \$25 billion.

Another important angle of nonprofits' response to taxation is their avoidance behavior. Past literature has examined how nonprofits manipulate their revenue to circumvent regulatory thresholds (St. Clair, 2016; Marx, 2018) or misreport on financial statements to avoid taxation (Omer & Yetman, 2007; Hofmann, 2007). However, existing studies focus on organizations *reducing* their size or merely playing tricks on numbers without actual changes in service level. Few studies understand whether organizations would also respond to tax threshold designs that push them to *expand* their service level. This latter case highlights the potential for policy designs on nonprofit taxation to enhance rather than diminish public goods provision.

To gain insight into how nonprofits respond to taxation and how their tax avoidance and shifting behaviors affect overall societal benefits, this paper investigates nonprofit colleges' reactions to the Net Investment Income Tax (NIIT). The tax was introduced under the 2017 Tax Cuts and Jobs Act (TCJA), imposing a 1.4% excise tax targeting selected nonprofit colleges' investment returns.[2] Referred to by some scholars as the endowment tax, it aims to address wealth disparities among institutions, encouraging the use of endowment returns for education rather than wealth accumulation (Quinn, 2019; Bird-Pollan, 2021). However, affected colleges argue that this tax burden may hinder their ability to support core education and research activities, potentially leading to reductions in financial aid for disadvantaged students.[3] An open question remains regarding how colleges will respond to the tax and the potential impact on educational quality and equity.

The case of NIIT targeting nonprofit colleges is particularly relevant to broader questions regarding nonprofit taxation for three reasons. First, the NIIT targets endowment and capital gains, representing earnings from an organization's wealth. Wealth inequality across organizations is a central concern challenging the nonprofit tax exemption (Cordes et al., 2002; De Alva & Schneider, 2015; Sherlock et al., 2018; Bird-Pollan, 2021). Scholars have also been discussing the feasibility and potential impacts of endowment taxation in the nonprofit sector (Cowan, 2007; Willie, 2012; Fricke, 2015; Zelinsky, 2018; Bird-Pollan, 2021). In other words, if the government plans to tax

[2] The tax only applies to colleges with more than 500 students and more than $500,000 assets per student.

[3] In March 2018, 48 colleges wrote a joint letter to the Senate and the House to raise this concern. Retrieved Jan 10, 2023, from https://ofr.harvard.edu/files/ofr/files/march_2018_endowment_tax_letter_to_leadership_from_schools.pdf.

nonprofits, endowment or investment-related taxes would be the starting point. Secondly, higher education is a significant sector within nonprofits, with colleges ranking among the wealthiest and most influential institutions.[4] Higher education is also one of the sectors that benefit most from tax exemption (Brody & Cordes, 2006; Baum & Lee, 2019), only exceeded by hospitals. Finally, the policy design of NIIT grants colleges multiple pathways to respond. For example, colleges can choose to either increase or decrease their enrollment, as well as manipulate their endowment assets to gain exemption status. This policy setting allows this study to test the specific hypotheses on whether nonprofits tend to respond by increasing or decreasing public good provision. Therefore, insights gained from evaluating nonprofit colleges' responses to NIIT can contribute valuable perspectives to the broader literature on nonprofit taxation.

To examine nonprofit colleges' responses to the NIIT, I combined data from the Integrated Postsecondary Education Data System (IPEDS) and Form 990, tracking colleges from 2010 to 2022 (the NIIT became effective in 2018). Utilizing a difference-in-differences (DD) framework, I evaluate colleges' tax avoidance (trying to be exempted from the tax) and shifting (paying taxes but shifting the burden to the service population) behaviors. Additionally, I utilize the Synthetic Control Method (SCM) to evaluate the responses of each individual college and obtain estimates on the taxes paid, avoided, and the amount shifted to students. This information is then combined to generate estimations to compare government revenue earned and the costs imposed on society.

This paper finds empirical evidence on both nonprofits' tax-shifting and avoidance behaviors. First, colleges that end up paying the tax bill opt to shift the burden to students by increasing tuition and charges on room and board. While taxing colleges brings in annual government revenue of $324 million, tax-shifting behaviors make students bear a total of $287 million (nearly 88%) more in tuition/charges per year. However, colleges do not cut spending or reduce enrollment. The findings suggest that the tax-shifting behavior of non-profits does not lead to a diminish in the quality and quantity of public goods provision, but it does increase the cost of access to public goods. Secondly, colleges that manage to avoid the tax choose to increase student enrollment to

[4] In terms of asset value per institution, colleges are the wealthiest within all nonprofit categories; In terms of revenue or expenditure per institution, colleges are the second-highest industry, only exceeded by hospitals (NCCS, 2020).

circumvent the tax threshold based on assets per student. Although tax avoidance behaviors lead to a \$31 million loss in government revenue, they create an additional 9,600 enrollment opportunities, translating to over \$350 million in net benefits. The results suggest that, with the right incentive and policy design, nonprofits would have the motivation to respond to taxation by increasing their public good provision, leading to the enhancement of societal benefits.

This present study contributes to the literature on nonprofit taxation behaviors in two significant ways. Firstly, the findings shed light on the tax-shifting behaviors of nonprofits. Some previous studies find that nonprofits do not respond to taxes by reducing production levels (Grimm Jr, 1999; Fei et al., 2016; Herring et al., 2018). However, they do not fully consider all potential approaches to tax-shifting—such as increasing service fees or changing service populations. This study finds that, though colleges do not cut financial aid and expenditure, they respond by increasing tuition and charges. Additionally, colleges shift educational opportunities from historically underserved groups to international students (who pay higher tuition). The results provide important empirical evidence on how taxing nonprofits, while it does not alter the overall service level, could end up redistributing access to public service and diminish societal benefits.

Secondly, this paper contributes to the literature on the tax avoidance behavior of nonprofits. Previous studies have identified how nonprofits manipulate their revenue or spending to qualify for reduced administrative requirements or tax rates (Sansing & Yetman, 2006; St. Clair, 2016; Marx, 2018). This study offers insights by examining thresholds based on assets per student. The distinct policy context provides two key avenues for analysis: one, it allows for the evaluation of responses to a threshold directly tied to the size of the service population (i.e., students), a factor not previously explored, generating new knowledge on a different pattern of nonprofits' tax avoidance behavior. Additionally, the policy offers colleges two opposite avenues for avoidance—either increasing student enrollment or reducing assets. While the former leads to an increase in service level, the latter results in a reduction of organization resources used for providing service. This setting enables the current study to test the hypothesis on whether nonprofits prefer to maximize their output instead of minimize cost, thereby enhancing understanding of their behavioral considerations.

2 Policy Background

The 2017 TCJA imposed a new NIIT on nonprofit colleges with large endowments. According to the regulation, nonprofit colleges with more than 500 tuition-paying students and more than \$500,000 in assets per full-time equivalent (FTE) student would be subjected to a 1.4% excise tax on net investment income. Nonprofit colleges that do not meet this cutoff and all public colleges are still exempted from this taxation.[5] The policy was effective from January 1st, 2018.

The tax threshold is based on student population and asset size. However, the Internal Revenue Service (IRS) leaves some discretion to colleges. Specifically, the IRS defines student size as "the daily average number of full-time students, with part-time students being taken into account on a full-time equivalent basis," but it is up to colleges to decide how to convert part-time students into full-time equivalents. Besides, the IRS defines assets as "aggregate fair market value of assets," but allows colleges to use any reasonable method to evaluate their assets, as long as the approach is consistently applied.[6] In other words, colleges could manipulate the values by either really changing the student/asset size or applying different calculation methods (Fishman, 2018).

The IRS estimated the tax would be applied to 25 to 40 colleges (ACE, 2019). Specifically, in the first year of the policy, 33 colleges were subjected to the tax. Table 1 lists the colleges potentially affected by the tax and their tax status from 2018 to 2022. As the taxation thresholds have not been changed, the number of colleges subject to the tax would increase over time as institutions' endowments grow. As of 2021, 40 colleges were affected by the tax.

Previous studies suggest that taxation on endowment or investment return could be an effective way to address the wealth inequality among institutions and encourage colleges to invest their resources for education purposes instead of wealth accumulation (Cowan, 2007; Willie, 2012; Sherlock et al., 2018; Fishman, 2018). However, concerns have been raised about the potential tax avoidance and shifting behaviors. First, as the tax applies only to colleges surpassing specified

[5] Public colleges are not subjected to the policy. In fact, none of the public colleges really meet the tax thresholds. On the other hand, for-profit colleges have always been subject to income tax as private firms are.

[6] Tax Cuts and Jobs Act — EO Provision. Retrieved Dec 24, 2022, from https://www.irs.gov/pub/newsroom/1-excise-tax-on-net-investment-income-colleges-4968-13701_508.pdf

thresholds in student population and assets, scholars fear that colleges might manipulate their student or endowment size to avoid the tax, resulting in a decrease in education resources (Fishman, 2018; Hinrichs, 2018).

Secondly, many colleges have pointed out the policy could force them to shift the tax burden to student via cutting spending or raising tuition. In March 2018, 48 colleges wrote a joint letter to the Senate and the House stating that the new tax placed a significant burden on them and limited their ability to provide financial aid to low-income students and support core educational activities.[7] Individual colleges also delivered a similar message via public statements. Specifically, Stanford University faced a $42.9 million bill in 2019 and mentioned that the tax would harm their ability to provide financial aid and support academic mission (Selig, 2020). Similarly, MIT estimated the tax would cost them $10 million per year and constrain their expenditure toward scholarship, education, and research (Stendahl, 2017). The tax also imposes a heavy debt for smaller colleges with less endowment. For example, Trinity University calculated that the tax would create an additional $3 million bill per year and force them to increase tuition or reduce aids (Derrig, 2017).

Table A2 in Appendix A furnishes insightful statistics on the expenditure and revenue of colleges subject to the tax, offering a basis for estimating the expected tax bill derived from their net investment income. The estimated tax bill for the affected colleges, computed at a 1.4% tax rate, averages at $13 million annually (ranging from $1 million to nearly $60 million). This figure accounts for 0.5% of total revenue (with a range from 0.04% to 1%) or 1.3% of total expenditure (ranging from 0.04% to 3%) for the institution.

3 Theoretical Framework

This section establishes the theoretical framework for understanding colleges' responses to the NIIT. When the government imposes taxation, organizations might first consider whether there is any way to escape from the regulation. Section 3.1 delves into this perspective, labeling it as "tax

[7]Endowment Tax Letter to Leadership. Retrieved Jan 10, 2023, from https://ofr.harvard.edu/files/ofr/files/march_2018_endowment_tax_letter_to_leadership_from_schools.pdf.

avoidance." If organizations find no way to avoid the tax and eventually need to bear the cost, they might opt to cut spending or raise revenue to offset the tax payment. Section 3.2 explores this approach, referring to it as "tax shifting."

3.1 Tax Avoidance

Tax avoidance is a process in which organizations seek to maximize their profit or utility through legally or illegally reducing the tax payment (Slemrod & Yitzhaki, 2002; Lee et al., 2015; Raiborn et al., 2015). Nonprofits, while they do not aim to be profit-seeking, also have the motivation to reduce the tax liability and maximize their available resources (Omer & Yetman, 2007; Schmidt, 2007). Previous research has indicated that nonprofit organizations respond to tax or regulatory thresholds by manipulating their revenue or other financial variables (Sansing & Yetman, 2006; St. Clair, 2016; Marx, 2018). Particularly, the direction of manipulation behavior depends on how the tax threshold is designed, potentially leading organizations to either decrease or increase the corresponding values. For instance, St. Clair (2016) and Marx (2018) find that a government regulation requiring nonprofits with revenue *above* a certain threshold to be subject to stricter reporting or auditing requirements would prompt organizations to *reduce* their revenue to avoid the requirement. In contrast, Sansing & Yetman (2006) finds that a dual tax rate system, which imposes a higher tax rate on foundations with a payout rate *below* a specific threshold, would encourage organizations to *increase* their investment payout rate. This evidence underscores the nuanced nature of tax avoidance behaviors, illustrating that nonprofits employ different strategies based on the specific tax-related context they face.

However, how and to what extent organizations would engage in tax avoidance behavior depends on the technology available for them to manipulate and the associated costs due to such responses (Slemrod & Yitzhaki, 2002; Katz et al., 2015; Guenther et al., 2017; McClure, 2023). The technology available refers to the ability of an organization to manipulate the values corresponding to tax threshold or tax base to reduce the tax bills and the technology to conceal such behavior (Slemrod & Yitzhaki, 2002). Other associated costs include the operational costs of implementing the avoidance behavior and the potential reputation or revenue loss due to the manipulation of the financial values (Austin & Wilson, 2015, 2017; McClure, 2023).

Given the above consideration, nonprofits might have different niches and considerations compared to for-profit firms when engaging in tax avoidance. First, nonprofits and for-profits differ in their response to asset-related thresholds. While studies show that for-profit firms often *reduce* reported asset values to avoid taxes or regulations (Egger & Wamser, 2015; Hosono et al., 2018; Cespedes et al., 2021), nonprofits are less likely to *lower* their assets to gain exemption (Marx, 2018). This discrepancy can be attributed to the lack of adequate technology and the higher reputation cost for nonprofits to manipulate assets. In particular, nonprofits' assets are typically subject to donor restrictions, limiting their ability to dispose of assets as they wish (Surysekar et al., 2015; Hung & Berrett, 2021; Prentice & Clerkin, 2023). Additionally, nonprofits rely more on public support than for-profits, making their financial statistics publicly accessible (Keating & Frumkin, 2003; Calabrese, 2011). Reporting lower asset values would, therefore, harm nonprofits' public image. Consequently, they may seek to maintain a positive image of their asset values and refrain from underreporting this metric (McDonald III & Goodman, 2021). For instance, Homonoff et al. (2020) find that nonprofits with negative assets tend to inflate their asset values to zero to demonstrate financial health to donors.

Secondly, nonprofits and for-profits differ in whether changes in financial metrics result from misreporting or actual production behavior. Lower (reported) revenue or assets can stem from either misreporting data or genuine reductions in production. The distinction between real behavior versus misreporting is crucial because if the avoidance is triggered by real behavior, it might result in not only diminished government revenue but also impact organizations' production and service (Slemrod & Yitzhaki, 2002; Bird & Davis-Nozemack, 2018). Most studies on tax avoidance and evasion behavior of for-profit corporations suggest that the reduction in revenue is primarily driven by misreporting rather than a real production response (Almunia & Lopez Rodriguez, 2014; Carrillo et al., 2017; Bachas & Soto, 2021). However, studies on nonprofits indicate that, while they also engage in some level of misreporting, their changes in revenue are more driven by actual production response than misreporting (St. Clair, 2016; Marx, 2018). This difference may be attributed to the higher transparency requirements for financial reports and organizational information in the nonprofit sector (Hale, 2013; Harris & Neely, 2021). In other words, nonprofits may not have adequate technology to conceal their misreporting and would need to seek a real production response.

Drawing from insights in the existing literature, I anticipate that nonprofit colleges will respond to the threshold of the NIIT. Given that the taxation is only applied to colleges with more than 500 students and more than $500,000 assets per student, colleges can manipulate either student population or asset values. Specifically, colleges around the student cutoff may reduce the student size to below 500. Conversely, colleges around the asset cutoff may either increase student enrollment to raise the denominator or decrease assets to lower the numerator. While previous studies have not examined a threshold directly related to service population, the fact that nonprofits could respond to policy thresholds either by reducing revenues (St. Clair, 2016; Marx, 2018) or increasing payout rate (Sansing & Yetman, 2006) implies that they could also respond to the threshold by either decreasing or increasing service level, depending on which direction would grant them exemption.

On the other hand, based on the perspective of previous literature, this paper expects that colleges are less likely to respond to the threshold via manipulation of their assets. Nonprofit colleges, similar to general public charities, are subject to more donor restrictions on their assets and government regulations on transparency. Furthermore, the target of the NIIT is endowment assets, which are by nature contributions from donors and are subjected to more restrictions and supervision. Consequently, colleges may act similarly to other nonprofits and be reluctant or incapable of reducing their asset values (Marx, 2018; Homonoff et al., 2020). Hence, I expect that colleges' response could be more driven by changes in students rather than assets.

3.2 Tax Shifting

This section explores how nonprofit colleges might engage in tax-shifting behavior. The theoretical foundation is built upon a dual perspective, leveraging existing knowledge on nonprofits navigating taxation challenges and colleges responding to financial shock. When examining tax-shifting behavior, I also consider the implications on public good provisions. Specifically, organizations could shift tax burden in three ways: First, reduce the *quantity* of the service. In the case of NIIT, colleges might reduce student enrollment. Secondly, reduce the *quality* of service. In the setting of colleges' response, they might cut spending on instruction or research. Finally, additional revenue can be generated by increasing charges on service populations. In the setting of colleges' response, this would be raising tuition or other student charges. While this type of response might not directly alter service quantity or quality, it might increase the cost to access the service and, therefore, alter the distribution of the service.

3.2.1 Nonprofits' Tax Shifting Behaviors

Existing research indicates that nonprofits tend to maximize their service output (Brooks, 2005; Chang & Jacobson, 2011) or social welfare (Witesman & Fernandez, 2013; Arora et al., 2022) rather than profit. Therefore, while for-profit firms typically respond to taxation by increasing prices (Felix, 2007; Politi & Mattos, 2011; Sullivan & Dutkowsky, 2012; Gaarder, 2019) or reducing production levels (Vartia, 2008; Schwellnus & Arnold, 2008; Djankov et al., 2010; Arulampalam et al., 2012; Fuest et al., 2018), such predictions do not necessarily apply to nonprofits.

Previous studies on how nonprofits respond to taxation echo the theoretical perspective that they tend not to engage in tax shifting. The nonprofit sector that best mimics the higher education setting is the hospital industry. Previous studies explore how nonprofit hospitals respond to taxation by comparing their community service levels with those of for-profit hospitals (Rosenbaum et al., 2015; Herring et al., 2018; Zare et al., 2022). Specifically, Herring et al. (2018) compare the provision of public goods (measured as the proportion of community service to total expenditure) between nonprofit and for-profit hospitals in states with varying levels of nonprofit tax exemption generosity. They find that while within the same state, nonprofit hospitals tend to provide more community service than their for-profit counterparts, this gap does not change associated with the generosity of tax exemption a state provides. The findings imply that nonprofit hospitals would not adjust their service level in response to taxation (exemption).

Another study that is directly connected to the policy setting of this paper is the evidence on how private foundations respond to NIIT. Sansing & Yetman (2006) utilize a special dual tax rate system in which foundations with an endowment payout rate exceeding 5% were subjected to a 1% tax rate on their investment income rather than 2% for those with lower payout rates. They find that foundations just below the cutoff (subject to a higher tax rate) do not significantly differ from those just above in terms of the proportion of assets used for charity purposes and payroll payment. The evidence implies that they do not shift the tax cost by cutting service levels.

Another line of inquiry examines the impact of variations in property tax exemption on nonprofit activities. For example, Grimm Jr (1999) investigates a policy reform in Indianapolis City, altering the property tax exemption threshold for nonprofits, and finds minimal impact on nonprofits' service activities, suggesting no evidence of customers bearing the tax burden. Besides, Fei et al. (2016), leveraging variations in property tax across townships in Massachusetts, discover that a 1% higher property tax on nonprofits leads to a trivial 0.2% reduction in revenue. Their findings suggest that nonprofits do not respond to taxation by seeking additional revenue. However, they do not examine whether nonprofits change their spending or service level.

To sum up, existing studies on hospitals, private foundations, and property tax suggest a null or minimal connection between taxation and the production levels of nonprofits, implying a tendency for nonprofits to avoid shifting their tax burden by cutting spending or service levels. This observation is aligned with the literature that nonprofits tend to seek to maximize their service output (Brooks, 2005; Chang & Jacobson, 2011). However, these studies only used spending or revenue as an index of service level and did not directly examine the impact on the service population. In addition, many of these studies did not evaluate whether nonprofits shift costs by increasing service charges. The puzzle remains on the potential responses of nonprofits to taxation.

3.2.2 Colleges' Responses to Financial Shock

To unravel the potential responses of nonprofit colleges to the NIIT, this section delves into the literature exploring how colleges navigate financial shocks. Insights are derived from two distinct strands of research—first, understanding how colleges react to endowment shocks from the investment market, and second, examining responses of public colleges to reductions in government funding.

Numerous studies shed light on the impact of endowment shocks driven by the investment market on colleges' financial dynamics (Brown et al., 2014; Rosen & Sappington, 2019; Bulman, 2022). For instance, Brown et al. (2014) suggest that colleges reduce their endowment payout rate and trim tenured faculty positions in response to negative investment shocks. Similarly, Rosen & Sappington (2019) discover a symmetric effect on colleges' endowment payout rate, indicating a 13 to 14% increase (decrease) in payout following a 10% positive (negative) investment return shock. Adding to this perspective, Bulman (2022) evaluates the impact of cumulative endowment returns and finds that a positive return leads to an increase in colleges' actual spending level. His findings show that a 10% increase in endowment values driven by cumulative returns increases core spending by 2.5%. They also find a symmetry effect when restricting the analysis to a post-recession sample (which is more likely to be a negative shock).[8] Beyond estimating the impact of endowment values on spending, Bulman (2022) also scrutinizes the effects on colleges' tuition and financial aid support. Contrary to the expectation, they find no evidence that colleges would raise tuition or cut institutional financial aid in response to negative investment returns.

A parallel strand of research delves into the response of public colleges to cuts in government funding. While the nature of funding cuts differs superficially from taxation, the analogy lies in that tax exemption could be viewed as a form of indirect government support. Previous studies establish a connection between reductions in government funding for higher education and the subsequent rise in tuition at public colleges (Kane & Orszag, 2003; Mumper & Freeman, 2005; Mitchell et al., 2019; Civera et al., 2021). This body of literature indicates that, in response to funding cuts, public colleges may resort to increasing tuition or introducing new charges on students (Kane & Orszag, 2003; Mumper & Freeman, 2005; Filippakou et al., 2019; Civera et al., 2021). Additionally, due

[8] These studies have various sample construction and period focus. Brown et al. (2014) focuses on only 200 selective doctoral universities, Bulman (2022) looks at the 200 wealthiest nonprofit colleges, while Rosen & Sappington (2019) includes a broader sample of nearly 800 institutions. Additionally, while Brown et al. (2014) and Bulman (2022) focus on the 1980s/1990s to 2009, Rosen & Sappington (2019) examines the sample period of 2003 to 2018.

to restrictions on tuition levels of public colleges, they might further reduce spending to address revenue declines (Kane & Orszag, 2003; Mumper & Freeman, 2005; Altundemir, 2012).

In summary, previous research indicates that colleges adjust to changes in endowment returns and government funding. Literature came to an agreement that colleges cut spending when faced with decreased investment income or government funds. Although evidence doesn't strongly support tuition increases following endowment shocks, colleges may consider this option during government funding cuts. This absence of response to endowment shocks could be due to their short-term nature, making tuition adjustments less feasible. On the other hand, public colleges' responses to funding cuts imply that private nonprofit colleges might also respond similarly when the government withdraws the indirect support of tax exemption.

