Colleges' Responses to the Net Investment Income Tax and the Impact on Education Opportunities

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Abstract

The 2017 Tax Cuts and Jobs Act introduced a net investment income tax on select wealthy non-profit colleges. This study examines institutional responses and their impact on educational access. Findings suggest that taxed colleges raised tuition, transferring the burden to students and reducing access for historically underserved groups. However, some colleges strategically increased enrollment to circumvent the tax threshold, creating more educational opportunities. These contrasting responses highlight how policy design significantly influences institutional reactions to taxation. While the tax aimed to address wealth concentration in higher education, its implementation produced mixed results — in some cases undermining educational access while in others expanding it. The findings demonstrate how tax policy can guide institutional behavior toward socially beneficial outcomes.

Keywords—college endowment, net investment income tax, higher education, college access

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1 Introduction

A small number of selective private non-profit colleges in the US manage substantial endowments that generate considerable capital gains which have historically been tax-exempt (Sherlock et al., 2018; Quinn, 2019; Bird-Pollan, 2021). Scholars have noted that this wealth is disproportionately concentrated and often used for wealth accumulation rather than educational purposes (Frey, 2002; Cowan, 2007; Nichols & Santos, 2016), raising questions regarding the justification for tax exemption. In response, the 2017 Tax Cuts and Jobs Act (TCJA) introduced the Net Investment Income Tax (NIIT) — a 1.4% excise tax — on these nonprofit colleges' investment returns. Often referred to as the "endowment tax," the policy only targets colleges with more than $500,000 in endowment assets per student. However, affected colleges argue that this tax burden may reduce their ability to support education and financial aid (Amherst College, et al., 2018). Concerns also exist about potential system gaming, as colleges might manipulate their enrollment or endowment sizes to avoid the tax, potentially decreasing educational resources (Fishman, 2018; Hinrichs, 2018).

This paper evaluates nonprofit colleges' behavioral and fiscal responses to the NIIT. Specifically, I examine whether and to what extent colleges manipulate their enrollment or assets to avoid the tax (designated as tax avoidance behaviors). I also investigate whether taxed colleges adjusted tuition, reduced financial aid, or cut other spending to offset the tax burden (designated as tax shifting behaviors). An additional focus of the analysis is how these institutional responses affect the access and distribution of educational opportunities.

I combine data from the Integrated Postsecondary Education Data System (IPEDS) and Internal Revenue Service (IRS) Form 990 data, tracking colleges from 2010 to 2022. Using a difference-in-differences (DD) framework, I compare colleges subjected to the tax with those unaffected to examine the impact of the policy. I evaluate two types of institutional responses: tax avoidance (attempts to maintain tax-exempt status) and tax-shifting behaviors (paying taxes while transferring the burden to others). Additionally, I examine how these responses affect the distribution of college enrollment opportunities. To complement the DD analysis, I employ the synthetic control method (SCM) to evaluate individual colleges' responses.

The analysis reveals that nonprofit colleges engage in both tax avoidance and shifting behaviors. Colleges near the tax threshold increase student enrollment to circumvent the assets-per-student threshold, effectively avoiding the tax. While this behavior reduces government revenue, it creates additional enrollment opportunities that benefit students across all backgrounds. In contrast, colleges that pay the tax respond by shifting the burden to students through increased tuition and charges. Of the total annual NIIT revenue of $324 million, students bear $287 million (88%) of it through higher tuition and room-and-board fees. Although colleges maintain their spending levels and enrollment numbers, the increased attendance costs alter student composition, reducing opportunities for historically underserved groups and middle-to-low-income students who rely on student loans. These findings suggest that while taxing colleges may generate government revenue, society ultimately bears the burden. However, well-designed incentives and policies could encourage colleges to expand educational access.

The study makes two significant contributions to the literature on college behaviors. First, it provides insights into how colleges respond to the government's regulatory thresholds. It is common for the government to utilize specific cutoffs to allocate funding or regulate institutional behaviors. However, these setups create opportunities for institutions to game the system by manipulating related metrics. For example, studies indicate that colleges might manipulate sports participation statistics to superficially comply with Title IX gender equality requirements (Stevens, 2004), or manipulate cohort default rates (CDR) of federal student loans to avoid losing federal funding eligibility (GAO, 2018). However, empirical evidence on whether and how colleges respond to regulatory thresholds remains limited. Additionally, most previously examined regulations typically offer institutions only one response pathway. The policy context examined in this study is unique because it offers colleges two opposite pathways for manipulating relevant variables and gaining tax exemption. The tax threshold is based on a fraction — assets per student — allowing colleges to either (1) *reduce* their assets (potentially decreasing resources invested in higher education) or (2) *increase* student enrollment (expanding educational access) to gain tax exemption. Therefore, this paper offers insights into whether colleges opt to circumvent regulatory thresholds in ways that either diminish or improve educational values, with implications for policy design to guide institutional responses.