Overall, while the nonprofit literature suggests that nonprofits tend not to cut service levels when facing tax burden, those studies do not comprehensively examine the full picture of potential responses. On the other hand, the higher education literature suggests that colleges would respond to fiscal shock with spending cuts or tuition hikes. Both nonprofit and college finance literature might generate insights into the case of non-profit colleges facing NIIT. Hence, this study anticipates that colleges subjected to the tax might try to avoid cutting their service level in a significant way that might harm their mission but would still need to make some corresponding adjustments in either spending or tuition to offset the tax payment.

4 Data and Sample

4.1 Data

This paper incorporates data from the IPEDS and Form 990. The data period included in the analyses is from 2010 to 2021 for finance variables and expanded to 2022 for other variables.[9]

[9]Throughout the paper, the year notation denotes the beginning of the fiscal year (for finance variables) or academic year (for other variables). For most colleges, the fiscal year begins in July and ends in June of the following year. For example, 2017 denotes the fiscal year from July 2017 to June 2018 and the academic year from Fall 2017 to Summer 2018.

The IPEDS is an annual survey conducted by the U.S. Department of Education's (ED) National Center for Education Statistics (NCES).[10] All higher education institutions participating in federal student aid programs are required to respond to the survey. The data provides information on colleges' characteristics, student enrollment (breakdown by enrollment status, level of study, and race/ethnicity), and finance information (including subcategories of revenue, expenditure, scholarship, and tuition).

Form 990 is the tax return filed by tax-exempt organizations.[11] nonprofit colleges with gross receipts greater than $200,000 or total assets greater than $500,000 are required to file Form 990 to maintain their tax-exempt status. Specifically, within about 2,000 nonprofit colleges reported in the IPEDS survey, over 1,500 (72%) have filed Form 990. Also, given the asset cutoff of the Form 990 requirement, all institutions potentially subject to the NIIT would be required to file Form 990. The Form 990 data includes information on organizations' finance information and taxation status.

4.2 Variables

The primary variables determining the taxation statuses are student enrollment and total assets. I define full-time equivalent (FTE) students as the sum of full-time students and a one-third ratio of part-time students.[12] For the asset value, I use the "value of endowment assets at the end of the fiscal year" as reported in the IPEDS data. This paper uses the value reported in the IPEDS instead of in Form 990 because the former includes the assets of the college itself and its affiliated organizations, while the latter only contains the assets of the institution itself. As defined by the IRS, the asset cutoff of the NIIT should consider the assets from related organizations. Furthermore, this paper finds that the variables constructed by IPEDS are better aligned with the real tax status.[13]

When defining the tax and treatment status, this paper uses the nominal values to measure the

[10] The data is available at https://nces.ed.gov/ipeds/

[11] The data is available at https://www.irs.gov/charities-nonprofits/form-990-series-downloads

[12] This approach is the same as how the IPEDS defines FTE for calculating the student-faculty ratio.

[13] While it would be better to use whatever the variables the IRS is based on, the IRS allows colleges to calculate these variables and determine the taxation status on their own. In addition, the IRS does not require colleges to report student enrollment but only asks them to indicate whether they are subjected to the tax on Form 990.

financial resources. However, in order to make the estimation of the change in spending or assets comparable over time, the paper adjusts the monetary variables with the Consumer Price Index (CPI). The annual CPI used for adjustment was calculated based on the monthly CPI according to the specific start and end month of the fiscal year of each institution.[14] The values are then denoted as real dollars for July 2010 to June 2011 (the sample start period for most of the colleges in the sample). The result remains robust without this adjustment.

4.3 Sample

The samples included in this study are nonprofit colleges that participated in the IPEDS survey from 2010 to 2022 and e-filed Form 990 every year from 2010 to 2021.[15] Some colleges report to the survey but miss some questions. Following Fernandez et al. (2023), this paper imputes the missing value by using the data of the same institution in the surrounding years. This paper further excludes colleges that have experienced merging with other colleges,[16] substantial expansion or closure on a branch,[17] or engages in remote education for more than 50% of students.[18] The adjustment of this sample selection is because these colleges would experience a huge fluctuation in their student population or finance variables and would introduce unnecessary noise to the analysis.

I categorize colleges into different groups based on whether they meet the student and assets thresholds. Figure 1 plots the distribution of colleges by student population (horizontal axis) and endowment assets per student (vertical axis). The upper-right corner denotes the area where colleges meet both thresholds and, therefore, are subject to the tax (see Figure 1a). Colleges around the boundary would be the ones with the motivation to engage in tax avoidance (see Figure 1b).

[14] For example, for an institution that begins its fiscal year in July and ends next June, the CPI for the 2015–16 fiscal year is computed by the average monthly CPI from July 2015 to June 2016.

[15] I do not require all colleges to have already filed their Form 990 return in the latter years as the timing of organizations doing so might vary. This paper further complements the dataset by manually collecting data from paper Form 990 (in scanned PDF format) data for colleges that reported per student assets above $500,000 in IPEDS data.

[16] I exclude Thomas Jefferson University and Philadelphia University, which combined in 2017.

[17] I exclude the following: (1) Mayo Clinic Alix School of Medicine, which expanded its four-year medical school to the Mayo Clinic Arizona campus in 2017. (2) Rensselaer at Hartford, which closed its distance learning center in Groton in 2018. (3) Vanderbilt University, which opened a new innovation center—the Wond'ry—in 2015.

[18] 37 colleges were excluded for this criterion.

There are only two colleges above the assets cutoff (with more than $500,000 assets per student) but just around the student cutoff (with a student population within 400 to 600). Due to the small sample size, this paper opts not to focus on this group.[19] Conversely, 17 colleges are above the student cutoff (with a student population of more than 500) but around the assets cutoff (with assets per student between $400,000 and $600,000). Specifically, nine of them are just above the assets cutoff (with assets per student within $500,000 and $600,000), and another eight are just below the assets cutoff (with assets per student within $400,000 and $500,000). Table 1 displays the list of colleges close to or over the threshold. Table 2 summarizes the sample size by student population and assets per student in 2016 (i.e., one year before the policy's effectiveness).

5 Empirical Strategy

The primary empirical strategy in this paper involves employing a difference-in-differences (DID) framework.[20] To complement the results, I also utilize a triple-difference (DDD) design (provided in the Appendix B) and Synthetic Control Method (SCM). The empirical strategy and settings for each approach are discussed in subsequent sections.

5.1 Difference-in-Differences

This paper investigates both tax avoidance and shifting behaviors of colleges. The DID framework is applied to both estimations but with varying sample settings and treatment definitions.

5.1.1 Tax Avoidance

In analyzing tax avoidance, the samples are restricted to colleges that meet the tax threshold on student enrollment. Then, I compare those *around* and *far away* from the assets per student

[19] A Synthetic Control Method (SCM) has been applied to these two institutions and found no abnormal change in their enrollment.

[20] As the sample size just around the cutoff is very small, it is not suitable to apply a bunching analysis to explore manipulation behavior. Figure A1 in Appendix A shows the distribution of endowment assets per student. There is no clear bunching pattern, possibly due to the small sample size.

threshold. The status of distance from the cutoff is defined using pre-policy values (in 2016).

The design is based on the assumption that only colleges around the tax threshold have the motivation to manipulate their student size and asset values to be exempted from taxation. In contrast, colleges far away from the cutoff would either be safe (far below the threshold) or destined to be subjected to taxation (far above the threshold). Therefore, the analysis compares the change in outcomes across time between colleges with and without motivation for tax avoidance. The estimation equation is as follows:

$$Y_{it} = \alpha_0 + \beta_1 Cutoff_i \times Post_t + \theta_i + Above_i \times \delta_t + X_i \times \delta_t + \varepsilon_{it} \tag{1}$$

Where Y_{it} is the outcome of interest for college i in year t. $Cutoff_i$ is a dummy variable indicating whether the colleges are around the cutoff (i.e., had endowment assets per student in 2016 between \$400,000 to \$600,000).[21] $Post_t$ is a dummy variable indicating whether the policy is effective. The policy became effective on January 1st, 2018. However, since the 2017 fiscal year usually includes the second half of 2017 and the first half of 2018, the policy would be partially effective for the 2017–18 fiscal year. I assign the value to be 0.5 in 2017 and 1 after 2018.[22] θ_i is the college fixed effect. δ_t is the year fixed effect. $Above_i$ is a dummy variable indicating that the colleges were above the cutoff (i.e., had endowment assets per student in 2016 above \$500,000). The specification includes the above-cutoff-status-by-year fixed effects ($Above_i \times \delta_t$) to account for potential differences in trends between those subjected and those not subjected to the tax. The equation further includes the time-invariant college characteristics-by-year fixed effect ($X_i \times \delta_t$). Specifically, this paper includes the Carnegie categorization interacting with the time variable to establish comparisons within institutions of the same type. The results without including these interaction terms are robust. ε_{it} is the error term. The key parameter of interest is β_1, indicating the responses of colleges around the cutoff after the policy becomes effective.

The identification assumption in this setting is that the colleges around the cutoff should have

[21] Asset is measured as the end-of-year balance of the fiscal year, typically referring to June 2017 for most colleges.

[22] 80% of treated colleges have fiscal cycles started in July (exactly in the middle of the year). The results remain robust when redefining the $Post$ variable according to the fiscal cycle of each college.

followed the same trend in outcomes as those far away from the cutoff in the absence of the policy. This paper evaluates the assumption by examining the pre-policy parallel trend using an event-study design. As demonstrated in Figure 2, the samples close to and far from the cutoff follow a parallel trend prior to the policy implementation in both student enrollment and endowment assets.

5.1.2 Tax Shifting

In the analysis of tax shifting, attention is directed towards colleges meeting the tax threshold on student enrollment, comparing those *meeting* and *not meeting* the assets per-student threshold. Those meeting the threshold would be subjected to the NIIT, while those not meeting would be exempted. The treatment status is defined using pre-policy values (in 2016). Additionally, colleges around the cutoff (i.e., with endowment assets per student in 2016 between \$400,000 to \$600,000) are excluded, as their response might be confounded by tax avoidance behavior. Therefore, the analysis compares the change in outcomes over time between colleges subjected to and not subjected to taxation. Specifically, the following equation is estimated:

$$Y_{it} = \alpha_0 + \beta_1 Treat_i \times Post_t + \theta_i + X_i \times \delta_t + \varepsilon_{it} \tag{2}$$

Where Y_{it} represents the outcomes of interest for colleges i in year t. $Treat_i$ is a dummy variable indicating that the colleges met the tax threshold (i.e., had endowment assets per student above \$500,000) in 2016. The definitions of $Post_t$, θ_i, δ_t, and ε_{it} are the same as in equation (1). The specification also includes a time-invariant college characteristics-by-year fixed effect ($X_i \times \delta_t$) to ensure the comparison is based on colleges with similiar characteristics.[23]

The identification assumption in this setting is that the colleges subject to the tax should have followed the same trend in outcomes as those exempt from the tax in the absence of the policy, at least conditional on the fixed effect included in the equation. The event study version of equation (2)

[23] In all analysis, I include Carnegie categorization-by-year fixed effect. The analysis of expenditure further includes interaction terms with state-fixed effects and continuous measurements of student population and assets in the baseline period. It is worth noting that in some cases, a college in the control group might fail to find a match for the college in the treatment group. For example, there are no associated colleges in the treatment group, and there are no treated colleges in Florida and many other states. Under this setting, if a college is of a category without any treated college AND in a state without any treated college, it would not contribute to the estimation of β_1.

ensures that the treatment and control groups follow a similar trend prior to the policy intervention (see Figure 4).

The key parameter in equation (2) is β_1, indicating the change in the outcome variable of colleges subjected to tax after the policy effective compared to the change in the control group during the same period. This paper defines the treatment status using pre-policy variables, which might experience a change after policy implementation. The estimated β_1 would typically represent the intent to treat (ITT). In the main analysis, colleges around the cutoff are excluded, and these samples are less likely to experience a change in treatment status. Therefore, the estimate could be viewed as the average treatment effect on the treated (ATT). In the robustness check, the whole sample is used, and the results remain robust.

5.2 Synthetic Control Method

The DD models are helpful in constructing the average treatment effect but would be limited in understanding the heterogeneous response. However, since each college is distinct in terms of its proximity to the threshold and the size of the expected tax payment (see Table A1 and A2 in Appendix A), understanding the treatment effect on individual colleges is crucial.

To gain a better understanding of the effect on individual colleges, this paper adopts the Synthetic Control Method (SCM) to examine the treatment effect on each individual college. SCM constructs the counterfactual of a single observation by using a weighted combination of non-treated observations (the donor pool). The weights are determined by minimizing the difference in pre-intervention observed characteristics (Abadie et al., 2010).

This paper utilizes the demeaning pre-treatment outcome variables to compute the SCM weights. Specifically, each pre-treatment outcome variable subtracts the mean of the institution in the pre-intervention period. This practice, similar to the inclusion of the institution fixed effect in the DD model, has the benefit of improving the pre-treatment fit (Doudchenko & Imbens, 2016). Figure A2 in Appendix A demonstrates the top 20 institutions that receive the highest weights. The highest weight was around 0.035.

In the tax avoidance analysis, the treatment group comprises colleges around the asset cutoffs, while the donor pool consists of those far from the assets cutoff. Only colleges that meet the student threshold are included in the analysis. In the tax shifting analysis, the treatment group comprises colleges subjected to the tax (meet both student and asset thresholds), while the donor pool includes colleges that meet the student threshold but do not meet the asset threshold. Colleges around the cutoff are excluded from the analysis.

The estimation is performed separately for each college in the treatment group. Specifically, the treatment effect of a given college i in year t is estimated as follows:

$$\widehat{\beta_{it}} = (Y_{it} - \overline{Y_i}) - \sum_{j=1}^{M} w_j^*(Y_{jt} - \overline{Y_j}) \tag{3}$$

Where the estimated treatment effect ($\widehat{\beta_{it}}$) is defined as the difference between the observed de-meaning outcome of the treated college ($Y_{it} - \overline{Y_i}$) and the synthetic control ($\sum_{j=1}^{M} w_j^*(Y_{jt} - \overline{Y_j}$). The synthetic control is constructed as a weighted average of the colleges in the donor pool. w_j^* is a vector of weights that minimizes the difference in the pre-treatment outcomes. j is each of the control units in the donor pool, and M is the total number of units in the donor pool.

Equation (3) provides the estimated treatment effect of a single unit i in a given period t. To further compare the estimates with the DD results, I calculate the average treatment effect using the following equations:

$$\overline{\beta_t} = \frac{1}{N}\sum_{i=1}^{N} \beta_{it} \tag{4}$$

Where $\overline{\beta_t}$ is the average treatment effect in period t. N is the total number of treated units. The average treatment effect is computed as the simple average of all treated units. Then, the average treatment effect in the full post-treatment period is calculated as:

$$ATT = \frac{1}{T - T_0 + 0.5}\left(0.5 \times \overline{\beta_{t=T_0}} + \sum_{t>T_0}^{T} \overline{\beta_t}\right) \tag{5}$$

The term T represents the maximum time period in the sample. T_0 denotes the years of policy implementation (in this case, 2017). The expression $T - T_0 + 0.5$ accounts for the fact that the year 2017 is only half-treated. $\overline{\beta_{t=T_0}}$ is the average treatment effect in the first year of policy implementation (2017). This is multiplied by 0.5 to give it the appropriate weight, considering the partial treatment in that year. The second part of the equation involves the summation $\sum_{t>T_0}^{T} \overline{\beta_t}$, which adds up the average treatment effects for the remaining post-treatment periods (when $t > T_0$). The overall calculation is then divided by $T-T_0+0.5$ to obtain the average over the entire post-treatment period. In simpler terms, the Average Treatment Effect (ATT) is computed by combining the partially treated year (2017) with the average treatment effects for all subsequent years, adjusting for the duration of the post-treatment period. This provides a comprehensive measure of the treatment effect over time.

To provide inference statistics, this paper employs a permutation test. Specifically, I first estimate equation (3) for each control unit in the donor pool, obtaining nearly a thousand placebo estimates. In each permutation test, a corresponding set of placebo estimates is randomly selected, matching the actual number of treated units in the study. For each selected set of units in a permutation, equations (4) and (5) are then applied to calculate the ATT. This process is repeated for 1,000 permutations to generate a distribution of placebo ATT for comparison with the actual results. The permutation p-value is computed by comparing the actual estimates with the distribution of the placebo estimates. The details of the permutation method are discussed in Appendix C.

6 Empirical Results

6.1 Tax Avoidance

6.1.1 Distances to Tax Threshold

This section reviews the statistics of nonprofit colleges potentially subjected to the NIIT and assesses their motivation and ability to manipulate values for tax exemption. Table A1 in Appendix

A provides statistics estimates of how close these colleges are to the thresholds on assets per student, considering both the numerator (asset values) and denominator (student population). The distance to the threshold denotes the difficulties and motivation for colleges to avoid the tax. If colleges only need to make minor adjustments to be exempted from the tax, they might have a strong motivation to do so.

The evaluation suggests that colleges just above the cutoff only need to make a small adjustment, such as decreasing their asset values by 0.05% to 15% or increasing their student population by 0.05% to 17%, to qualify for tax exemptions. Some colleges that are very close to the cutoff only need to increase their student enrollment by less than 50 counts. This group is motivated to respond promptly to the policy, as a minor change can lead to tax exemption.

On the other hand, colleges just below the cutoff also have the motivation to respond. The taxation threshold of the NIIT will not adjust with inflation or endowment growth. Therefore, more colleges will be subject to the tax over time. As shown in Table A1, colleges just below the cutoff are expected to meet the tax threshold if their endowment values grow by 7% to 24%. However, many have an average endowment growth rate of 3% to 6%. In other words, if they do not respond, they are expected to be subject to the tax within 3 or 4 years. Consequently, this group is motivated to adjust their student population or asset values promptly after the policy becomes effective.

6.1.2 Average Response

The results find that colleges around the assets per student threshold tend to manipulate their student population rather than asset size. Specifically, colleges around the cutoff increase their FTE enrollment by 6% ($p < 0.01$, see Table 3, Panel A, Column (1)) after the policy is effective. Given the average baseline enrollment of 7 thousand, the effect is roughly equivalent to 500 students per institution. The change in enrollment is largely driven by increases in full-time students (up by 6.7%) and undergraduate students (up by 8%). Panel B and C further separate colleges by whether they are above or below the assets threshold. Colleges below the tax threshold demonstrate larger responses to enrollment expansion than those above the threshold. The pattern implies that colleges manipulate student enrollment to avoid future tax treatment.

On the other hand, the estimation reveals that colleges around the tax threshold insignificantly reduce their total endowment assets by 0.6% ($p > 0.1$; see Table 4, Panel A, Column (1)), which is essentially null. Exploration of the change of various types of assets also finds no significant changes (see Columns (3) to (8)). Due to the increase in student population and unchanged total endowment, these colleges experience an insignificant 5% drop in their endowment assets per student (see Table 4 Panel A, Column (2)). Colleges below the tax threshold experience a significant 8% drop in their endowment assets per student, primarily driven by their increase in student population (see Panel B, Column (2)). Given the statistics in Table A1, this 8% drop in assets per-student is large enough to offset their average growth rate in assets value and can help them to maintain tax exemption status.

The event study estimation in Figure 2 reassures the above findings and the DD assumption. Colleges close to and far from the tax threshold yield a common trend prior to the policy on enrollment, endowment assets, and assets per student prior to the policy. Furthermore, the dynamic treatment effect estimation shows an increase in student enrollment starting in 2018, which then became more prominent during the pandemic period (See Figure 2a). The endowment assets per student also started to drop in 2018, with the magnitude expanding over time (See Figure 2c).

6.1.3 Individual Institution Response

Figure 3 turns to the evaluation of effects on individual institutions with the SCM approach. All colleges around the cutoff show an increase in enrollment after the policy's implementation (see Figure 3e). Particularly, the University of Chicago was the one with the largest response, with an increase in student enrollment by 18%,[24] followed by Colby College (13% increase),[25] Washington

[24] Public records suggest that the increase in enrollment at UChicago is due to an intended new strategy adopted (IVY COACH, 2018). In November 2018, the Dean of College at UChicago announced that the university is planning to expand its undergraduate student body to around 7,000 citepyee2018boyer. The undergraduate student body at UChicago had increased from 6,300 in 2017 to 7,000 in 2020.

[25] The increase in student enrollment at Colby College has also been shown to be driven by the change in their strategic plan. Colby College has set up a long-run strategic plan every five years. Their 2017–2022 strategic

University in St Louis (11%),[26] and Duke University (11%).[27] The range of the effects is between 3% to 18%. The pooled estimate of average effect among all colleges is 0.085 ($p = 0.008$), align the DD model result.

Regarding the response on assets per student, half (9 out of 17) of colleges show a negative change in this variable, ranging from –14% to +16% (see Figure 3f). The colleges with the most substantial negative responses are Wabash College (–13%), University of Chicago (–12%), and Northwestern University (–9%). The pooled estimate of average effect among all colleges is 0.004 ($p = 0.647$); however, when only consider colleges below the cutoff, the pooled average estimate is –0.04, echoing the finding from the DD model that the results is driven by college below the tax threshold.

Using the counterfactual obtained from the SCM for individual colleges, I identified colleges that could have been subjected to the tax if they had not manipulated their student population and asset levels but "successfully avoided the tax" based on the actual observed values. Specifically, the manipulation behavior allows two colleges that could have been taxed in the first year of the policy to be successfully exempt from it. The two colleges were the University of Chicago and Berry College, the ones most close to the tax threshold prior to the policy (see Table A1). In the second and third years, Trinity University (which was taxed in the first year) and Northwestern University joined the group that "successfully avoided the tax." In 2021, Wabash College joined the group of

plan had a specific goal to "employ strategies to expand revenue through increased enrollment." (See `https://www.colbycc.edu/Assets/Documents/About/strategic-plan/operational-report-2017-18.pdf`.) On the other hand, such goals were absent in their 2012–2017 strategic plan. Instead, at that time, they had an enrollment management plan designed to manage their enrollment based on their "current capacity." (See `https://www.colbycc.edu/Assets/Documents/Faculty/HLC/assurance-filing16.pdf`.) The student body of Colby College has increased from 1,800 in 2017 to 2,200 in 2022.

[26] The investigation of enrollment patterns at WashU also suggests that their increase in enrollment is a result of the institution's concerted efforts. WashU established a new office, the Academy for Diversity, Equity, and Inclusion (which has since been renamed the Office of Institutional Equity), in 2018. While the primary goal of the office is equity, the university has proposed a series of strategies such as forging partnerships with community-based organizations to enhance college access for disadvantaged students, launching recruitment programs in rural areas to reach high school graduates (Riley, 2019; Keaggy, 2022; Blake, 2024).

[27] The increase in Duke's student enrollment was more driven by graduate students instead of undergraduate students. In late 2017 to early 2018, Duke established a new center—The University Center of Exemplary Mentoring (UCEM)—and initiated a series of programs aiming to "expand Duke's capacity to attract, retain, and graduate STEM doctoral students from all backgrounds " (Saff, 2018; Vashisth, 2018). The program has led to a surge in graduate student enrollment. The total FTE graduate students at Duke has increased from 9 thousand in 2017 to 11 thousand in 2022.

successful avoidance. The college was about 100 thousand away from the tax threshold of assets per student prior to the policy, and given its counterfactual, it could have met the tax threshold in 2021. However, it has been exempted from the tax and continued the exemption status by the most recent record. Vassar College and Colby College were subjected to tax in 2021 and should have continued to be in 2022, but due to the increase in their enrollment, they were successfully exempted from the tax in the most recent record. Overall, the tax avoidance behavior has allowed 7 colleges (or specifically, 12 institution-years in a 5-year time frame) to be (temporarily) exempted from the tax or delay the timing they are subjected to taxation. The estimated tax loss due to tax avoidance is 31 million (in 2010 real dollars) in the five-year time span.[28]

6.2 Tax Shifting

6.2.1 Average Response

Contrary to claims by colleges and theoretical expectations, this paper finds no evidence that colleges subjected to the tax would cut their spending. Specifically, Table 5 suggests that taxation leads to an insignificant 2% increase in total spending (see Panel A, Column (1)).[29] The event study evidence presented in Figure 4a shows good common trends prior to the policy and no substantial change after the policy implementation. The evidence from the DDD setting provides similar results (see Table B1 and Figure B2 in Appendix B).

Table 5 Panel B and C further separate samples into research universities and non-research universities (as defined by Carnegie categorization). Both groups of colleges show no significant changes in expenditure. Some suggestive evidence implies that research universities are even less likely to cut their research spending, but the estimations are non-significant across groups.

On the other hand, colleges respond to taxation by shifting costs to students. Table 6 finds that

[28] This amount is calculated by applying the 1.4% tax rate to the net investment income of those colleges that should have been subjected to the tax based on the counterfactual but were eventually exempted from it.

[29] The results presented here are based on the donut sample, i.e., excluding those colleges around the tax threshold. Table A3 in Appendix A reports the estimation based on the full sample and also finds no significant drop in spending. Some expenditure categories show an increase in spending, possibly driven by colleges around the cutoff increasing enrollment for tax avoidance.

colleges subjected to the tax raised their listed tuition and charges for room and board after the policy became effective. Substantial heterogeneous responses exist across institution types. Specifically, while non-research universities raise their undergraduate tuition by 3.3% ($p < 0.05$, see Panel C, Column (2)), research universities opt to increase the graduate tuition by 6.7% ($p < 0.01$, see Panel B, Column (3)). Both types of universities also significantly raise the charge for room and board by 3 to 5% (see Column (4)). In terms of dynamic effect, the event study results in Figure 5 demonstrate a gradual increase in tuition. Research universities increased graduate tuition by 4% in 2019 and boosted to around 7% in 2022 (see Figure 5e). Besides, non-research universities raised undergraduate tuition by 2% in 2018 and hiked to 6% in 2022 (see Figure 5d). The evidence from the DDD also finds significant increases in tuition and charges but with larger point estimates (see Table B2 and Figure B3 in Appendix B).

The result also shows an increase in total enrollment, but only for non-research colleges. Specifically, non-research colleges experience a significant 6% increase in FTE student enrollment ($p < 0.01$, see Table 6 Panel C, Column (1)), while research universities show a null change (see Table 6 Panel B, Column (1)). The increase in student enrollment might be a strategy that colleges adopted to boost revenue, as evidenced by a 20% significant increase in total tuition revenue for non-research colleges (see Table 6 Panel C, Column (5)) despite tuition only increased by 3%.

6.2.2 Individual Institution Response

Figure 6 examines the individual institution response using the SCM approach. The estimated responses of impact on total expenditure range from a decrease of 16% to an increase of 12% (see Figure 6e). However, most estimates are not significant. There is also no clear pattern that colleges with higher tax bills tend to respond more pronounced. The average treatment effect retrieved from pooled SCM is 0.00004 ($p = 0.135$), which is essentially null, aligning with the DD estimate.

In terms of tuition revenue, 20 out of 24 colleges see an increase in total tuition revenue after the policy implementation.[30] The magnitudes range from a rise of 27% to a drop of 4% (see Figure

[30] The analysis here takes total tuition revenue as a summarized index of change in the listed tuition price and total enrollment. When separately examining change in tuition, 22 colleges increased their undergraduate tuition, and 21

6f). The dynamic effects reported in Figure 6d demonstrate that most of these colleges show a pattern of gradually increasing their tuition revenue but a temporary drop in 2020, potentially due to COVID. The average treatment effect retrieved from pooled SCM is 0.07 ($p = 0.01$), close to the estimate obtained from the DD model. However, there is no pattern showing that colleges with higher tax bills tend to respond more strongly than those otherwise.

6.3 Impact on Student Composition

Section 6.1 finds colleges would increase student enrollment to qualify for tax exemption, and Section 6.2 suggests that colleges would raise tuition to shift the tax burden to students. The induced question is how these changes affect education opportunities. Table 7 explores this question by examining the impact on students' racial/ethnic composition.

The boost in enrollment triggered by tax avoidance seems to benefit all groups of students, though the distribution is not equal. Table 7 Panel A reveals that tax avoidance leads to an increase in student enrollment in all racial categories. Specifically, Whites experience a significant increase of 8.5% ($p < 0.01$; see Panel A, Column (1)). Black, Hispanic, and Asian also show an increase, but the estimates are non-significant. Other minorities demonstrate a significant 23% increase ($p < 0.01$; see Panel A, Column (5)), mostly driven by change in students who identified as two or more races/ethnicities.

On the other hand, the increase in education costs driven by tax shifting seems to harm students from historically underrepresented groups. Colleges subjected to tax underwent a significant drop in Hispanic enrollment by 13% ($p < 0.01$; see Panel B, Column (3)). In contrast, the nonresident alien (NRA; i.e., international students) increased by 10% ($p < 0.1$; see Panel B, Column (6)), which implies that colleges might try to recruit students who are going to pay a higher tuition rate.

Section 6.2 has found that non-research universities paying tax also increase their enrollment. However, Table 7 Panel D reveals that the increase in enrollment is more driven by international students (increased by 16%, $p < 0.05$, see Column (6)). Whites and Asians also show insignificant

colleges increased their graduate tuition.

increases (5% and 6%, separately). However, Hispanic students show a significant 13% decrease in enrollment ($p < 0.05$, see Column (3)). In other words, the increase in enrollment driven by tax-shifting behaviors does not seem to benefit domestic students, at least not the disadvantaged groups.

6.4 Compare Tax Loss/Revenue to Avoidance/Shifting Consequences

6.4.1 Compare Revenue Loss and Opportunities Generated

Although tax avoidance behavior leads to a loss in revenue, it prompts colleges to increase enrollment, which can be seen as a positive social benefit. The colleges affected by taxation tend to be selective colleges. Hence, the enrollment expansion at these colleges could result in additional individual or societal returns. Previous studies have found a positive effect of attending selective colleges on academic and labor market outcomes compared to less selective ones—even when accounting for pre-enrollment characteristics (Melguizo, 2008; Kapur et al., 2016; Witteveen & Attewell, 2017; Zimmerman, 2019; Ge et al., 2022), implying that students could be better off if access to these colleges is expanded.

To evaluate the benefits of enrollment expansion due to tax avoidance, I calculate the additional return of college degrees from these colleges compared to degrees from colleges that are one level lower in selectivity. The detailed methodology is described in Appendix D. Using different assumptions, the estimated total net benefit (including individual and societal benefits) ranges from $350 million to $1,300 million.

Taking the lower bound of these estimates, the benefit generated from enrollment ($350 million) is over 10 times the revenue loss ($31 million throughout the five-year time span) due to tax avoidance. This underscores the potential social value created through colleges' efforts to boost enrollment in response to tax incentives, emphasizing the broader positive outcomes beyond mere fiscal considerations.

However, the interpretation of this estimate is subject to some limitations. First, the estimated benefit is calculated from all colleges (17 colleges) engaged in tax avoidance (regardless of whether the effort is successful), but the tax loss only considers those that should have been taxed but successfully avoided it (5 colleges). Therefore, the comparison refers to an overall policy impact and does not imply that granting a $1 tax exemption would lead to a $10 social benefit.

Secondly, the estimate is only short-term, as colleges are not likely to increase their enrollment indefinitely in the long run, but their endowments might continue to grow (at least with inflation). Hence, these colleges might lose motivation for manipulation in the long run (though new colleges might fall just around the cutoff).

6.4.2 Compare Revenue Earned and Amount Shifted to Students

Previous sections suggest that colleges increase their tuition and charge on students in response to the tax burden. Using evidence of single institution response estimated from SCM, the total cost shifted to students throughout the 5-year span are $1,186 million for tuition revenue and $249 million for auxiliary facilities charges (such as room and board) (in 2010 real dollars).[31] On the other hand, the estimated tax revenue from NIIT for the same analysis sample is around $1,621 million (in 2010 real dollars) throughout the 5-year sample period.

Combining the above calculation, colleges shifted 88% of their tax burden to students. The remaining might either be absorbed by colleges' assets, the surplus in revenue, or insignificant adjustments in other spending categories. Overall, the results suggest that tax shifting via price hikes is the major approach for nonprofit colleges to manage their tax burden.

7 Discussion and Conclusion

Nonprofits have long benefited from generous tax exemptions, representing a form of invisible government support through tax spending. However, scholars have raised concerns about the justification of this tax exemption, questioning whether nonprofits always utilize the tax benefits

[31] This estimate is only based on the treatment group in the analysis sample, which consists of colleges with more than 500 students and more than $600 thousand in assets per student prior to the policy. This sample excludes colleges around the tax threshold, and those that initially were not by might later be subjected to the tax.

to enhance their services (Desai et al., 1998; Frey, 2002; Cowan, 2007; Nichols & Santos, 2016; Herring et al., 2018; Propheter, 2019). The consideration of whether the government should tax nonprofits hinges on how nonprofits would respond to taxation. Nonprofits might engage in tax avoidance behavior by manipulating their finances or services to avoid taxes or shift the tax burden onto the service population or the public. Previous studies on for-profit organizations have shown that tax avoidance and shifting behaviors can result in inefficiency or inequity (Weisbach, 2002; Nerudová & Dobranschi, 2016; Farrell, 2017; Felix, 2007; Bird & Davis-Nozemack, 2018; G. Taylor et al., 2019). However, few studies have explored how nonprofits' responses to taxation translate into societal benefits or utility loss, and whether the consequences outweigh the potential revenue generated from government taxation.

This paper aims to explore how nonprofits adjust their provision of public goods in response to government taxation by examining nonprofit colleges' reactions to the NIIT introduced by the TCJA. This policy represents the government's first attempt to regulate public charities' endowments and tax their investment income. This policy provides a unique opportunity to evaluate nonprofits' responses to taxation and whether these responses might reduce public goods provision and diminish overall societal benefits.

This paper obtains three key findings. Firstly, the study reveals that nonprofit colleges engage in tax avoidance behavior but in a manner that benefits society. The NIIT targets nonprofit colleges with more than 500 students and above $500,000 endowment assets per student, allowing colleges to manipulate either their student population or endowment assets to maintain tax exemption status. The findings suggest that nonprofit colleges around the tax threshold responded to the policy by increasing student enrollment (increasing public goods provision) but not reducing endowment assets (shrinking their available resource, thereby reducing public goods provision), aligning with theoretical expectations that nonprofits tend to maximize their service output (Brooks, 2005; Chang & Jacobson, 2011). This behavioral pattern provides the government with an opportunity to design tax policies that guide nonprofits to respond in ways that benefit society.

Secondly, the paper examines tax-shifting behavior, in which organizations pass the tax burden to another party. Findings suggest that colleges subjected to the tax respond by increasing tuition and charges on-campus facilities, shifting the tax burden to their service population (i.e., students). However, colleges do not cut spending on financial aid and core education and research expenditures despite their claim in public statements and lobbying activities of doing so. This finding aligns with previous studies suggesting that taxes or tax exemptions on nonprofits might not have much impact on organizations' service levels (Grimm Jr, 1999; Fei et al., 2016; Herring et al., 2018). Colleges' choice to raise tuition instead of cutting service levels also aligns with previous studies finding that when colleges encounter financial fluctuations, they tend to choose approaches that maintain or improve their excellence (Bulman, 2022). The findings echo theoretical perspectives that nonprofits prioritize social welfare and their mission, choosing approaches that least harm their mission when facing tax burdens.

The response pattern also has implications for public goods provision. In the specific context evaluated in this paper, colleges facing tax bills choose not to shrink their service quantity (reduce student enrollment) or reduce service quality (cut spending) but instead, increase the cost for the service population to access services (raise tuition and charges). While this behavioral response does not alter the overall service level, it may change the distribution of service access. Specifically, analysis suggests that tuition hikes redistribute enrollment from historically underserved groups (particularly Hispanic students) to international students who may possess more financial resources.

Finally, a detailed analysis of costs and benefits finds that tax avoidance behaviors lead to a \$31 million loss in tax revenue over a five-year period but create an additional 9,600 enrollment opportunities, translating to over \$350 million in personal or social benefits. On the other hand, taxation earns the government \$1,621 million in revenue over the same period but also imposes higher attendance costs for students, totaling \$1,435 million (88% of the total tax payment). Overall, for this specific policy, the total benefits (sum of government revenue and the implied benefits due to enrollment expansion) may exceed the burden borne by society (the increased costs borne by students). However, despite the overall improvement in societal benefits, concerns about equity (redistribution of educational opportunity) should not be ignored. Whether the policy is overall beneficial depends on whether the government can use the generated revenue to compensate the groups harmed by the policy.

Based on the above findings, this paper offers several policy recommendations, both specifically for the NIIT on colleges and also for general nonprofit taxation. Firstly, for the NIIT on colleges, while there are some negative consequences of the policy, the worst-case scenario (cutting spending and financial aid) that colleges claimed they would do did not occur. Additionally, the benefits generated from the policy exceed the negative costs. Hence, this paper does not recommend "undoing" the policy. Moreover, returning the tax payment to colleges may not guarantee that they will use the money to improve educational equity. Particularly, Bulman (2022) finds that when colleges earn more from the endowment return, they will spend the money to be more selective instead of improving education equity. Similarly, Brown et al. (2014) find that a positive shock on endowment assets would lead colleges to accumulate their wealth instead of increasing spending. The government, however, could consider using the revenue earned to improve equity access to higher education. In addition, the government could also redesign the taxation to offer incentives for colleges to respond positively. The findings on tax avoidance behavior suggest that colleges are willing to expand enrollment to gain tax exemption status. Therefore, if the policy aims to encourage colleges to spend their endowment assets on educational purposes, the government could grant tax exemption status or tax deductions based on the proportion or amount spent from endowment assets, offering incentives for colleges to enhance their service quality and equity.

Secondly, for general nonprofit taxation policy, this paper identifies that nonprofits respond differently to taxation than for-profit organizations, allowing the government to tax nonprofits without diminishing societal benefits. Crucially, nonprofits tend to maximize their service levels and social welfare. Therefore, they will be willing to respond to taxation by providing more public goods, even if it costs them more. Most government taxation or regulatory thresholds are based on the logic that larger and more capable organizations should pay more or do more. However, this logic may not be suitable for nonprofits. If the rationale for nonprofit tax exemption is that they provide public goods, then larger and more capable nonprofits (conditional on also providing more public goods) might deserve even more generous tax benefits. The evidence in this paper also suggests that a well-designed tax structure can guide nonprofits to respond in ways that align with societal benefits. On the other hand, concerns about tax shifting do exist. Nevertheless, since nonprofits care about their mission and social welfare, they may choose approaches that harm their values the least. Therefore, taxing nonprofits does not necessarily lead to unacceptable consequences. The overall social welfare implications depend on whether the government can use the tax revenue to address potential burden transfers due to tax shifting.

Reference

Abadie, A. (2021). Using synthetic controls: Feasibility, data requirements, and methodological aspects. *Journal of Economic Literature*, *59*(2), 391–425.

Abadie, A., Diamond, A., & Hainmueller, J. (2010). Synthetic control methods for comparative case studies: Estimating the effect of california's tobacco control program. *Journal of the American Statistical Association*, *105*(490), 493–505.

ACE. (2019). Treasury Department releases endowment tax draft rules. American Council on Education. *American Council on Education*. Retrieved December, 25, 2022, from https://www.acenet.edu/News-Room/Pages/Treasury-Department-Releases-Endowment-Tax-Draft-Rules.aspx

Almunia, M., & Lopez Rodriguez, D. (2014). Heterogeneous responses to effective tax enforcement: Evidence from Spanish firms. *Banco de Espana Working Paper*, *1419*. (http://dx.doi.org/10.2139/ssrn.2471467)

Altundemir, M. E. (2012). The impact of the financial crisis on american public universities. *International Journal of Business and Social Science*, *3*(8), 190–198.

Arora, P., Rahmani, M., & Ramachandran, K. (2022). Doing less to do more? optimal service portfolio of non-profits that serve distressed individuals. *Manufacturing & Service Operations Management*, *24*(2), 883–901.

Arulampalam, W., Devereux, M. P., & Maffini, G. (2012). The direct incidence of corporate income tax on wages. *European Economic Review*, *56*(6), 1038–1054.

Austin, C. R., & Wilson, R. J. (2015). Are reputational costs a determinant of tax avoidance? In *2013 American Taxation Association Midyear Meeting: Tax avoidance in an international setting*.

Austin, C. R., & Wilson, R. J. (2017). An examination of reputational costs and tax avoidance: Evidence from firms with valuable consumer brands. *The Journal of the American Taxation Association*, *39*(1), 67–93.

Bachas, P., & Soto, M. (2021). Corporate taxation under weak enforcement. *American Economic Journal: Economic Policy*, *13*(4), 36–71.

Baum, S., & Lee, V. (2019). *The role of college and university endowments*. Urban Institute. (https://vtechworks.lib.vt.edu/bitstream/handle/10919/95075/CollegeUniversityEndowments.pdf)

Bird, R., & Davis-Nozemack, K. (2018). Tax avoidance as a sustainability problem. *Journal of Business Ethics*, *151*(4), 1009–1025.

Bird-Pollan, J. (2021). Taxing the ivory tower: Evaluating the excise tax on university endowments. *Pepp. L. Rev.*, *48*, 1055.

Blake, J. (2024). A reboot for rural recruitment. *Inside Higher Ed*. Retrieved January, 22, 2024, from https://www.insidehighered.com/news/admissions/traditional-age/2024/01/04/washington-university-ramps-outreach-rural-applicants

Brody, E., & Cordes, J. J. (2006). Tax treatment of nonprofit organizations: A two-edged sword? *Nonprofits and Government: Collaboration and Conflict*, *141*, 149–150.

Brooks, A. C. (2005). What do nonprofit organizations seek? (and why should policymakers care?). *Journal of Policy Analysis and Management*, *24*(3), 543–558.

Brown, J. R., Dimmock, S. G., Kang, J.-K., & Weisbenner, S. J. (2014). How university endowments respond to financial market shocks: Evidence and implications. *American Economic Review*, *104*(3), 931–962.

Bulman, G. (2022). The effect of college and university endowment returns on financial aid, admissions, and student composition. *National Bureau of Economic Research Working Paper*. (https://www.nber.org/papers/w30404)

Calabrese, T. D. (2011). Public mandates, market monitoring, and nonprofit financial disclosures. *Journal of Accounting and Public Policy*, *30*(1), 71–88.

Carnevale, A. P., Wenzinger, E., & Cheah, B. (2022). The most popular degree pays off: Ranking the economic value of 5,500 business programs at more than 1,700 colleges. *Georgetown University Center on Education and the Workforce*.

Carrillo, P., Pomeranz, D., & Singhal, M. (2017). Dodging the taxman: Firm misreporting and limits to tax enforcement. *American Economic Journal: Applied Economics*, *9*(2), 144–164.

Cespedes, J., Nickerson, J., & Parra, C. (2021). Strategically staying small: Regulatory avoidance and the cra. *Available at SSRN 3874987*. (http://dx.doi.org/10.2139/ssrn.3874987)

Chang, T., & Jacobson, M. (2011). What do nonprofit hospitals maximize? evidence from california's seismic retrofit mandate. *National Bureau of Economic Research Working Paper*. (https://users.nber.org/~jacobson/ChangJacobson12.5.10.pdf)

Civera, A., Cattaneo, M., Meoli, M., Paleari, S., & Seeber, M. (2021). Universities' responses to crises: The influence of competition and reputation on tuition fees. *Higher Education*, *82*, 61–84.

Cordes, J. J., Gantz, M., & Pollak, T. (2002). What is the property-tax exemption worth. In E. Brody (Ed.), *Property-tax exemption for charities: Mapping the battlefield* (pp. 81–112). Urban Institute Press Washington DC.

Cowan, M. J. (2007). Taxing and regulating college and university endowment income: The literature's perspective. *JC & UL*, *34*, 507.

De Alva, J. K., & Schneider, M. (2015). *Rich schools, poor students: tapping large university endowments to improve student outcomes*. NEXUS Research & Policy Center.

Derrig, K. (2017). Trinity endowment under aim in tax reform policy. Trinitionian. *Trinitonian*. Retrieved December, 25, 2022, from https://trinitonian.com/2017/11/29/trinity-endowment-under-aim-in-tax-reform-policy/

Desai, K. R., Young, G. J., & Lukas, C. V. (1998). Hospital conversions from for-profit to nonprofit status: The other side of the story. *Medical Care Research and Review*, *55*(3), 298–308.

Djankov, S., Ganser, T., McLiesh, C., Ramalho, R., & Shleifer, A. (2010). The effect of corporate taxes on investment and entrepreneurship. *American Economic Journal: Macroeconomics*, *2*(3), 31–64.

Doudchenko, N., & Imbens, G. W. (2016). Balancing, regression, difference-in-differences and synthetic control methods: A synthesis. *National Bureau of Economic Research Working Paper*. (https://www.nber.org/papers/w22791)

Edelson, D. (2016). How do college graduates benefit society at large. *Association of Public and Land-Grant Universities*. (https://www.aplu.org/our-work/4-policy-and-advocacy/publicuvalues/societal-benefits/)

Egger, P. H., & Wamser, G. (2015). The impact of controlled foreign company legislation on real investments abroad. a multi-dimensional regression discontinuity design. *Journal of Public Economics*, *129*, 77–91.

Farrell, N. (2017). What factors drive inequalities in carbon tax incidence? decomposing socioeconomic inequalities in carbon tax incidence in ireland. *Ecological Economics*, *142*, 31–45.

Fei, F., Hines Jr, J. R., & Horwitz, J. R. (2016). Are pilots property taxes for nonprofits? *Journal of Urban Economics*, *94*, 109–123.

Felix, R. A. (2007). Passing the burden: Corporate tax incidence in open economies. (https://www.econstor.eu/handle/10419/95465)

Fernandez, F., Hu, X., & Umbricht, M. (2023). Examining Wyoming's endowment challenge program: A synthetic control analysis. *Research in Higher Education*, *64*, 654–674.

Filippakou, O., Tapper, T., Filippakou, O., & Tapper, T. (2019). Moving from the public to the private funding of english higher education: The imposition of student tuition fees. *Creating the Future? The 1960s New English Universities*, 75–83.

Fishman, J. J. (2018). How big is too small: Should certain higher educational endowments' net investment income be subject to tax. *Cornell JL & Pub. Pol'y*, *28*, 159.

Frey, D. (2002). University endowment returns are underspent. *Challenge*, *45*(4), 109–121.

Fricke, M. (2015). The case against income tax exemption for nonprofits. *John's L. Rev*, *89*, 1129.

Fuest, C., Peichl, A., & Siegloch, S. (2018). Do higher corporate taxes reduce wages? *American Economic Review*, *108*(2), 393–418.

Gaarder, I. (2019). Incidence and distributional effects of value added taxes. *The Economic Journal*, *129*(618), 853–876.

Ge, S., Isaac, E., & Miller, A. (2022). Elite schools and opting in: Effects of college selectivity on career and family outcomes. *Journal of Labor Economics*, *40*(S1), S383–S427.

Grimm Jr, R. T. (1999). Reforming property tax exemption policy in the nonprofit sector: Commercialism, collective goods, and the donative theory. *Nonprofit Management and Leadership*, *9*(3), 241–259.

Guenther, D. A., Matsunaga, S. R., & Williams, B. M. (2017). Is tax avoidance related to firm risk? *The Accounting Review*, *92*(1), 115–136.

Hale, K. (2013). Understanding nonprofit transparency: The limits of formal regulation in the american nonprofit sector. *International Review of Public Administration*, *18*(3), 31–49.

Harris, E. E., & Neely, D. (2021). Determinants and consequences of nonprofit transparency. *Journal of Accounting, Auditing & Finance*, *36*(1), 195–220.

Hassan, M., Wedig, G. J., & Morrisey, M. A. (2000). Charity care by non-profit hospitals: the price of tax-exempt debt. *International Journal of the Economics of Business*, *7*(1), 47–62.

Herring, B., Gaskin, D., Zare, H., & Anderson, G. (2018). Comparing the value of nonprofit hospitals' tax exemption to their community benefits. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, *55*, 0046958017751970.

Hill, K., Hoffman, D., & Rex, T. R. (2005). *The value of higher education: Individual and societal benefits*. Arizona State University.

Hinrichs, P. L. (2018). College endowments. *Economic Commentary*(2018-04). doi: 10.26509/frbc-ec-201804

Hofmann, M. A. (2007). Tax-motivated expense shifting by tax-exempt associations. *Journal of the American Taxation Association*, *29*(1), 43–60.

Homonoff, T., Spreen, T. L., & Clair, T. S. (2020). Balance sheet insolvency and contribution revenue in public charities. *Journal of Public Economics*, *186*, 104177.

Hosono, K., Hotei, M., & Miyakawa, D. (2018). Tax avoidance by capital reduction: Evidence from corporate tax reform in japan. *Asian Finance Association (AsianFA) 2018 Conference*. (http://dx.doi.org/10.2139/ssrn.3105794)

Humphreys, J., & Solomon, A. (2012). *Public investment in private higher education: Estimating the value of nonprofit college and university tax exemptions*. Tellus Institute. (https://ssrn.com/abstract=2148586)

Hung, C., & Berrett, J. (2021). Service delivery under pressure: The effect of donor-imposed financial restrictions. *Public Performance & Management Review*, *44*(3), 580–601.

IVY COACH. (2018). University of chicago class size expansion (2018). *IVY COACH*. Retrieved January, 22, 2024, from https://www.ivycoach.com/the-ivy-coach-blog/college-admissions/university-of-chicago-class-size-expansion/

Kane, T. J., & Orszag, P. (2003). *Funding restrictions at public universities: Effects and policy implications*. Washington, DC: Brookings Institution.

Kapur, N., Lytkin, N., Chen, B.-C., Agarwal, D., & Perisic, I. (2016). Ranking universities based on career outcomes of graduates. In *Proceedings of the 22nd ACM SIGKDD international conference on knowledge discovery and data mining* (pp. 137–144).

Katz, S. P., Khan, U., & Schmidt, A. (2015). Tax avoidance and dupont measures of future performance. *Columbia Business School Research Paper*(15-29).

Keaggy, D. T. (2022). Washu hits major milestone: Class of 2026 is 20% pell grant-eligible, 15% first-generation. *The Source*. Retrieved January, 22, 2024, from https://source.wustl.edu/2022/08/washu-hits-major-milestone-class-of-2026-is-20-pell-grant-eligible-15-first-generation/

Keating, E. K., & Frumkin, P. (2003). Reengineering nonprofit financial accountability: Toward a more reliable foundation for regulation. *Public Administration Review*, *63*(1), 3–15.

Lee, B. B., Dobiyanski, A., & Minton, S. (2015). Theories and empirical proxies for corporate tax avoidance. *Journal of Applied Business & Economics*, *17*(3).

Marx, B. M. (2018). The cost of requiring charities to report financial information. *Munich Personal RePEc Archive*. (https://mpra.ub.uni-muenchen.de/88660/)

McClure, C. G. (2023). How costly is tax avoidance? evidence from structural estimation. *The Accounting Review*, *98*(6), 353–380.

McDonald III, B. D., & Goodman, C. B. (2021). The truth about honesty in the nonprofit sector. *Public Administration Quarterly*, *45*(2), 188–210.

Melguizo, T. (2008). Quality matters: Assessing the impact of attending more selective institutions on college completion rates of minorities. *Research in Higher Education*, *49*, 214–236.

Mitchell, M., Leachman, M., & Saenz, M. (2019). State higher education funding cuts have pushed costs to students, worsened inequality. *Center on Budget and Policy Priorities*, *24*, 9–15.

Mumper, M., & Freeman, M. L. (2005). The causes and consequences of public college tuition inflation. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (pp. 307–361). Springer.

NCCS. (2020). The nonprofit sector in brief 2019. *Urban Institute*. Retrieved October, 5, 2023, from https://web.archive.org/web/20231005033640/https://nccs.urban.org/publication/nonprofit-sector-brief-2019

Nerudová, D., & Dobranschi, M. (2016). The impact of tax burden overshifting on the pigovian taxation. *Procedia-Social and Behavioral Sciences*, *220*, 302–311.

Nichols, A. H., & Santos, J. L. (2016). A glimpse inside the coffers: Endowment spending at wealthy colleges and universities. In *Higher education policy for minorities in the United States*. The Education Trust.

Omer, T. C., & Yetman, R. J. (2007). Tax misreporting and avoidance by nonprofit organizations. *Journal of the American Taxation Association*, *29*(1), 61–86.

Politi, R. B., & Mattos, E. (2011). Ad-valorem tax incidence and after-tax price adjustments: evidence from brazilian basic basket food. *Canadian Journal of Economics/Revue canadienne d'économique*, *44*(4), 1438–1470.

Prentice, C. R., & Clerkin, R. M. (2023). The influence of nonprofit financing and operations on the acquisition of unrestricted and restricted donations. *Nonprofit Management and Leadership*, *24*(1), 211–225.

Propheter, G. (2019). Excessive revenue underforecasting: Evidence and implications from new york city's property tax. *The Palgrave Handbook of Government Budget Forecasting*, 217–240.

Quinn, M. C. (2019). Wealth accumulation at elite colleges, endowment taxation, and the unlikely story of how donald trump got one thing right. *Wake Forest L. Rev.*, *54*, 451.

Raiborn, C. A., Massoud, M. F., & Payne, D. M. (2015). Tax avoidance: The good, the bad, and the future. *Journal of Business & Management*, *21*(1).

Riley, C. (2019). Wash u in st. louis pledges low-income missouri students can attend 'free of charge'. *Spring Field News-Leader*. Retrieved January, 22, 2024, from https://www.news-leader.com/story/news/education/2019/10/03/washington-university-st-louis-pledges-free-tuition-low-income-missouri-students/3836259002/

Rosen, H. S., & Sappington, A. J. (2019). The impact of endowment shocks on payouts. *The Journal of Higher Education*, *90*(5), 690–716.

Rosenbaum, S., Kindig, D. A., Bao, J., Byrnes, M. K., & O'Laughlin, C. (2015). The value of the nonprofit hospital tax exemption was $24.6 billion in 2011. *Health Affairs*, *34*(7), 1225–1233.

Ryan, C., Marsicano, C., Bernhardt, A., & Martin, R. (2024). Gaming the endowment tax. *Florida Tax Review*, *forthcoming*.

Saff, D. (2018). Duke aims to bring minorities into stem graduate programs. *The Daily Tar Heel*. Retrieved January, 28, 2024, from https://www.dailytarheel.com/article/2018/01/duke-minority-program

Sansing, R., & Yetman, R. (2006). Governing private foundations using the tax law. *Journal of Accounting and Economics*, *41*(3), 363–384.

Schmidt, A. P. (2007). Discussion of tax misreporting and avoidance by nonprofit organizations. *Journal of the American Taxation Association*, *29*(1), 87–92.

Schwellnus, C., & Arnold, J. M. (2008). Do corporate taxes reduce productivity and investment at the firm level?: Cross-country evidence from the amadeus dataset.

Selig, K. (2020). Facing $43 million bill, university warns endowment tax will hamper financial aid. *The Stanford Daily*. Retrieved December, 25, 2022, from https://stanforddaily.com/2020/02/14/facing-43-million-bill-university-warns-endowment-tax-will-hamper-financial-aid/

Sherlock, M. F., Crandall-Hollick, M. L., Gravelle, J., & Stupak, J. M. (2018). *College and university endowments: Overview and tax policy options*. Congressional Research Service Washington, DC.

Sherlock, M. F., & Gravelle, J. G. (2009). *An overview of the nonprofit and charitable sector*. Congressional Research Service.

Simon, J., Dale, H., & Chisolm, L. (2006). The federal tax treatment of charitable organizations. *The nonprofit sector: A research handbook*, *267*, 267.

Slemrod, J., & Yitzhaki, S. (2002). Tax avoidance, evasion, and administration. In A. J. Auerbach, M. Feldstein, & M. S. Feldstein (Eds.), *Handbook of public economics* (Vol. 3, pp. 1423–1470). Elsevier.

St. Clair, T. (2016). How do nonprofits respond to regulatory thresholds: Evidence from New York's audit requirements. *Journal of Policy Analysis and Management*, *35*(4), 772–790.

Stendahl, M. (2017). MIT, Harvard say GOP's endowment tax will cost them millions. *Boston Business journal*. Retrieved December, 25, 2022, from https://www.bizjournals.com/boston/news/2017/12/21/mit-harvard-say-gops-endowment-tax-will-cost-them.html

Stevens, S. A. (2010). Tax aid and non-profit organizations. *EC Tax Review*, *19*(4).

Sullivan, R. S., & Dutkowsky, D. H. (2012). The effect of cigarette taxation on prices: an empirical analysis using local-level data. *Public Finance Review*, *40*(6), 687–711.

Surysekar, K., Turner, E. H., & Wheatley, C. M. (2015). On the association between donor-imposed financial inflexibility and future donations to charitable organizations. *Journal of Management Accounting Research*, *27*(1), 63–79.

Taylor, G., Al-Hadi, A., Richardson, G., Alfarhan, U., & Al-Yahyaee, K. (2019). Is there a relation between labor investment inefficiency and corporate tax avoidance? *Economic Modelling*, *82*, 185–201.

Taylor, P., Parker, K., Fry, R., Cohn, D., Wang, W., Velasco, G., & Dockterman, D. (2011). *Is college worth it? college presidents, public assess*. Pew Research Center.

Toepler, S. (2018). Government funding policies. In B. A. Seaman & D. R. Young (Eds.), *Handbook of research on nonprofit economics and management* (pp. 409–427). Edward Elgar Publishing.

Trostel, P. A. (2015). *It's not just the money the benefits of college education to individuals and to society*. Lumina Foundation.

Vartia, L. (2008). How do taxes affect investment and productivity?: An industry-level analysis of OECD countries.
(https://doi.org/10.1787/18151973)

Vashisth, S. (2018). New scholarship program aims to increase underrepresented minorities in graduate stem disciplines. *The Chronicle*. Retrieved January, 28, 2024, from https://www.dukechronicle.com/article/2018/01/new-scholarship-program-aims-to-increase-underrepresented-minorities-in-graduate-stem-disciplines

Weisbach, D. A. (2002). An economic analysis of anti-tax-avoidance doctrines. *American Law and Economics Review*, *4*(1), 88–115.

Willie, M. (2012). Taxing and tuition: A legislative solution to growing endowments and the rising costs of a college degree. *BYU L. Rev.*, 1665.

Witesman, E. M., & Fernandez, S. (2013). Government contracts with private organizations: Are there differences between nonprofits and for-profits? *Nonprofit and Voluntary Sector Quarterly*, *42*(4), 689–715.

Witteveen, D., & Attewell, P. (2017). The earnings payoff from attending a selective college. *Social Science Research*, *66*, 154–169.

Zare, H., Eisenberg, M. D., & Anderson, G. (2022). Comparing the value of community benefit and tax-exemption in non-profit hospitals. *Health Services Research*, *57*(2), 270–284.

Zelinsky, E. A. (2018). Section 4968 and taxing all charitable endowments: A critique and a proposal. *Va. Tax Rev*, *38*, 141.

Zimmerman, S. D. (2019). Elite colleges and upward mobility to top jobs and top incomes. *American Economic Review*, *109*(1), 1–47.

Tables

Table 1: List of Colleges Affected by the Net Investment Income Tax

	Student Enrollment		Endowment Assets		Tax Status				
	Total	FTE	Total ($ Million)	Per-student ($ Thousand)	2018	2019	2020	2021	2022
Panel A: Student above 500, and per student Asset above 600K									
Princeton University	8,181	8,082	23,353	2,890	Y	Y	Y	Y	Y
Yale University	12,458	12,383	27,217	2,198	Y	Y	Y	Y	Y
Harvard University	29,908	23,697	37,096	1,565	Y	Y	Y	Y	Y
Stanford University	17,184	16,448	24,785	1,507	Y	Y	Y	Y	Y
Middlebury Institute of International Studies at Monterey	786	717	1,074	1,497	Y	Y	Y	Y	N
Pomona College	1,563	1,558	2,165	1,389	Y	Y	Y	Y	Y
Massachusetts Institute of Technology	11,376	11,247	14,832	1,319	Y	Y	Y	Y	Y
Swarthmore College	1,543	1,542	1,956	1,268	Y	Y	Y	Y	Y
Amherst College	1,849	1,849	2,248	1,216	Y	Y	Y	Y	Y
The Juilliard School	939	872	1,046	1,200	Y	Y	Y	Y	Y
California Institute of Technology	2,240	2,239	2,641	1,179	Y	Y	Y	Y	Y
Williams College	2,150	2,127	2,383	1,121	Y	Y	Y	Y	Y
Grinnell College	1,699	1,672	1,871	1,119	Y	Y	Y	Y	Y
Rice University	6,855	6,662	5,836	876	Y	Y	Y	Y	Y
Cooper Union for the Advancement of Science and Art	964	929	799	860	Y	Y	Y	Y	Y
Bowdoin College	1,806	1,803	1,456	808	Y	Y	Y	Y	Y
Wellesley College	2,482	2,392	1,931	807	Y	Y	Y	Y	Y
University of Notre Dame	12,393	12,256	9,685	790	Y	Y	Y	Y	Y
Dartmouth College	6,409	6,335	4,956	782	Y	Y	Y	Y	Y
Medical College of Wisconsin	1,297	1,178	876	744	Y	Y	Y	Y	Y
Baylor College of Medicine	1,569	1,565	1,134	724	Y	Y	Y	Y	Y
Washington and Lee University	2,160	2,156	1,547	718	Y	Y	Y	Y	Y
University of Richmond	4,131	3,745	2,374	634	Y	Y	Y	Y	Y
Smith College	2,896	2,838	1,767	623	Y	Y	Y	Y	Y
Panel B: Student above 500, and per student Asset between 500 to 600K									
Emory University	14,067	13,009	7,613	585	Y	Y	Y	Y	Y
Claremont McKenna College	1,347	1,346	784	583	Y	Y	Y	Y	Y
Icahn School of Medicine at Mount Sinai	1,203	1,203	675	561	Y	Y	Y	Y	Y
University of Pennsylvania	24,960	22,559	12,213	541	Y	Y	Y	Y	Y
Washington University in St Louis	15,047	13,655	7,215	528	Y	Y	Y	Y	Y
Duke University	15,735	15,218	7,911	520	Y	Y	Y	Y	Y
Bryn Mawr College	1,708	1,661	853	513	Y	Y	Y	Y	Y
Hamilton College	1,883	1,873	955	510	Y	Y	Y	Y	Y
Trinity University	2,466	2,401	1,201	500	Y	N	Y	Y	Y
Panel C: Student above 500, and per student Asset between 400 to 500K									
University of Chicago	15,775	14,136	6,617	468	N	N	N	Y	N
Berry College	2,174	2,115	969	458	N	Y	N	Y	Y
Middlebury College	2,549	2,520	1,074	426	N	N	N	Y	Y
Northwestern University	21,823	18,924	7,948	420	N	N	N	Y	Y
Vassar College	2,424	2,411	1,003	416	N	N	N	Y	N
Colby College	1,879	1,879	775	413	N	N	N	Y	N
Davidson College	1,796	1,796	727	405	N	N	N	Y	Y
Wabash College	842	842	340	404	N	N	N	N	N
Panel D: Student between 400 to 600, and per student Asset above 500K									
Soka University of America	430	430	1,239	2,882	N	N	N	N	N
Principia College	479	479	377	788	N	N	N	N	N

Note: The student enrollment and endowment assets information were in 2016. Full-time equivalent (FTE) is calculated as the sum of full-time and one-third of part-time students. Endowment asset amounts are reported in nominal values. Tax status indicates whether a college is subject to the net investment income tax (NIIT) in a specific year. **Y** refers to being subject to the net investment income tax, while **N** refers to not being subject. The NIIT applies to colleges with over 500 students and more than $500,000 in endowment assets per student.

Table 2: Sample Size by Student Population and Endowment Asset Per Student

	Endowment Assets Per-student			
	Below 400 K	400 to 500 K	500 to 600K	Above 600K
# Student above 500	759	8	9	24
# Student below 500	125	5	2	20

Notes: Samples are non-profit colleges reported in the IPEDS and e-filed Form 990 every year from 2010 to 2022. The student enrollment and endowment assets information were in 2016. The number of total students is the sum of full-time and part-time students. Endowment assets per student are calculated as endowment asset values divided by full-time equivalent (FTE) students (with one part-time student taken into account as one-third of full-time students). Endowment asset amounts are reported in nominal values.

Table 3: Tax Avoidance Behavior on Student Enrollment

	(1)	(2)	(3)	(4)	(5)
	Log FTE	By Enrollment Status		By Student Level	
	Enrollment	Full-time	Part-time	Undergraduate	Graduate
Panel A: All Colleges					
$Cutoff \times Post$	0.064***	0.067***	–0.004	0.080***	0.031
	(0.022)	(0.022)	(0.131)	(0.027)	(0.181)
Observations	10,308	10,308	10,308	10,308	10,308
Baseline Mean (Thousand)	6.915	6.617	0.894	3.774	3.141
Panel B: Colleges Below the Assets Threshold					
$Cutoff \times Post$	0.107***	0.111***	0.057	0.107***	0.182
	(0.025)	(0.025)	(0.171)	(0.033)	(0.300)
Observations	9,879	9,879	9,879	9,879	9,879
Baseline Mean (Thousand)	5.578	5.288	0.870	3.242	2.336
Panel C: Colleges Above the Assets Threshold					
$Cutoff \times Post$	0.038*	0.039	–0.055	0.073	–0.155
	(0.022)	(0.023)	(0.214)	(0.047)	(0.161)
Observations	377	377	377	377	377
Baseline Mean (Thousand)	8.103	7.798	0.915	4.246	3.857

Note: The coefficients are estimated using equation (1). Standard errors clustered at the institution level in parentheses. The outcomes are log students enrollment. The number of full-time equivalent (FTE) students is defined as the sum of full-time and one-third of part-time students. Samples are private non-profit colleges that reported in IPEDS and filed Form 990 yearly from 2010 to 2022, with a student population above 500 in 2016. Panel B restricted the sample to colleges with assets per student less than \$500,000 in 2016. Panel C restricted the sample to colleges with assets per student of more than \$500,000 in 2016. The observation period is from 2010 to 2022.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 4: Tax Avoidance Behavior on Student Enrollment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log Endowment		By Restricted Status		By Category			
	Total	Per-student	Non-restricted	Restricted	Capital	Investment	Others	Liability
Panel A: All Colleges								
$Cutoff \times Post$	0.006	–0.054	0.008	0.040	0.047	0.066	–0.227	0.150
	(0.039)	(0.036)	(0.141)	(0.033)	(0.042)	(0.044)	(1.031)	(0.094)
Observations	9,515	9,515	9,515	9,515	9,515	9,515	9,515	9,515
Baseline Mean (Million)	3,153	0.442	2,018	2,165	2,552	3,843	11	1,688
Panel B: Colleges Below the Assets Threshold								
$Cutoff \times Post$	0.012	–0.085*	–0.080	0.072	0.065	0.042	–1.100	0.044
	(0.054)	(0.046)	(0.217)	(0.048)	(0.069)	(0.054)	(1.257)	(0.083)
Observations	9,119	9,119	9,119	9,119	9,119	9,119	9,119	9,119
Baseline Mean (Million)	2,213	0.388	1,133	1,643	1,492	2,588	20	1,063
Panel C: Colleges Above the Assets Threshold								
$Cutoff \times Post$	0.041	0.005	0.078	0.022	0.008	0.130	1.013	0.270
	(0.044)	(0.048)	(0.062)	(0.036)	(0.046)	(0.078)	(1.752)	(0.217)
Observations	348	348	348	348	348	348	348	348
Baseline Mean (Million)	3,989	0.491	2,805	2,628	3,494	4,958	3	2,243

Note: The coefficients are estimated using equation (1). Standard errors clustered at the institution level in parentheses. The outcomes are log endowment assets. All dollars are adjusted by CPI and denoted in 2010 real dollars. Samples are private non-profit colleges that reported in IPEDS and filed Form 990 yearly from 2010 to 2022, with a student population above 500 in 2016. Panel B restricted the sample to colleges with assets per student less than $500,000 in 2016. Panel C restricted the sample to colleges with assets per student of more than $500,000 in 2016. The observation period is from 2010 to 2021.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 5: Tax Shifting Behavior on Expenditure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log Expenditure						
	Total	Instruction	Research	Public Service	Institution Support	Auxiliary Facilities	Institution Grant
Panel A: All Colleges							
$Treat \times Post$	0.020	–0.002	0.005	0.021	–0.007	–0.019	0.220
	(0.034)	(0.037)	(0.087)	(0.097)	(0.047)	(0.046)	(0.160)
Observations	9,252	9,252	9,252	9,252	9,252	9,252	9,252
Baseline Mean (Million)	1,524	478	222	28	121	459	123
Panel B: Research Universities							
$Treat \times Post$	0.062	0.047	0.267	–0.104	–0.112	0.014	–0.037
	(0.069)	(0.071)	(0.171)	(0.142)	(0.091)	(0.074)	(0.129)
Observations	3,672	3,672	3,672	3,672	3,672	3,672	3,672
Baseline Mean (Million)	2,866	957	411	15	227	871	227
Panel C: Non-Research Universities							
$Treat \times Post$	0.019	0.006	–0.075	0.126	0.053	–0.014	0.259
	(0.042)	(0.051)	(0.103)	(0.130)	(0.060)	(0.058)	(0.211)
Observations	5,472	5,472	5,472	5,472	5,472	5,472	5,472
Baseline Mean (Million)	407	79	65	38	33	115	36

Note: The coefficients are estimated using equation (2). Standard errors clustered at the institution level in parentheses. The outcomes are the log expenditure by spending category. Column (1) is the total expenditure. Column (2) is the sum of instructional and academic support expenditures. Column (3) is the sum of research and independent operation expenditure. Column (4) is the public service expenditure. Column (5) is the institutional support expenditure, which includes spending on operational support, administrative services, and management. Column (6) is the sum of auxiliary facilities, hospital, and student service expenditure. Column (7) is the net institutional grant aid to students, including scholarships and fellowships. All dollars are adjusted by CPI and denoted in 2010 real dollars. Samples are private non-profit colleges that reported in IPEDS and filed Form 990 yearly from 2010 to 2022, with a student population above 500 in 2016. All Panels exclude colleges with endowment assets per student between \$400,000 and 600,000 in 2016 (i.e., only include the donut sample). Panel B restricted the sample to colleges categorized as doctoral or master institutions in the Carnegie categorization. Panel C restricted the sample to colleges not categorized as doctoral or master institutions in the Carnegie categorization. The observation period is from 2010 to 2021.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 6: Tax Shifting Behavior on Enrollment, Tuition, and Charge

	(1)	(2)	(3)	(4)	(5)	(6)
	Log FTE	Log Listed Price			Log Total Revenue	
	Enrollment	Undergrad Tuition	Graduate Tuition	Room & Board	Tuition	Auxiliary
Panel A: All Colleges						
$Treat \times Post$	0.034**	0.024***	0.008	0.042***	0.142***	0.041
	(0.016)	(0.009)	(0.024)	(0.013)	(0.033)	(0.047)
Observations	10,087	10,087	10,087	10,087	9,311	9,311
Baseline Mean (Thousand)	6.037	39.033	28.449	11.451	162,878	61,246
Panel B: Research Universities						
$Treat \times Post$	–0.005	0.011	0.067***	0.034*	0.036	0.096
	(0.022)	(0.009)	(0.023)	(0.019)	(0.036)	(0.090)
Observations	4,069	4,069	4,069	4,069	3,756	3,756
Baseline Mean (Thousand)	11.127	41.906	39.592	12.289	304,929	113,932
Panel C: Non-Research Universities						
$Treat \times Post$	0.060***	0.033**	–0.031	0.047***	0.211***	0.005
	(0.019)	(0.013)	(0.035)	(0.017)	(0.045)	(0.049)
Observations	6,018	6,018	6,018	6,018	5,555	5,555
Baseline Mean (Thousand)	1.795	36.639	19.164	10.752	44,503	17,341

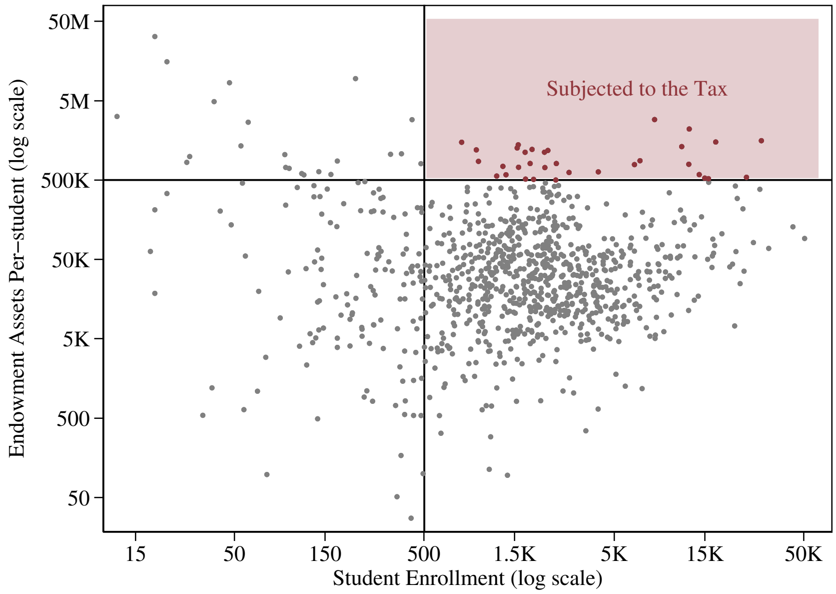
Note: The coefficients are estimated using equation (2). Standard errors clustered at the institution level in parentheses. The outcomes are the log enrollment, price, and revenue. All dollars are adjusted by CPI and denoted in 2010 real dollars. Samples are private non-profit colleges that reported in IPEDS and filed Form 990 yearly from 2010 to 2022, with a student population above 500 in 2016. All Panels exclude colleges with endowment assets per student between $400,000 and 600,000 in 2016 (i.e., only include the donut sample). Panel B restricted the sample to colleges categorized as doctoral or master institutions in the Carnegie categorization. Panel C restricted the sample to colleges not categorized as doctoral or master institutions in the Carnegie categorization. The observation period is from 2010 to 2022 for columns (1) to (4) and 2010 to 2021 for columns (5) and (6).
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 7: Tax Avoidance and Shifting Behavior on Student Enrollment by Race/Ethnicity

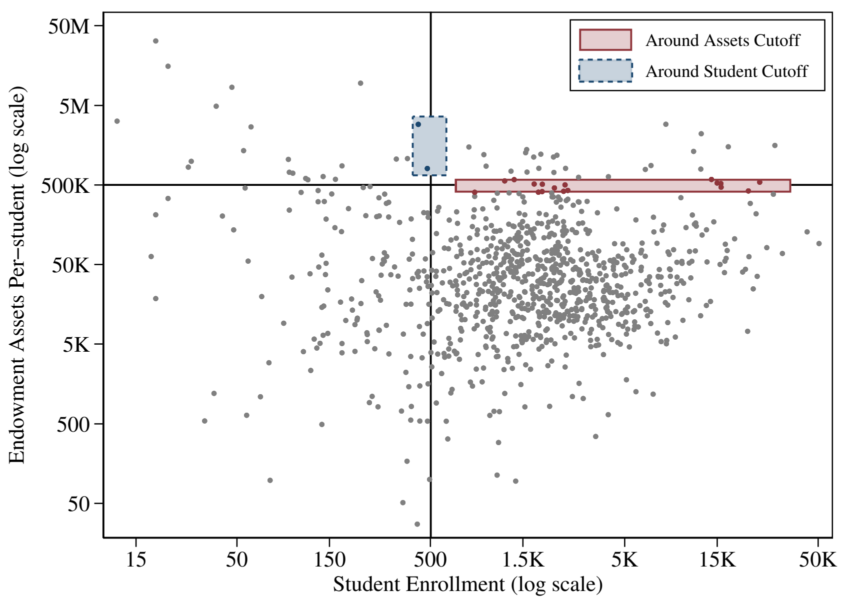
	(1)	(2)	(3)	(4)	(5)	(6)
	Log FTE Enrollment					
	White	Black	Hispanic	Asian	Other Minority	NRA
Panel A: Tax Avoidance, All Colleges						
$Cutoff \times Post$	0.085***	0.038	0.071	0.055	0.233***	0.022
	(0.031)	(0.040)	(0.049)	(0.047)	(0.058)	(0.070)
Observations	10,308	10,308	10,308	10,308	10,308	10,308
Baseline Mean (Thousand)	2.331	0.298	0.386	0.646	0.176	0.889
Panel B: Tax Shifting, All Colleges						
$Treat \times Post$	0.022	0.007	–0.128***	0.017	–0.069	0.102*
	(0.026)	(0.033)	(0.041)	(0.039)	(0.048)	(0.058)
Observations	10,087	10,087	10,087	10,087	10,087	10,087
Baseline Mean (Thousand)	2.739	0.336	0.516	0.840	0.262	1.159
Panel C: Tax Shifting, Research Universities						
$Treat \times Post$	–0.023	0.033	–0.128**	–0.054	–0.040	0.009
	(0.036)	(0.050)	(0.056)	(0.055)	(0.071)	(0.088)
Observations	4,069	4,069	4,069	4,069	4,069	4,069
Baseline Mean (Thousand)	2.739	0.336	0.516	0.840	0.262	1.159
Panel D: Tax Shifting, Non-Research Universities						
$Treat \times Post$	0.052	–0.011	–0.129**	0.063	–0.088	0.162**
	(0.036)	(0.044)	(0.056)	(0.053)	(0.064)	(0.077)
Observations	6,018	6,018	6,018	6,018	6,018	6,018
Baseline Mean (Thousand)	2.739	0.336	0.516	0.840	0.262	1.159

Note: The coefficients in Panel A are estimated using equation (1). The coefficients in Panel B to D are estimated using equation (2). Standard errors clustered at the institution level in parentheses. The outcomes are log full-time equivalent (FTE) students by race/ethnicity. Other minorities include Native Hawaiian and Pacific Islander (NHPI), American Indians and Alaska Natives (AIAN), and two or more races. NRA stands for non-resident alien. Samples are private non-profit colleges that reported in IPEDS and filed Form 990 yearly from 2010 to 2022, with a student population above 500 in 2016. Panels B to D exclude colleges with endowment assets per student between \$400,000 and 600,000 in 2016 (i.e., only include the donut sample). Panel C restricted the sample to colleges categorized as doctoral or master institutions in the Carnegie categorization. Panel D restricted the sample to colleges not categorized as doctoral or master institutions in the Carnegie categorization. The observation period is from 2010 to 2022.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Figures



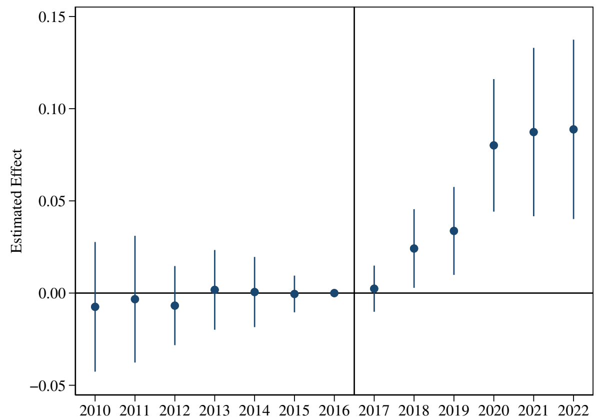
(a) Colleges Subjected to the Tax



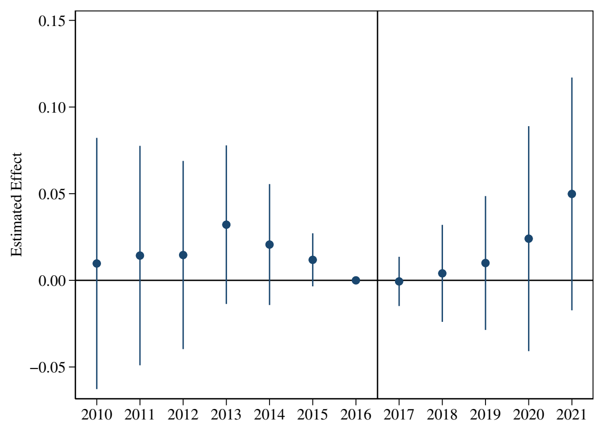
(b) Colleges Around the Tax Cutoff

Figure 1: Distribution of Samples by Student Enrollment and Endowment Per-student

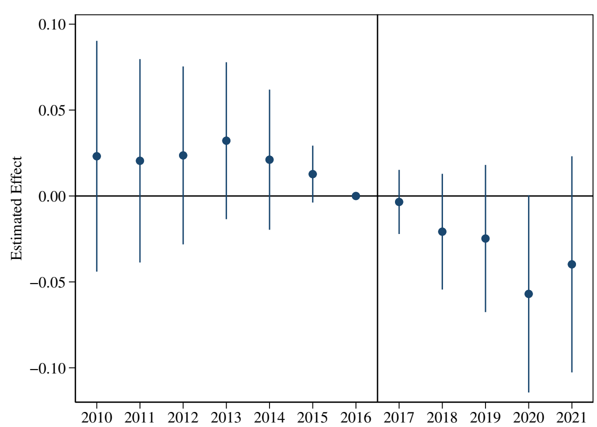
Note: The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022. The horizontal axis denotes the total number of students (the sum of full-time and part-time students). The vertical axis denotes the endowment assets per student (full-time equivalent students). Endowment assets are reported in nominal values. The vertical line stands for the student enrollment cutoff. The horizontal line stands for the endowment assets cutoff. Each dot stands for one college. The data is as of the year 2016.



(a) Log Number of FTE Students



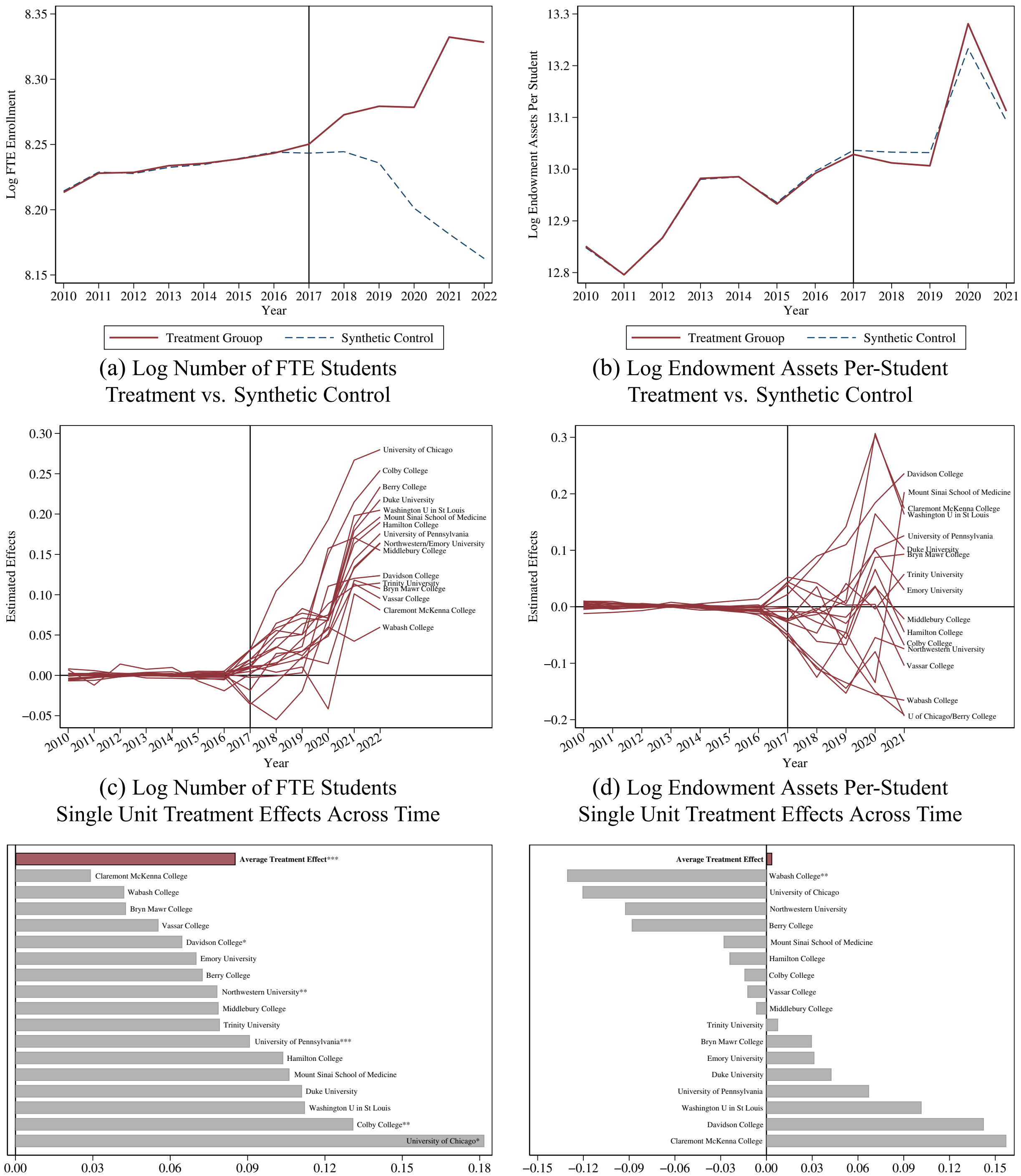
(b) Log Total Endowment Assets



(c) Log Endowment Assets Per-student

Figure 2: Event Study Estimates: Tax Avoidance Behavior

Note: The coefficients are estimated using the event study version of equation (1). The error bars denote the 95% confidence interval. The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022, with a student population above 500 in 2016. FTE (full-time equivalent) is calculated as the sum of full-time and one-third of part-time students.



(a) Log Number of FTE Students
Treatment vs. Synthetic Control

(b) Log Endowment Assets Per-Student
Treatment vs. Synthetic Control

(c) Log Number of FTE Students
Single Unit Treatment Effects Across Time

(d) Log Endowment Assets Per-Student
Single Unit Treatment Effects Across Time

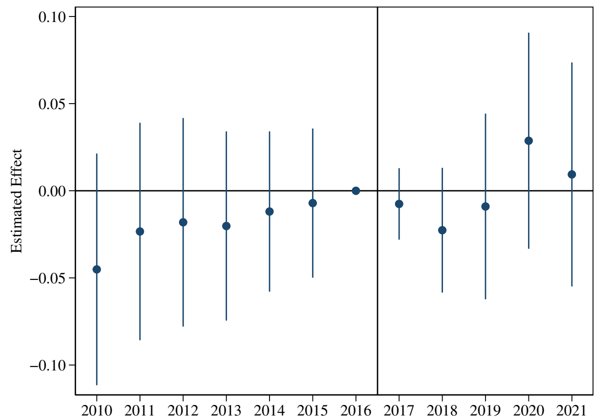
(e) Log Number of FTE Students
Single Unit Average Treatment Effects

(f) Log Endowment Assets Per-Student
Single Unit Average Treatment Effects

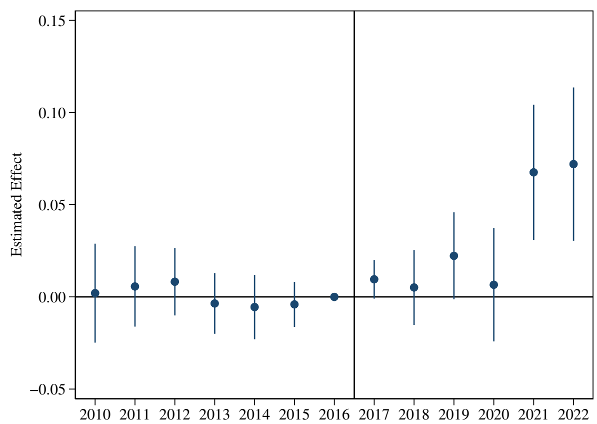
Figure 3: Synthetic Control Method: Tax Avoidance Behavior

Note: The synthetic controls are estimated using SCM. The treatment effects are estimated using equation (3) to (5). The error bars denote the 95% confidence interval. The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022, with a student population above 500 in 2016. FTE (full-time equivalent) is calculated as the sum of full-time and one-third of part-time students.

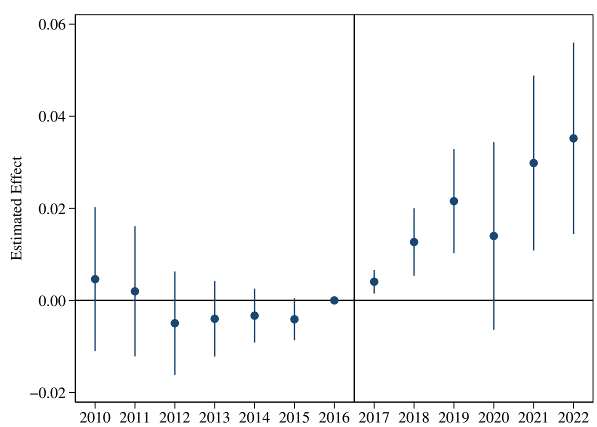
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$



(a) Log Total Expenditure



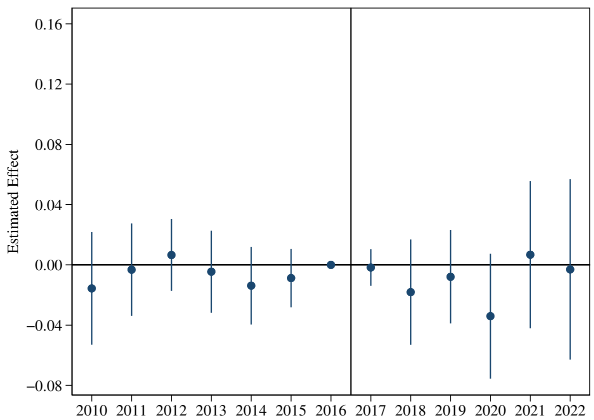
(b) Log FTE Enrollment



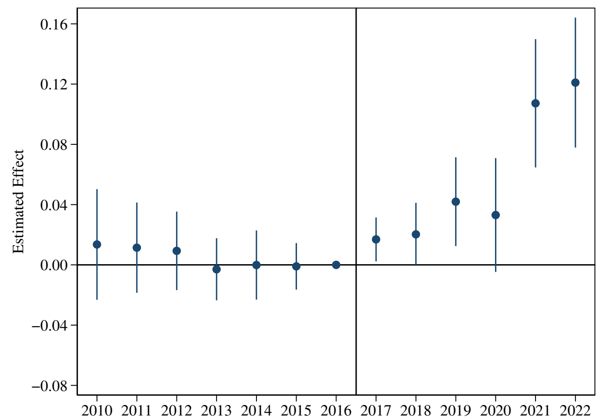
(c) Log Undergraduate Tuition

Figure 4: Event Study Estimates: Tax Shifting Behavior

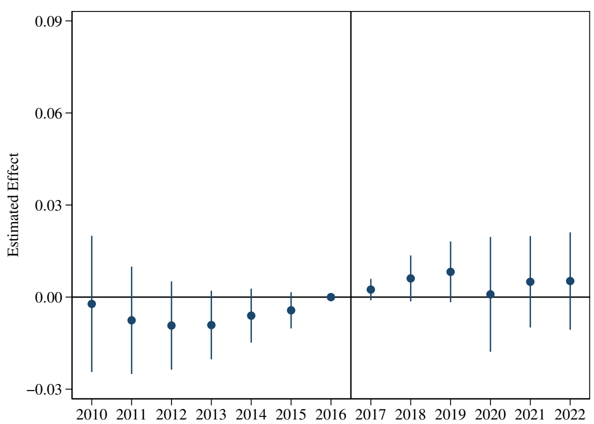
Note: The coefficients are estimated using the event study version of equation (2). The error bars denote the 95% confidence interval. The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022, with a student population above 500 in 2016, and exclude colleges with endowment assets per student between $400,000 and 600,000 in 2016 (i.e., only include the donut sample).



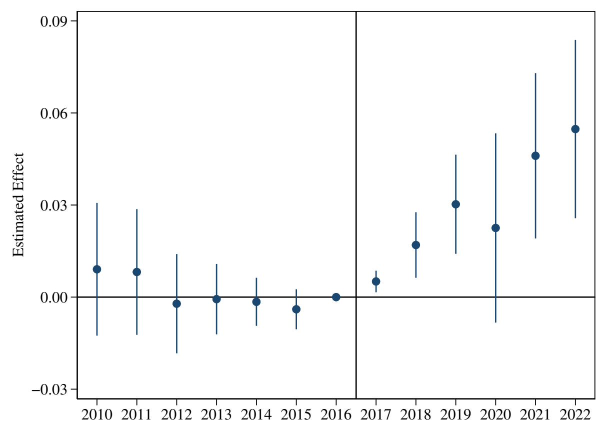
(a) Log FTE Enrollment (Research Universities)



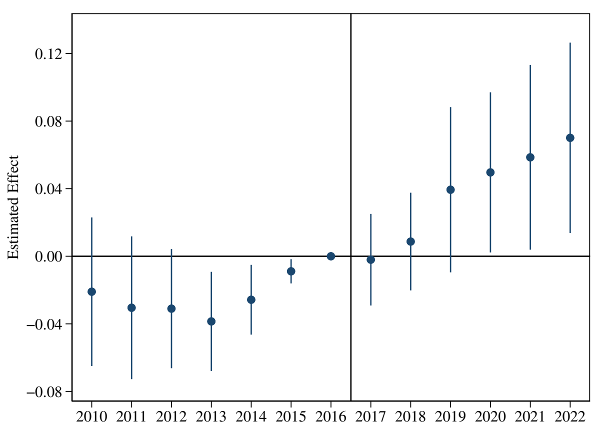
(b) Log FTE Enrollment (Non-Research Universities)



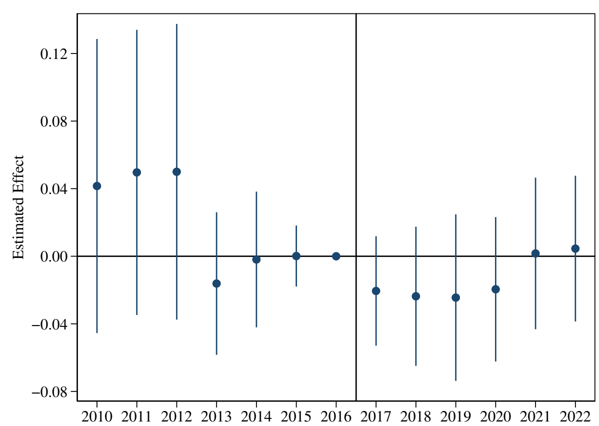
(c) Log Undergraduate Tuition
(Research Universities)



(d) Log Undergraduate Tuition
(Non-Research Universities)



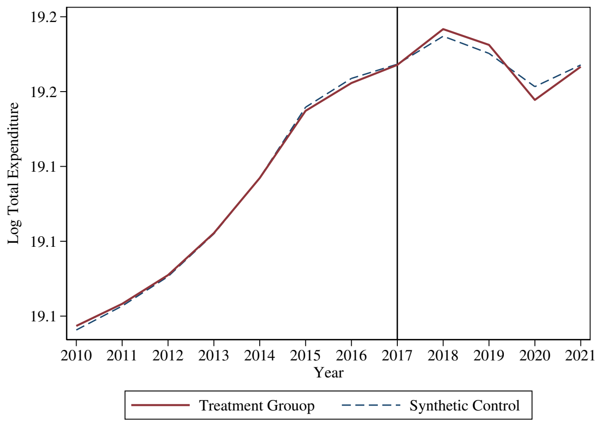
(e) Log Graduate Tuition (Research Universities)



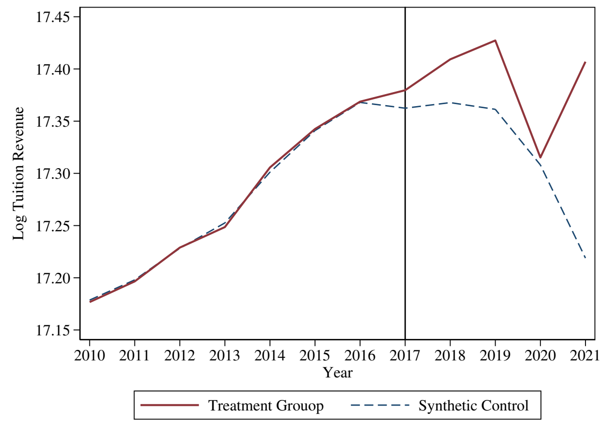
(f) Log Graduate Tuition (Non-Research Universities)

Figure 5: Event Study Estimates: Tax Shifting Behavior by Institution Types

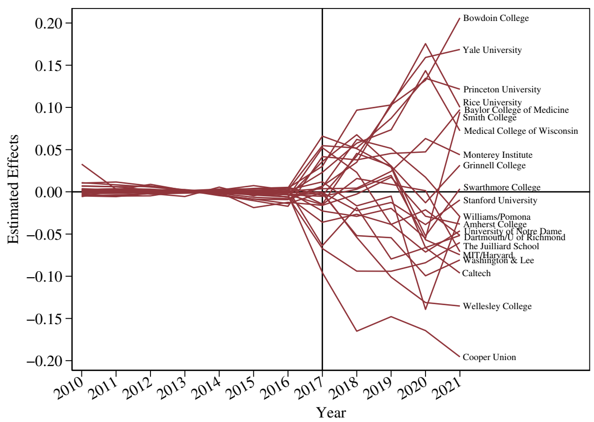
Note: The coefficients are estimated using the event study version of equation (2). The error bars denote the 95% confidence interval. The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022, with a student population above 500 in 2016, and exclude colleges with endowment assets per student between $400,000 and 600,000 in 2016 (i.e., only include the donut sample).



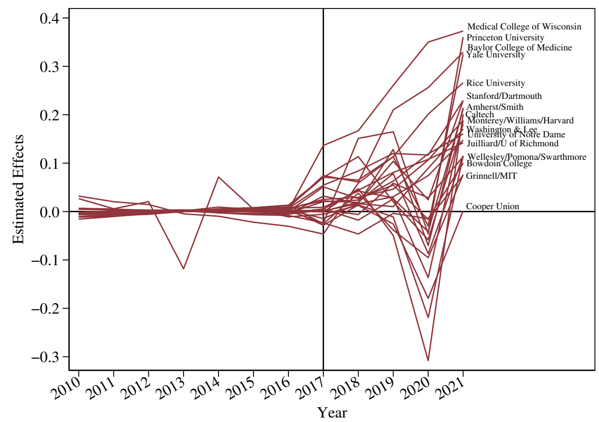
(a) Log Total Expenditure
Treatment vs. Synthetic Control



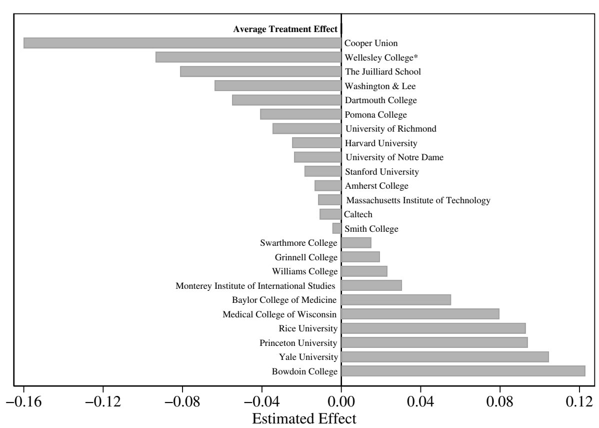
(b) Log Tuition Revenue
Treatment vs. Synthetic Control



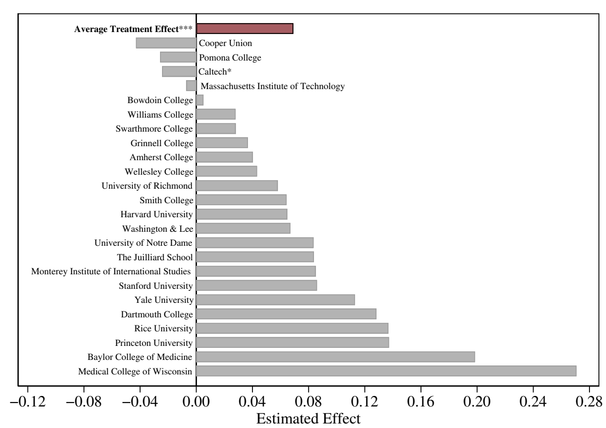
(c) Log Total Expenditure
Single Unit Dynamic Treatment Effects



(d) Log Tuition Revenue
Single Unit Dynamic Treatment Effects



(e) Log Total Expenditure
Single Unit Average Treatment Effects



(f) Log Tuition Revenue
Single Unit Average Treatment Effects

Figure 6: Synthetic Control Method: Tax Shifting Behavior

Note: The synthetic controls are estimated using SCM. The treatment effects are estimated using equation (3) to (5). The error bars denote the 95% confidence interval. The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022 and exclude colleges with endowment assets per student between \$400,000 and 600,000 in 2016.

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Appendix A: Additional Results

Table A1: Distance of Endowment Assets and Student Enrollment from Tax Threshold

	Distance of from Endowment Threshold				Average Growth Rate	
	Endowment Assets		FTE Enrollment		Endowment Assets	FTE Enrollment
	$ Million	%	Count	%		
Panel A: Student above 500, and per student Asset above 600K						
Princeton University	–19,312	–82.70%	38,625	477.93%	5.36%	0.76%
Yale University	–21,025	–77.25%	42,051	339.59%	6.14%	1.11%
Harvard University	–25,248	–68.06%	50,496	213.09%	2.65%	0.78%
Stanford University	–16,561	–66.82%	33,122	201.37%	7.13%	–0.22%
Middlebury Institute of International Studies at Monterey	–715	–66.60%	1,431	199.44%	1.77%	0.35%
Pomona College	–1,386	–64.01%	2,772	177.89%	4.35%	0.10%
Massachusetts Institute of Technology	–9,209	–62.09%	18,418	163.75%	7.45%	1.28%
Swarthmore College	–1,184	–60.56%	2,369	153.58%	4.69%	0.31%
Amherst College	–1,324	–58.88%	2,647	143.17%	5.71%	0.52%
The Juilliard School	–610	–58.34%	1,220	140.02%	4.59%	–0.11%
California Institute of Technology	–1,521	–57.61%	3,043	135.88%	8.74%	0.50%
Williams College	–1,320	–55.39%	2,640	124.15%	5.43%	0.38%
Grinnell College	–1,035	–55.33%	2,070	123.85%	4.28%	0.49%
Rice University	–2,505	–42.92%	5,009	75.20%	4.63%	2.52%
Cooper Union for the Advancement of Science and Art	–334	–41.84%	669	71.93%	4.64%	–0.92%
Bowdoin College	–555	–38.09%	1,109	61.53%	8.56%	0.44%
Wellesley College	–735	–38.06%	1,470	61.43%	4.28%	–0.43%
University of Notre Dame	–3,557	–36.73%	7,114	58.05%	7.36%	0.58%
Dartmouth College	–1,789	–36.09%	3,578	56.48%	6.43%	0.84%
Medical College of Wisconsin	–287	–32.77%	574	48.74%	10.98%	0.98%
Baylor College of Medicine	–351	–30.97%	702	44.86%	6.35%	0.84%
Washington and Lee University	–469	–30.32%	938	43.52%	4.13%	–0.09%
University of Richmond	–501	–21.11%	1,002	26.76%	4.22%	–0.73%
Smith College	–348	–19.72%	697	24.56%	3.88%	–1.16%
Panel B: Student above 500, and per student Asset between 500 to 600K						
Emory University	–1,109	–14.56%	2,217	17.04%	5.89%	0.37%
Claremont McKenna College	–111	–14.18%	222	16.52%	6.64%	0.93%
Icahn School of Medicine at Mount Sinai	–74	–10.90%	147	12.24%	1.94%	1.93%
University of Pennsylvania	–934	–7.65%	1,868	8.28%	11.08%	0.07%
Washington University in St Louis	–387	–5.37%	775	5.67%	5.37%	1.59%
Duke University	–302	–3.82%	604	3.97%	5.83%	0.59%
Bryn Mawr College	–22	–2.63%	45	2.70%	4.29%	0.06%
Hamilton College	–18	–1.91%	36	1.94%	5.20%	0.22%
Trinity University	–1	–0.05%	1	0.05%	3.96%	–0.11%
Panel C: Student above 500, and per student Asset between 400 to 500K						
University of Chicago	451	6.81%	–902	–6.38%	2.71%	0.89%
Berry College	89	9.20%	–178	–8.43%	4.17%	1.14%
Middlebury College	186	17.34%	–372	–14.78%	3.12%	0.04%
Northwestern University	1,515	19.06%	–3,029	–16.01%	6.65%	0.85%
Vassar College	203	20.26%	–406	–16.85%	3.71%	–0.01%
Colby College	164	21.21%	–329	–17.50%	4.25%	0.50%
Davidson College	171	23.44%	–341	–18.99%	6.18%	0.51%
Wabash College	81	23.73%	–162	–19.18%	0.15%	–0.50%

Note: The distances from the endowment threshold are calculated as the amount/number/proportion of endowment/students needed to be increased or decreased in order to make a college meet the tax threshold to be exempted from the tax or a college below the thresholds to be subject to the tax. The average growth rates were averaged from 2010 to 2016. All monetary amounts are reported in nominal values.

Table A2: Estimated Net Investment Income Tax Payment

	Average Expenditure / Revenue / Payment ($ Million)				Share of Invest Rev. to Total Rev.	Share of Est. Tax to Total Exp.	Share of Est. Tax to Total Rev.
	Total Expenditure	Total Revenue	Investment Revenue	Estimated NIIT			
Panel A: Student above 500, and per student Asset above 600K							
Princeton University	1,541	3,803	3,073	43.03	58.23%	2.79%	0.82%
Yale University	3,458	6,129	3,400	47.61	43.44%	1.36%	0.61%
Harvard University	4,416	7,412	4,192	58.68	42.82%	1.36%	0.60%
Stanford University	5,176	7,707	3,336	46.70	35.71%	0.91%	0.50%
Pomona College	149	290	216	3.02	47.66%	2.19%	0.67%
Massachusetts Institute of Technology	3,253	5,379	2,997	41.96	40.46%	1.29%	0.57%
Swarthmore College	154	306	235	3.29	52.61%	2.18%	0.74%
Amherst College	194	484	344	4.82	51.52%	2.50%	0.72%
The Juilliard School	98	152	87	1.22	36.80%	1.26%	0.52%
California Institute of Technology	2,822	2,951	304	4.26	9.07%	0.15%	0.13%
Williams College	227	513	355	4.97	50.67%	2.20%	0.71%
Grinnell College	114	327	234	3.27	58.51%	2.96%	0.82%
Rice University	658	1,031	583	8.16	37.45%	1.22%	0.52%
Cooper Union for the Advancement of Science and Art	69	98	69	0.96	67.83%	1.40%	0.95%
Bowdoin College	153	353	256	3.59	50.13%	2.39%	0.70%
Wellesley College	200	404	264	3.70	46.75%	1.92%	0.65%
University of Notre Dame	1,111	2,528	1,674	23.43	43.18%	2.20%	0.60%
Dartmouth College	781	1,460	754	10.55	37.21%	1.38%	0.52%
Medical College of Wisconsin	1,034	1,103	113	1.58	8.20%	0.15%	0.11%
Baylor College of Medicine	1,811	1,838	118	1.65	5.64%	0.09%	0.08%
Washington and Lee University	148	227	130	1.82	36.28%	1.24%	0.51%
University of Richmond	258	401	241	3.37	34.45%	1.32%	0.48%
Smith College	201	340	186	2.60	36.72%	1.39%	0.51%
Panel B: Student above 500, and per student Asset between 500 to 600K							
Emory University	5,581	6,280	853	11.94	12.10%	0.21%	0.17%
Claremont McKenna College	111	229	94	1.32	30.17%	1.27%	0.42%
Icahn School of Medicine at Mount Sinai	2,833	2,980	83	1.17	2.73%	0.04%	0.04%
University of Pennsylvania	9,370	11,344	1,566	21.92	11.95%	0.23%	0.17%
Washington University in St Louis	3,011	4,158	1,435	20.09	23.92%	0.66%	0.33%
Duke University	5,825	7,147	1,707	23.90	17.82%	0.41%	0.25%
Bryn Mawr College	111	186	90	1.26	35.73%	1.18%	0.50%
Hamilton College	124	189	101	1.41	34.89%	1.15%	0.49%
Trinity University	123	203	115	1.61	43.62%	1.31%	0.61%
Panel C: Student above 500, and per student Asset between 400 to 500K							
University of Chicago	3,464	3,869	654	9.15	13.44%	0.26%	0.19%
Berry College	82	138	86	1.20	45.98%	1.47%	0.64%
Middlebury College	237	302	112	1.57	27.86%	0.69%	0.39%
Northwestern University	2,132	2,758	1,055	14.77	28.72%	0.71%	0.40%
Vassar College	171	208	86	1.20	27.74%	0.70%	0.39%
Colby College	141	253	103	1.44	28.47%	1.02%	0.40%
Davidson College	118	223	111	1.55	36.19%	1.29%	0.51%
Wabash College	48	62	22	0.31	23.56%	0.67%	0.33%
Panel D: Student between 400 to 600, and per student Asset above 500K							
Soka University of America	51	124	66	0.92	22.22%	1.89%	0.31%
Principia College	39	62	48	0.67	62.34%	1.77%	0.87%

Note: The data are averaged from 2017 to 2021. Estimated NIIT is calculated by multiplying investment revenue by 1.4%. For observations with negative investment returns, the tax amount is defined as 0. All monetary amounts are adjusted by CPI and reported in 2010 real dollars.

Table A3: Tax Shifting Behavior on Expenditure (All Sample)

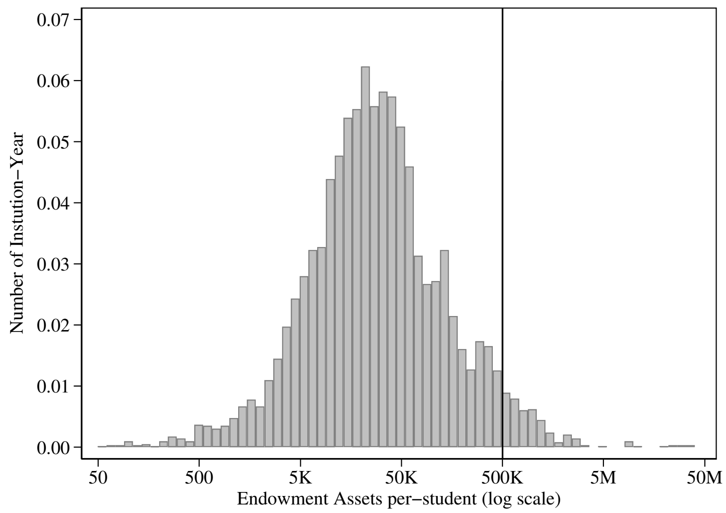
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log Expenditure						
	Total	Instruction	Research	Public Service	Institution Support	Auxiliary Facilities	Institution Grant
Panel A: All Colleges							
$Treat \times Post$	0.044	0.009	0.037	0.161	0.026	0.038	–0.015
	(0.032)	(0.032)	(0.079)	(0.136)	(0.082)	(0.045)	(0.040)
Observations	9,372	9,456	9,456	9,456	9,456	9,456	9,456
Baseline Mean (Million)	1,726	478	222	123	28	459	121
Panel B: Research Universities							
$Treat \times Post$	0.104*	0.044	0.210	–0.032	0.002	0.096	–0.097
	(0.060)	(0.060)	(0.136)	(0.103)	(0.117)	(0.073)	(0.072)
Observations	3,744	3,756	3,756	3,756	3,756	3,756	3,756
Baseline Mean (Million)	3,373	957	411	227	15	871	227
Panel C: Non-Research Universities							
$Treat \times Post$	0.027	0.013	–0.037	0.228	0.093	0.022	0.036
	(0.037)	(0.043)	(0.095)	(0.180)	(0.120)	(0.056)	(0.053)
Observations	5,520	5,592	5,592	5,592	5,592	5,592	5,592
Baseline Mean (Million)	445	79	65	36	38	115	33

Note: The coefficients are estimated using equation (2). Standard errors clustered at the institution level in parentheses. The outcomes are the log expenditure by spending category. Column (1) is the total expenditure. Column (2) is the sum of instructional and academic support expenditures. Column (3) is the sum of research and independent operation expenditure. Column (4) is the public service expenditure. Column (5) is the institutional support expenditure, which includes spending on operational support, administrative services, and management. Column (6) is the sum of auxiliary facilities, hospital, and student service expenditure. Column (7) is the net institutional grant aid to students, including scholarships and fellowships. All dollars are adjusted by CPI and denoted in 2010 real dollars. Samples are private non-profit colleges that reported in IPEDS and filed Form 990 yearly from 2010 to 2022, with a student population above 500 in 2016. Panel B restricted the sample to colleges categorized as doctoral or master institutions in the Carnegie categorization. Panel C restricted the sample to colleges not categorized as doctoral or master institutions in the Carnegie categorization. The observation period is from 2010 to 2021.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

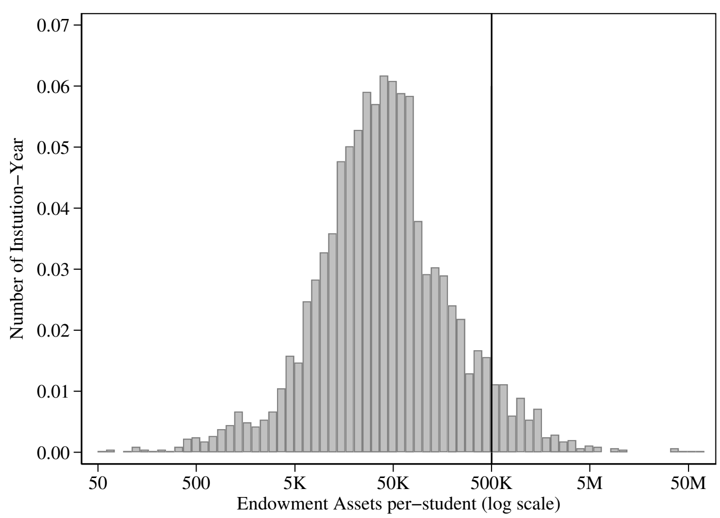
Table A4: Tax Shifting Behavior on Enrollment, Tuition, and Charge (All Sample)

	(1)	(2)	(3)	(4)	(5)	(6)
	Log FTE	Log Listed Price			Log Total Revenue	
	Enrollment	Undergrad Tuition	Graduate Tuition	Room & Board	Tuition	Auxiliary
Panel A: All Colleges						
$Treat \times Post$	0.035**	0.023***	0.011	0.029***	0.133***	0.013
	(0.015)	(0.008)	(0.022)	(0.011)	(0.027)	(0.045)
Observations	10,308	10,308	10,308	10,308	9,515	9,515
Baseline Mean (Thousand)	6.037	39.033	28.449	11.451	162,878	61,246
Panel B: Research Universities						
$Treat \times Post$	0.009	0.014	0.034	0.025*	0.039	0.096
	(0.022)	(0.010)	(0.030)	(0.014)	(0.030)	(0.070)
Observations	4,160	4,160	4,160	4,160	3,840	3,840
Baseline Mean (Thousand)	11.127	41.906	39.592	12.289	304,929	113,932
Panel C: Non-Research Universities						
$Treat \times Post$	0.054***	0.029***	–0.006	0.033**	0.201***	–0.046
	(0.020)	(0.011)	(0.031)	(0.015)	(0.038)	(0.055)
Observations	6,148	6,148	6,148	6,148	5,675	5,675
Baseline Mean (Thousand)	1.795	36.639	19.164	10.752	44,503	17,341

Note: The coefficients are estimated using equation (2). Standard errors clustered at the institution level in parentheses. The outcomes are the log enrollment, price, and revenue. All dollars are adjusted by CPI and denoted in 2010 real dollars. Samples are private non-profit colleges that reported in IPEDS and filed Form 990 yearly from 2010 to 2022, with a student population above 500 in 2016. Panel B restricted the sample to colleges categorized as doctoral or master institutions in the Carnegie categorization. Panel C restricted the sample to colleges not categorized as doctoral or master institutions in the Carnegie categorization. The observation period is from 2010 to 2022 for columns (1) to (4) and 2010 to 2021 for columns (5) and (6).
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$



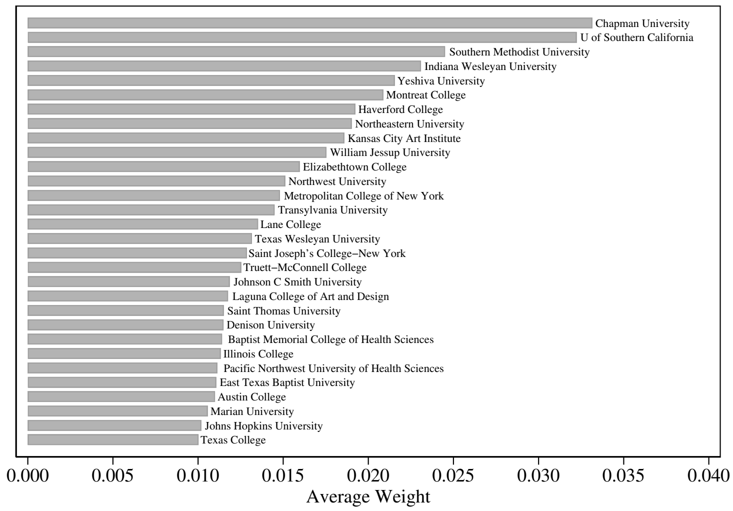
(a) Fiscal Year 2010 to 2016



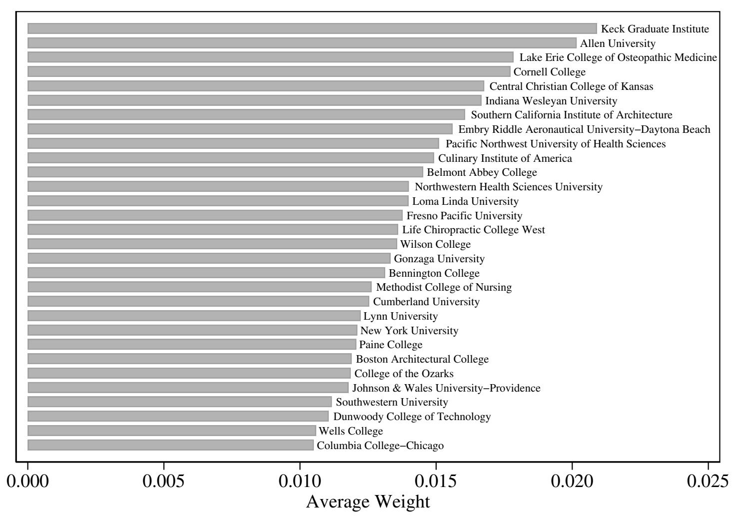
(b) Fiscal Year 2017 to 2021

Figure A1: Distribution of Endowment Assets Per-student

Note: The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022. Endowment assets per student are calculated as endowment asset values divided by full-time equivalent (FTE) students (with one part-time student taken into account as one-third of full-time students). Endowment asset amounts are reported in nominal values.



(a) Tax Avoidance Analysis



(b) Tax Shifting Analysis

Figure A2: Distribution of SCM Weights

Note: The figure shows the top 20 colleges with the highest weights obtained from SCM analysis. The horizontal axis shows the average weights across all treated units and all variables.

Appendix B: Triple-Difference Design for Tax Shifting

B1 Empirical Strategy

In the main analysis, I use the DD framework to estimate colleges' tax-shifting behaviors, which comparing colleges subjected to the tax (treatment group) with those that meet the student threshold but not the asset threshold (the control group). However, given the substantial difference in the asset values, the two groups might not share common trends in their spending and revenue. Specifically, Figure B1a shows that the treated colleges have a faster growth rate in their total expenditure compared to the colleges in the control group.

Despite the inclusion of fixed effects leading to an improvement of the pre-treatment common trend, the concern of the DD setting still remains. Particularly, wealthy and non-wealthy colleges might respond differently to other macro environment shocks, such as COVID. Hence, this study further applies a triple-difference (DDD) framework to test the robustness of the results. In particular, I separate colleges into four groups by both the student and assets threshold. Colleges meeting the student threshold (with student enrollment greater than 500 in 2016) are categorized as large and small otherwise. Colleges meeting the asset threshold (with endowment assets per student above $500,000 in 2016) are categorized as wealthy and non-wealthy otherwise. As demonstrated in Figure 1a, this categorization groups colleges into four quadrants, with the upper right corner denoting the treatment group.

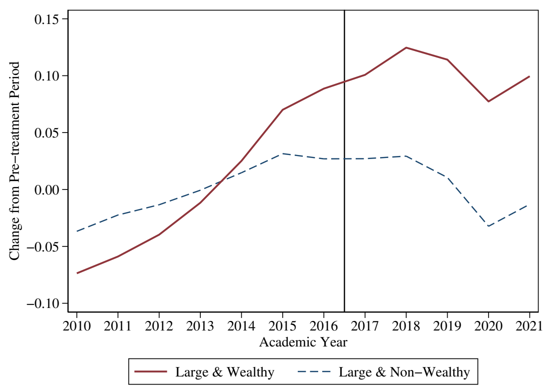
The basic idea of the DDD setting is to compare the changes in the gap between large wealthy and large non-wealthy colleges as well as the gap between small wealthy and small non-wealthy colleges. This analysis consists of all colleges (including those that unmet the student threshold) but still excludes those around the cutoff to prevent confounding from tax avoidance behaviors. Specifically, I estimate the following equation:

$$Y_{it} = \alpha_0 + \beta_1 Large_i \times Wealthy_i \times Post_t + \theta_i + Large_i \times \delta_t + Wealthy_i \times \delta_t + \varepsilon_{it} \qquad \text{(B1)}$$

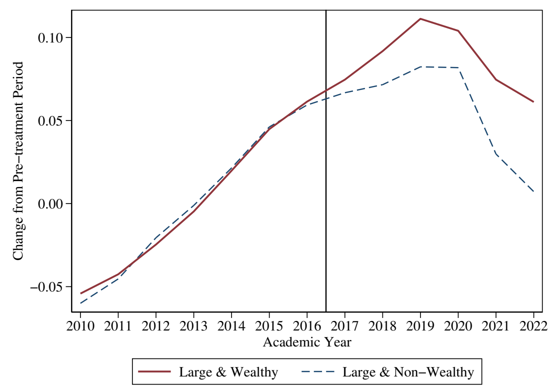
Where $Large_i$ is a dummy variable indicating that the colleges had a student population above 500 in 2016. $Wealthy_i$ is a dummy variable indicating that the colleges had endowment assets per student above $500,000 in 2016. The equation includes the student population by year fixed effect ($Large_i \times \delta_t$), which accounts for the potential difference in trends between large and small colleges. Similarly, the inclusion of asset size by year fixed effect ($Wealthy_i \times \delta_t$) accounts for the potential difference in trends between wealthy and non-wealthy colleges. The key parameter is β_1, which indicates the impact of policy on the colleges subject to the NIIT.

The empirical assumption of the DDD setting is that the difference in outcomes between "large, wealthy colleges" and "large, non-wealthy colleges" would have followed the same trend as the same difference between "small, wealthy colleges" and "small, non-wealthy colleges" in the absence of the policy. In other words, the DDD design assumes that the gap between wealthy and non-wealthy colleges would be the same between colleges with various student sizes. Also, the gap between larger and smaller colleges would be the same between colleges with various wealth levels. This assumption might be valid as the primary factors determining colleges' finance metrics would be their service population and available resources. This paper further evaluates the assumption by examining the pre-treatment parallel trend. Specifically, while "large, wealthy colleges" (treated group) hold a faster growth rate in expenditure than the "large, non-wealthy colleges" (see Figure B1a), the same pattern appears in the comparison between "small, wealthy colleges" versus "small, non-wealthy colleges" (see Figure B1c). Figure B1e compares the gap in two paired comparisons and shows that these two gaps follow the same trend over time.

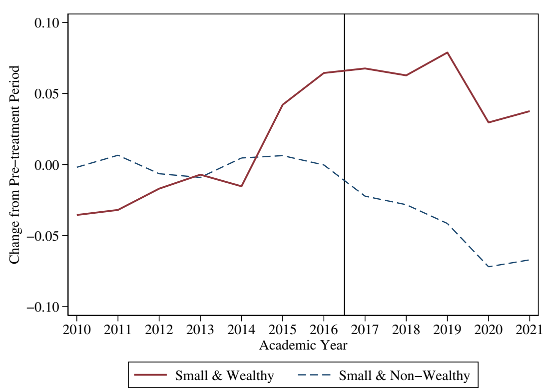
This paper employs DD in the primary setting while using DDD as a robustness check. The choice of the preferred specification involves a trade-off between bias and precision. While the DDD framework is better suited to correct the bias of comparing colleges with different asset levels, it necessitates the introduction of a comparison group of small but wealthy colleges. Most of these colleges are arts or medical schools. Due to their small student population and significant assets, they typically experience frequent and substantial fluctuations in spending. This setting, therefore, introduces more noise to the estimation and leads to larger standard errors.



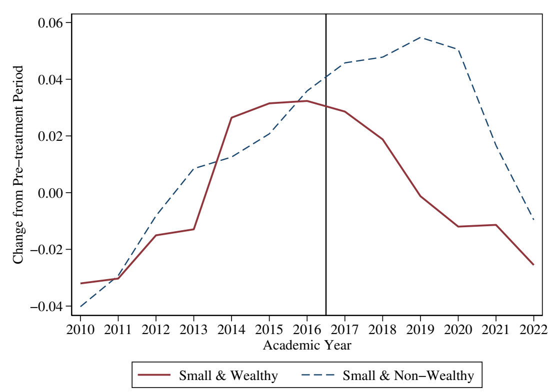
(a) Log Total Expenditure
(Large Colleges)



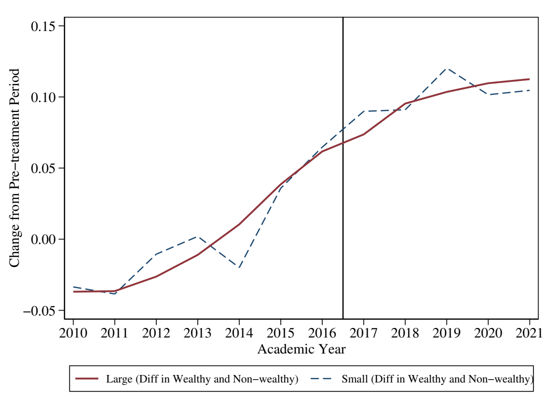
(b) Log Undergraduate Tuition
(Large Colleges)



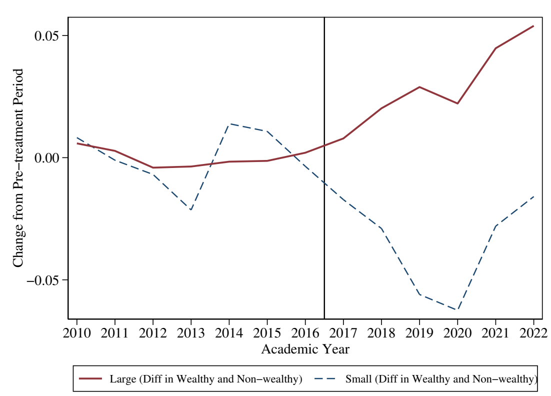
(c) Log Total Expenditure
(Small Colleges)



(d) Log Undergraduate Tuition
(Small Colleges)



(e) Log Total Expenditure
(DDD)



(f) Log Undergraduate Tuition
(DDD)

Figure B1: Tax Shifting: Trend in Total Expenditure and Tuition

Note: The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022 and exclude colleges with endowment assets per student between $400,000 and 600,000 in 2016 (i.e., only include the donut sample). The horizontal axis denotes the year (using the start year of the academic/fiscal year). The vertical axis denotes the percent change in the outcome variable from the pre-treatment period. The vertical line denotes the year of policy implementation. Large (small) colleges are colleges with more (less) than 500 students in 2016. Wealthy (non-wealthy) colleges are colleges with more (less) than $500,000 endowment assets per student (in nominal values) in 2016.

B2 Empirical Results

The DDD results of the impact on expenditure are quite similar to the DD estimations. Table B1 demonstrates that taxed colleges underwent an insignificant 0.2% increase in their total expenditure after the policy intervention (see Column (1)). There are also no negative responses for any of the spending categories.

Table B1: Tax Shifting Behavior on Expenditure (DDD Setting)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log Expenditure						
	Total	Instruction	Research	Public Service	Institution Support	Auxiliary Facilities	Institution Grant
$Large \times Wealthy \times Post$	0.002	0.025	0.029	0.140**	0.102	0.042	0.249
	(0.043)	(0.043)	(0.054)	(0.059)	(0.108)	(0.047)	(0.411)
Observations	11,004	11,004	11,004	11,004	11,004	11,004	11,004
Baseline Mean (Million)	1,524	478	222	28	121	459	123

Note: The coefficients are estimated using equation (B1). Standard errors clustered at the institution level in parentheses. The outcomes are the log expenditure by spending category. Column (1) is the total expenditure. Column (2) is the sum of instructional and academic support expenditures. Column (3) is the sum of research and independent operation expenditure. Column (4) is the public service expenditure. Column (5) is the institutional support expenditure, which includes spending on operational support, administrative services, and management. Column (6) is the sum of auxiliary facilities, hospital, and student service expenditure. Column (7) is the net institutional grant aid to students, including scholarships and fellowships. All dollars are adjusted by CPI and denoted in 2010 real dollars. Samples are private non-profit colleges that reported in IPEDS and filed Form 990 yearly from 2010 to 2022. All Panels exclude colleges with endowment assets per student between $400,000 and 600,000 in 2016 (i.e., only include the donut sample). The observation period is from 2010 to 2021.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

The event-study estimation reassures the findings. Figure B2 demonstrates non-significant estimates for all the pre-intervention periods, showing a good common trend. The results also suggest a null effect on spending change after the policy intervention.

The results on tuition hikes align with the general pattern of DD results but with larger estimates. Table B2 finds that taxed colleges underwent a 10% increase in undergraduate tuition ($p < 0.01$, see Column (2)), 5% increase in graduate tuition ($p < 0.1$, see Column (3)), and 6% increase in room and board charge ($p < 0.01$, see Column (4)). Despite the larger magnitude of the point estimates, the 95% confidence intervals overlap with the estimates from DD. The event-study estimates (see Figure B3), once again, confirm the parallel trend in the pre-intervention period and show that the increase in tuition has gradually increased over time.

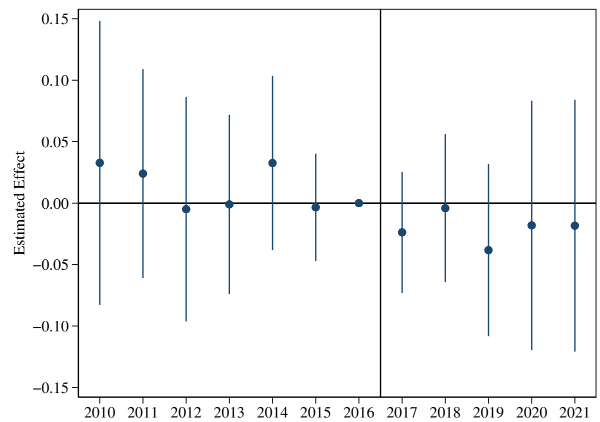


Figure B2: Event Study Estimates: Tax Shifting Behavior on Total Expenditure

Note: The coefficients are estimated using the event study version of equation (B1). The error bars denote the 95% confidence interval. The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022, and exclude colleges with endowment assets per student between \$400,000 and 600,000 in 2016 (i.e., only include the donut sample).

Figure B1 provides insight into the inconsistency in effect sizes between the DD and DDD models. As demonstrated in Figure B1b, colleges that are large and wealthy (subjected to the tax) show a parallel trend in tuition with colleges that are large but non-wealthy (the comparison group in the DD model) prior to the policy. However, the treatment group increased their tuition relatively more than the comparison group after the policy was effective. Despite the good pre-treatment common trend implying that large but non-wealthy colleges could serve as a good counterfactual, concerns remain about whether the common trend assumption would continue to hold true. Particularly, the pandemic might serve as a potential factor that affects the two groups differently.

This concern is backed up by evidence from the second control group from the DDD model. Figure B1d demonstrates that small but wealthy colleges and small and non-wealthy colleges also possess parallel trends prior to the policy, although these groups are more fluctuate due to their small nature. However, small but wealthy colleges show a larger drop in their tuition level during the pandemic period. One explanation could be that they are more able to use their assets to support students with a lower tuition level during hard times. The suspicion is aligned with previous studies' perspective that endowment assets could serve as the "rainy day fund" (Baum & Lee, 2019; Rosen & Sappington, 2019). In the DDD model, the response of small wealthy colleges could serve as

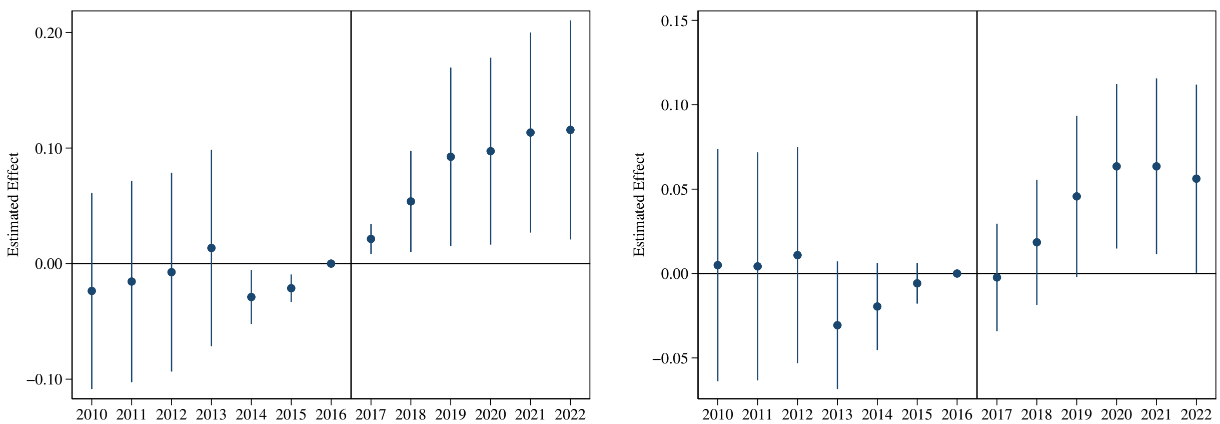
Table B2: Tax Shifting Behavior on Enrollment, Tuition, and Charge (DDD Setting)

	(1)	(2)	(3)	(4)	(5)	(6)
	Log FTE	Log Listed Price			Log Total Revenue	
	Enrollment	Undergrad Tuition	Graduate Tuition	Room & Board	Tuition	Auxiliary
$Large \times Wealthy \times Post$	–0.084	0.100***	0.052*	0.059***	0.214	–0.138
	(0.079)	(0.033)	(0.028)	(0.017)	(0.212)	(0.135)
Observations	11,004	11,004	11,004	11,004	11,004	11,004
Baseline Mean (Thousand)	6.037	39.033	28.449	11.451	162,878	61,246

Note: The coefficients are estimated using equation (B1). Standard errors clustered at the institution level in parentheses. The outcomes are the log expenditure by spending category. Column (1) is the total expenditure. Column (2) is the sum of instructional and academic support expenditures. Column (3) is the sum of research and independent operation expenditure. Column (4) is the public service expenditure. Column (5) is the institutional support expenditure, which includes spending on operational support, administrative services, and management. Column (6) is the sum of auxiliary facilities, hospital, and student service expenditure. Column (7) is the net institutional grant aid to students, including scholarships and fellowships. All dollars are adjusted by CPI and denoted in 2010 real dollars. Samples are private non-profit colleges that reported in IPEDS and filed Form 990 yearly from 2010 to 2022. All Panels exclude colleges with endowment assets per student between $400,000 and 600,000 in 2016 (i.e., only include the donut sample). The observation period is from 2010 to 2022 for columns (1) to (4) and 2010 to 2021 for columns (5) and (6).
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

a counterfactual for how large wealthy colleges would respond to the macro environment. Since the DDD model predicts that the treated colleges should have been able to control their tuition at a lower level as the small wealthy colleges did, the model produces a causal estimate of a larger relative increase in tuition for the treated colleges. Whether small wealthy colleges could serve as a better counterfactual for the treatment group than large non-wealthy colleges is untestable. Therefore, this paper presents the DD estimate as the lower bound while the DDD estimate as the higher bound.

Overall, the DDD estimates are generally aligned with the DD results. The evidence suggests that taxed colleges do not respond to the taxation by cutting spending but might increase tuition to shift the burden.



(a) Log Undergraduate Tuition

(b) Log Graduate Tuition

Figure B3: Event Study Estimates: Tax Shifting Behavior

Note: The coefficients are estimated using the event study version of equation (B1). The error bars denote the 95% confidence interval. The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022, and exclude colleges with endowment assets per student between $400,000 and 600,000 in 2016 (i.e., only include the donut sample).

Appendix C: Methodology Details on Permutation Test for SCM

This paper utilize the Synthetic Control Method (SCM) to examine the treatment effect on individual institution. The conventional SCM only offer point estimates but not inference statistics. To obtain the inference statistics, this paper obtains the distribution of the estimates using a permutation test. Specifically, I perform the following steps:

Step 1: Applying SCM to placebo units:

In this step, I take each of the units in the donor pool and perform the SCM (using equation (3)). For the analysis on tax avoidance, there were 800 colleges in the donor pool; and in the tax shifting analysis, there were 752 colleges in the donor pool (see Table C1). In this permutation test, the units in the treatment group are excluded from the analysis. The practice in this step provides 800 (752) placebo estimates on each of the single units in the donor pool.

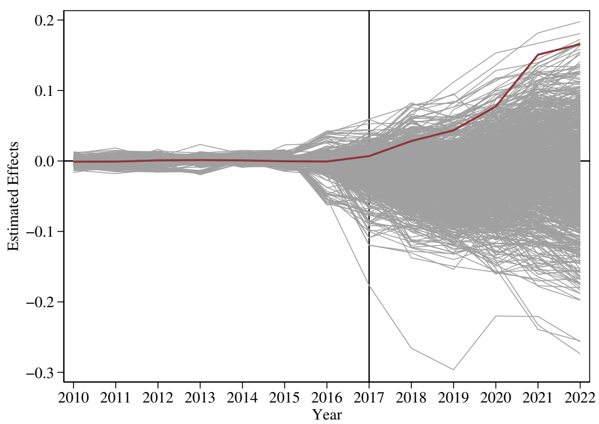
Table C1: Number of Units in Each Analysis

	Number of Units	
Analysis	Treatment Group	Donor Pool
Tax Avoidance	17	800
Tax Shifting	24	752

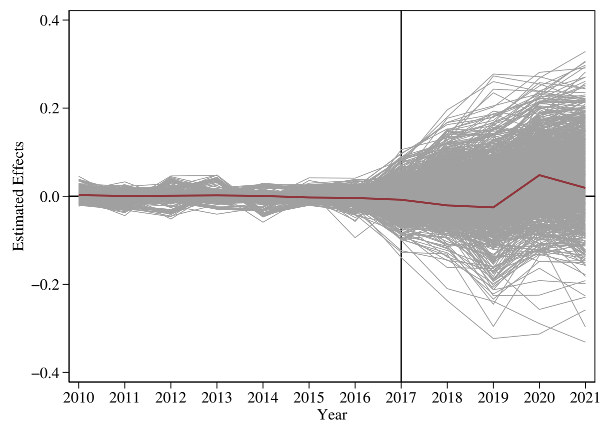
Step 2: Estimating placebo treatment effects:

In this step, I randomly select N placebo estimates from the previous step and calculate the average treatment effect at each time period ($\overline{\beta_t}$; using equation (4)). The number N is defined with the actual number of treated units. For example, in the tax avoidance analysis, I randomly selected 17 placebo estimates to take the average; and in the tax shifting analysis, the number would be 24. The procedure is then repeated 1,000 times, resulting in a distribution of the estimates.

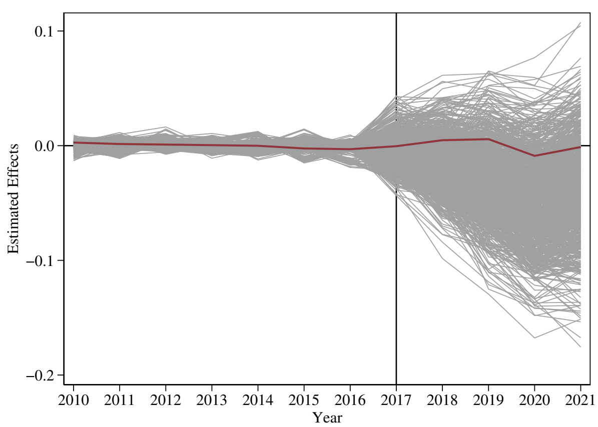
By this stage, I can already compare the actual estimates with the placebo ones to obtain the permutation p-values (for a single time period). Figure C1 demonstrates the distribution of the placebo estimates placed along with the actual estimates. These placebo estimates serve as the potential distribution of the estimated $\overline{\beta_t}$ in the absence of the policy. If the actual estimate is located at the range out of most (such as 95%) of the placebo estimates, then the estimated policy effect is likely not due to random. For the estimation of the impact of tax avoidance behavior on student enrollment, the results suggest that the actual estimate is located at the upper bound of the placebo estimates, especially in the latter year (see Figure C1a). For the estimation of the impact of tax-shifting behavior on tuition revenue, the actual estimate is also located at the upper bound of the placebo estimates (see Figure C1d).



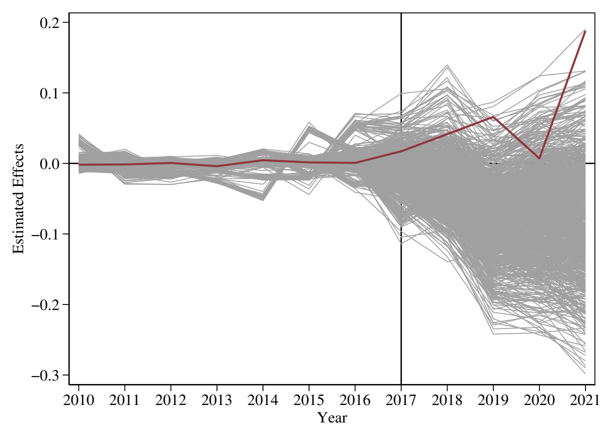
(a) Tax Avoidance:
Log Number of FTE Students



(b) Tax Avoidance:
Log Endowment Assets Per-Student



(c) Tax Shifting: Log Total Expenditure



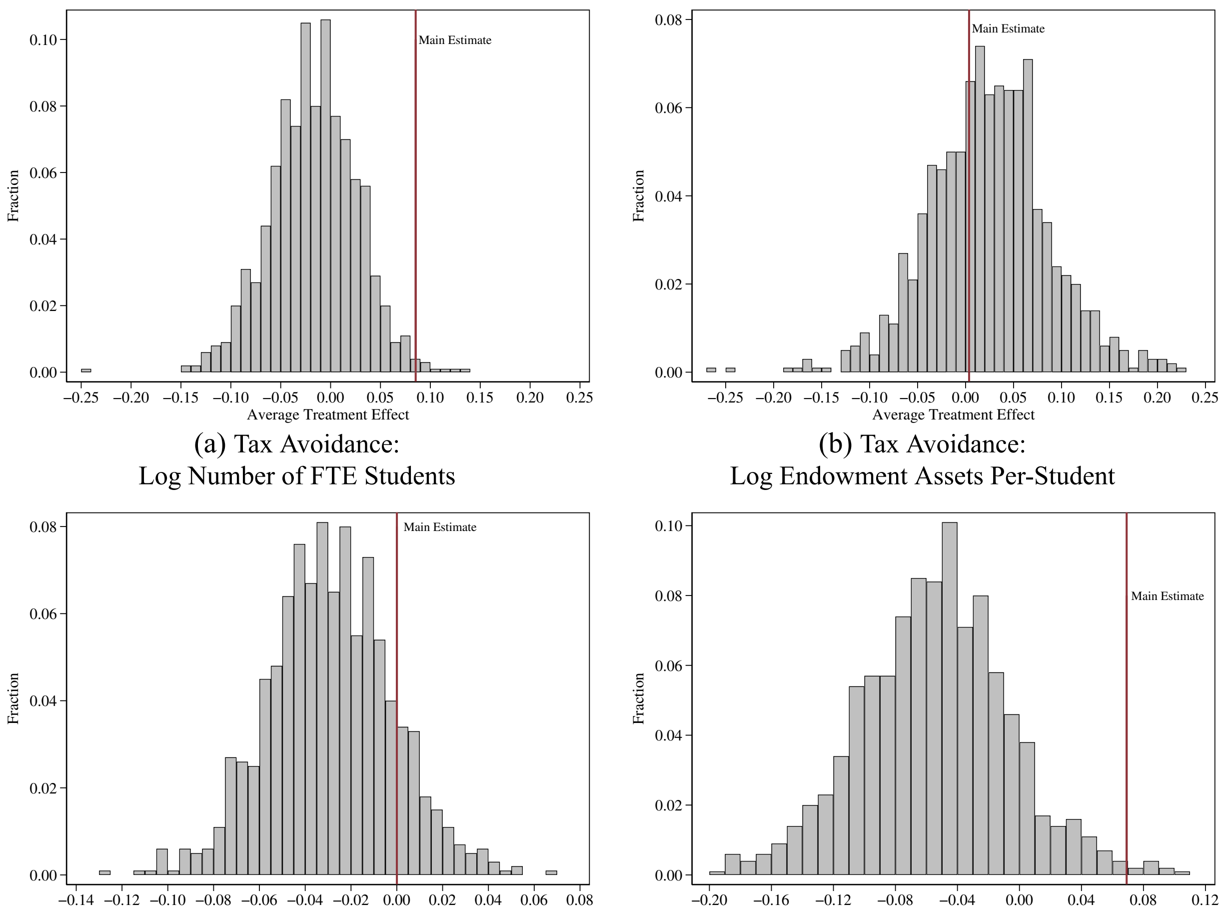
(d) Tax Shifting: Log Tuition Revenue

Figure C1: SCM Permutation Test: Dynamic Treatment Effect

Step 3: Calculating permutation p-value for ATT:

The former step obtains the dynamic treatment effect for the placebo units. In the next step, I apply equation (5) to compute the ATT for the entire post-treatment period, and then compare the actual estimate with the placebo ones.

Figure C2 demonstrates the distribution of placebo estimates (the histogram) and the location of the actual ATT (vertical line). The permutation p-value is calculated by counting the number of placebo estimates in excess of the actual estimate. In the case of analysis on tax avoidance impact on student enrollment, the permutation p-value would be 0.008 as only 8 out of 1000 placebo ratio excess the actual value (see Figure C2a). The ATT and permutation p-value of each variable are presented in Table C2 to C5. Most results are alined with the main findings with DD model.



(a) Tax Avoidance: Log Number of FTE Students

(b) Tax Avoidance: Log Endowment Assets Per-Student

(c) Tax Shifting: Log Total Expenditure

(d) Tax Shifting: Log Tuition Revenue

Figure C2: SCM Permutation Test: Average Treatment Effect

Table C2: Tax Avoidance Behavior on Student Enrollment: SCM Results

	(1)	(2)	(3)	(4)	(5)
	Log FTE	By Enrollment Status		By Student Level	
	Enrollment	Full-time	Part-time	Undergraduate	Graduate
ATT	0.085***	0.071***	–0.054	0.075*	0.033
Permutation p-value	0.008	0.004	0.694	0.057	0.144
Range	[0.029,0.182]	[–0.016,0.201]	[–0.729,0.388]	[–0.013,0.147]	[–0.191,1.095]

Note: The ATT are estimated using equation (5). The permutation p-values are estimated using Step 3 in Appendix C. Range denotes the minimum and maximum single-institution treatment effect.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table C3: Tax Avoidance Behavior on Endowment and Assets: SCM Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log Endowment		By Restricted Status		By Category			
	Total	Per-student	Non-restricted	Restricted	Capital	Investment	Others	Liability
ATT	0.060	0.004	0.285	0.103*	0.028	0.107*	0.076	0.070**
Permutation p-value	0.121	0.647	0.161	0.060	0.117	0.075	0.599	0.046
Range	[–0.10,0.18]	[–0.13,0.16]	[–0.27,1.49]	[–0.10,0.27]	[–0.08,0.31]	[–0.05,0.46]	[–11.12,12.10]	[–0.39,0.94]

Note: The ATT are estimated using equation (5). The permutation p-values are estimated using Step 3 in Appendix C. Range denotes the minimum and maximum single-institution treatment effect.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table C4: Tax Shifting Behavior on Expenditure: SCM Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log Expenditure						
	Total	Instruction	Research	Public Service	Institution Support	Auxiliary Facilities	Institution Grant
ATT	0.000	0.076**	0.049	0.208*	0.023*	0.002	–0.151
Permutation p-value	0.135	0.024	0.386	0.058	0.058	0.166	0.699
Range	[–0.16,0.12]	[–0.08,0.25]	[–0.27,0.28]	[–0.15,1.10]	[–0.16,0.40]	[–0.28,0.34]	[–0.51,0.13]

Note: The ATT are estimated using equation (5). The permutation p-values are estimated using Step 3 in Appendix C. Range denotes the minimum and maximum single-institution treatment effect.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table C5: Tax Shifting Behavior on Enrollment, Tuition, and Charge: SCM Results

	(1)	(2)	(3)	(4)	(5)	(6)
	Log FTE	Log Listed Price			Log Total Revenue	
	Enrollment	Undergrad Tuition	Graduate Tuition	Room & Board	Tuition	Auxiliary
ATT	0.040**	0.035*	0.016	0.018***	0.069**	–0.013
Permutation p-value	0.040	0.050	0.155	0.009	0.010	0.254
Range	[–0.14,0.21]	[–0.05,0.08]	[–0.29,0.17]	[–0.14,0.18]	[–0.04,0.27]	[–0.65,0.38]

Note: The ATT are estimated using equation (5). The permutation p-values are estimated using Step 3 in Appendix C. Range denotes the minimum and maximum single-institution treatment effect.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Step 4: Calculating permutation p-value for single unit:

To estimate the permutation p-value for single institution, I follow the approach outlined in Abadie et al. (2010) to compute the post/pre mean squared prediction error (MSPE) ratio using the following equation:

$$MSPE\,ratio = \frac{\frac{1}{T-T_0}\sum_{t>T_0}^{T}\left(\overline{\beta_t}\right)^2}{\frac{1}{T_0-1}\sum_{t<T_0}^{T_0-1}\left(\overline{\beta_t}\right)^2} \tag{C1}$$

Next, I compared the ratios of the actual estimate to the placebo estimates. The permutation p-value is calculated by counting the number of placebo post/pre-MSPE ratios in excess of the actual ratio. The level of significance of each institution is noted in the Figures 3 and 6 in the manuscript.

Appendix D: Estimation Net Benefit of Enrollment Expansion

This section estimates the net benefit derived from the enrollment expansion due to tax avoidance behavior. The estimation here is primarily based on the full-time undergraduate students as this group is the major driver of the enrollment effect. I perform the following steps to estimate the net benefits:

Step 1: Estimated the increase in college degree holders

Based on the SCM estimation, the 17 colleges around the tax threshold collectively increased their full-time undergraduate enrollment by 9,623 as of 2022. Table D1 reports the estimation for each college. Applying the degree completion rate at these colleges, this increase in enrollment could eventually result in an additional 8,799 college degree holders.[32]

Step 2: Obtained the net benefit of a college degree from prior studies

Previous studies have estimated the net personal benefit of earning a college degree to range from \$250 thousand to \$625 thousand (Hill et al., 2005; P. Taylor et al., 2011; Trostel, 2015), while the net social benefit falls between \$350 thousand and \$600 thousand (Hill et al., 2005; Edelson, 2016; Trostel, 2015). Combining the upper (lower) bounds of these estimates yields a total of \$1,225 (\$600) thousand. The estimations of individual benefits primarily hinge on the increase in earnings attributable to the degree, deducted tuition costs, and forgone earnings during college. Conversely, estimations of societal benefit primarily rely on the tax revenue accrued by the government due to increased labor earnings, net of government investment in higher education.

Step 3: Estimated the premium in return for sample college to less selective colleges

The increase in degree holders among these colleges might not be "additional." It is possible that these students could have enrolled in another college had these colleges not expanded their access. Therefore, I assume that the expansion in enrollment access essentially "moves up" stu-

[32] The average degree completion rate within 150% of normal time (i.e., 6 years) at these colleges is 88%, ranging from 65% to 97%. The estimation of degree holders is based on applying the degree completion rate in a specific college to the estimate of increased enrollment in the same college.

Table D1: Estimation of Net Benefit from Enrollment Expansion

	Barron's Ranking	Increase in FT Undergrad	Average Degree Completion Rate	Increase in Bachelor Degree	Estimate Net Benefit ($ Million)
University of Chicago	Most competitive	1,695	0.956	1,620	65.118
Emory University	Most competitive	1,481	0.900	1,333	53.572
Northwestern University	Most competitive	941	0.965	908	36.505
Washington University in St Louis	Most competitive	872	0.937	817	32.857
University of Pennsylvania	Most competitive	741	0.961	712	28.609
Duke University	Most competitive	701	0.966	677	27.234
Colby College	Most competitive	538	0.880	474	19.043
Middlebury College	Most competitive	499	0.935	467	18.781
Vassar College	Most competitive	482	0.920	443	17.803
Berry College	Very competitive	457	0.647	296	8.345
Hamilton College	Most competitive	357	0.924	330	13.259
Davidson College	Most competitive	288	0.916	264	10.593
Trinity University	Highly competitive	246	0.758	187	7.502
Claremont McKenna College	Most competitive	139	0.913	127	5.088
Wabash College	Highly competitive	119	0.753	90	3.607
Bryn Mawr College	Most competitive	67	0.826	56	2.240
Mount Sinai School of Medicine	Special	0.09	N/A†	0	0.000
Total		9,623		8,799	350

Note: The Barron's Ranking is obtained from Barron's Profiles of American Colleges, which categorizes colleges into seven categories: most competitive, highly competitive, very competitive, competitive, less competitive, noncompetitive, and special (usually art or medical schools). The increase in full-time undergraduate enrollment is measured as of 2022. The estimates are retrieved from equation (3). The average degree completion is measured as the proportion of bachelor's degree-seeking students who completed a bachelor's degree within 150 percent of the normal time (i.e., six years). The data is as of 2022 (calculated using the 2016 enrollment cohort). The increase in bachelor's degrees is calculated as the product of an increase in enrollment and average degree completion rate. For colleges of most competitive and highly competitive, the net benefit is estimated as 6.7% of the average personal and societal net benefit (i.e., $600 thousand) of college degrees. For colleges that are very competitive, the net benefit is estimated as 4.7% of the average personal and societal net benefit (i.e., $600 thousand) of college degrees.
† Mount Sinai School of Medicine does not report the degree completion data in the IPEDS.

dents from a less selective college to a more selective one instead of creating a new enrollment. Previous studies have widely established that the premium of attending a selective or elite college would exceed that of attending less selective ones (Kapur et al., 2016; Witteveen & Attewell, 2017; Zimmerman, 2019; Carnevale et al., 2022). Particularly, as demonstrated in Table D1, the majority of colleges engaged in tax avoidance behavior are categorized as most, highly, or very competitive.

I estimate the benefit of the enrollment expansion in these colleges by assuming the individual counterfactually attends a one-level lower college in Barron's categorization.[33] Specifically, for colleges categorized as most or highly competitive (tier 1 or 2), I assume that students would have attended very competitive colleges (tier 3) if the colleges had not expanded their access. For col-

[33] The categorization is retrieved from Barron's Profiles of American Colleges. The categorization is primarily based on "college selectivity"—computed with high school performance (ranking and GPA), standardized exams, and the admission rate. It categorizes colleges into seven categories: most competitive, highly competitive, very competitive, competitive, less competitive, noncompetitive, and special (usually art or medical schools).

leges categorized as very competitive (tier 3), I assume that students who have attended competitive (tier 4) colleges instead. Notice that I combined the groups of most and highly competitive (tier 1 and 2) as previous studies estimated the college return based on this categorization combined the two groups and did not provide a breakdown estimation (Witteveen & Attewell, 2017).

Witteveen & Attewell (2017) estimates the earning return from most or highly competitive colleges to be 6.7% higher than degrees from very selective colleges in the short run (4 years) and 11.3% higher in the long run (10 years). Besides, the earning return from very selective colleges is 4.7% higher than attending competitive colleges in the short run and 2.1% in the long run. I treat the percentage increase in the earnings for a higher level relative to a lower level college as the premium of attending a more selective college. Then, I define the net benefit of each additional college degree granted from these colleges to be the selective premium multiplied by the estimated total personal and societal net benefits.

Step 4: Calculated the total net benefit

Combining the above statistics, I calculated the total net benefit in each college using the below formula:

$$\begin{aligned} NetBenefit_{ij} =& IncreaseEnrollment_i \times CompletionRate_i \\ & \times SelectivePremiums_j \times AvgNetBenefit \end{aligned} \tag{D1}$$

Where the net benefit of college i of selective category j is the product of the increase in degree holders ($IncreaseEnrollment_i \times CompletionRate_i$), the percentage of increase in expected earning relative to less selective colleges ($SelectivePremiums_j$), and the estimated average net personal and society benefits of a college degree ($AvgNetBenefit$). $SelectivePremiums_j$ ranges from 2.1% to 11.3% depending on the selectivity of the colleges and whether the estimation is based on the short run or long run. $AvgNetBenefit$ is obtained from previous studies, ranging from \$600 to \$1,225.

Table D1 reports the most conservative estimates based on the lowest selective premiums and total net benefits. The sum of all colleges leads to a total net benefit of $350 million. Figure D1 illustrates the ranges of estimation based on different assumptions. The estimates range from $350 million to $1,300 million.

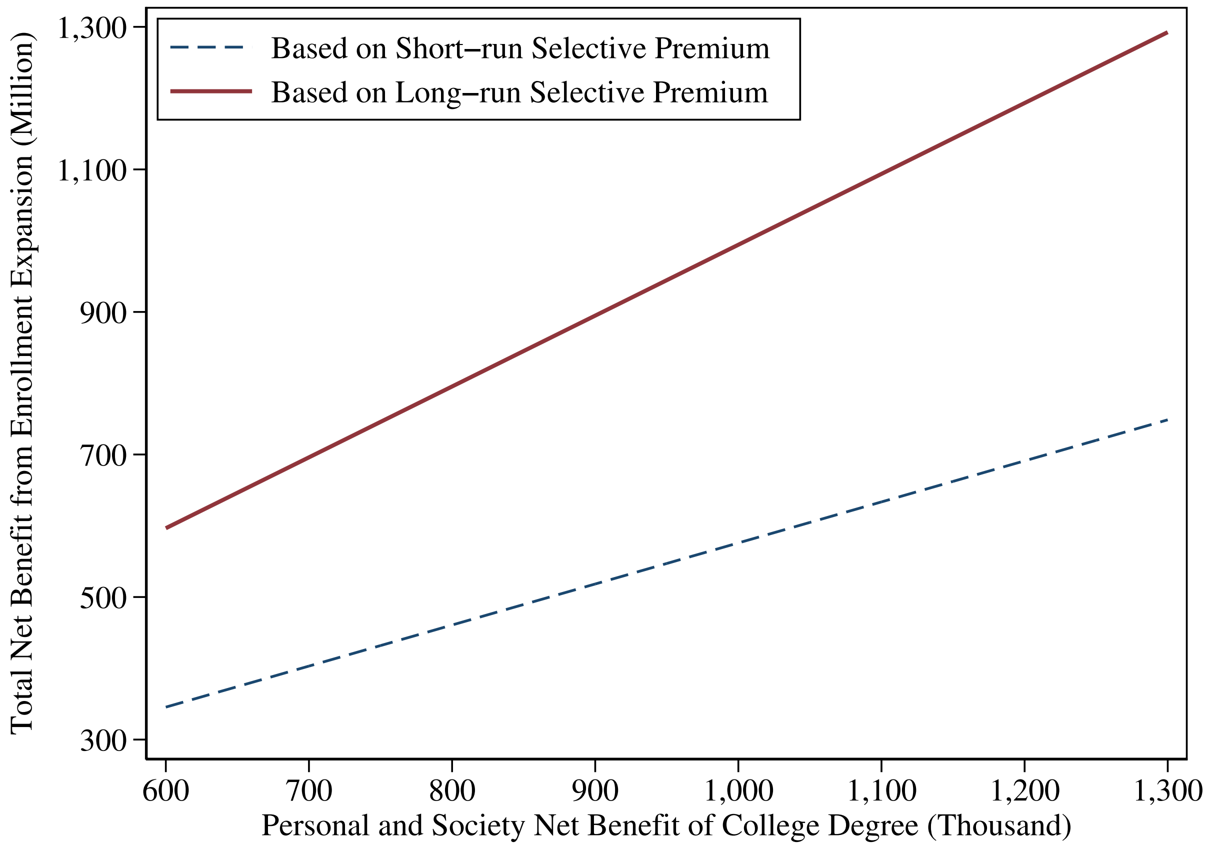


Figure D1: Estimation of Total Net Benefit from College Enrollment Expansion