Secondly, this paper contributes to the literature examining how colleges respond to financial shocks. While extensive research has examined how colleges respond to government funding cuts (Kane & Orszag, 2003; Mumper & Freeman, 2005; Altundemir, 2012; Filippakou et al., 2019; Civera et al., 2021) or negative economic shocks (Brown et al., 2014; Rosen & Sappington, 2019; Bulman, 2022), few studies investigate how colleges respond when the government imposes additional financial burdens, such as taxation. Previous studies find that funding cuts or negative shocks from endowment capital returns are associated with spending reductions or tuition increases (Altundemir, 2012; Filippakou et al., 2019; Civera et al., 2021; Brown et al., 2014; Rosen & Sappington, 2019; Bulman, 2022). However, government funding and capital market returns are usually unexpected and fluctuate, which might differ from an expected structural change like taxation. This paper provides insight by examining the effects of an investment income tax, a fixed ratio that could be incorporated into budget arrangements in advance. The results enhance our understanding of how colleges manage their finances and the implications for higher education access.

In a concurrent paper, Ryan et al. (2024) provides initial empirical evidence of colleges' responses to the NIIT, focusing on eight selected institutions using the SCM for each case. Their analysis suggests that some colleges may have responded to the tax by increasing enrollment, raising attendance costs, or reducing financial aid. However, the study has important limitations: it relies on a short pre-intervention period (2015–2017), which may undermine SCM validity (Abadie, 2021), and does not examine aggregate responses across all affected colleges. This paper advances the literature in two key ways. First, it offers a more rigorous and comprehensive analysis of institutional responses by combining a DD design with SCM across a larger and more representative sample. Second, it moves beyond institutional behavior to assess the broader effects of the NIIT on college access and student composition, providing new evidence on how tax policy can shape equity in higher education.

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 the cutoffs and all public colleges remain exempt from this taxation. The policy went into effect on January 1st, 2018.

The IRS initially estimated the tax would be applied to 25 to 40 colleges (ACE, 2019). In actuality, during the first year of the policy, 33 colleges were subjected to the tax. Table A1 in Appendix A lists the colleges potentially affected by the tax and their tax statuses from 2018 to 2022. As the taxation thresholds have not changed, the number of colleges subject to the tax would increase as institutions' endowments grow. As of 2021, 40 colleges were affected by the tax.

Despite the good intention of the policy to address wealth inequalities and encourage colleges to invest resources for educational purposes rather than wealth accumulation (Cowan, 2007; Willie, 2012; Sherlock et al., 2018; Fishman, 2018), concerns have been raised about potential tax avoidance and shifting. Firstly, as the tax applies only to colleges surpassing specified thresholds, scholars fear that colleges might manipulate their student enrollment or endowment sizes to avoid the tax, resulting in decreased available educational resources (Fishman, 2018; Hinrichs, 2018).

Secondly, many colleges stated that the policy could force them to shift the burden to students by cutting spending or raising tuition. In March 2018, 48 colleges wrote a joint letter to Congress stating that the new tax placed a significant burden on them and limited their ability to provide financial aid and support core educational activities (Amherst College, et al., 2018). Individual colleges also delivered similar messages. For example, Stanford mentioned that the tax would harm their ability to provide financial aid and support their academic mission (Selig, 2020), MIT asserted that the tax would constrain their expenditures toward scholarships, education, and research (Stendahl, 2017), and Trinity University stated that the tax bill would force them to increase tuition or cut aid (Derrig, 2017).

Table A2 in Appendix A provides insightful statistics on the expenditures and revenues of colleges subject to the tax and offers a basis for estimating the expected tax bills derived from their net investment incomes. These estimated tax bills, computed using a 1.4% tax rate, average \$13 million annually (ranging from \$1 million to nearly \$60 million). This figure accounts for 0.5% of total revenue (ranging from 0.04% to 1%) or 1.3% of total expenditures (ranging from 0.04% to 3%) for the institutions.

Although the current tax liability affects only a few colleges and appears minor relative to endowment size, several proposals seek to expand its scope and impact. Bill S.3514 proposes increasing the tax rate from 1.4% to 35% for colleges with endowments above \$10 billion. H.R.8883 suggests a 10% rate for colleges with per-student endowment assets above \$250,000, and would affect over 150 institutions. Bill S.3465 proposes a one-time 6% tax on total endowment assets above \$9 billion. Evaluating the current policy's societal effects provides crucial insight for considering these alternative proposals.

3 Conceptual Framework and Literature Review

This section establishes the conceptual framework for understanding colleges' responses to the NIIT. When facing taxation, institutions typically consider two strategic responses. First, they may pursue "tax avoidance" strategies — attempting to manipulate relevant metrics to escape regulatory thresholds and maintain tax-exempt status. Second, institutions may engage in "tax shifting" by transferring the burden to stakeholders through spending cuts or revenue increases to offset tax payments. To understand how colleges might respond to the NIIT specifically, I examine previous literature from two complementary perspectives: (1) how colleges strategically navigate government regulations and respond to financial shocks, and (2) how nonprofit organizations more broadly respond to tax-related regulations. Together, these research streams inform hypotheses about institutional responses to the NIIT and their potential effects on educational opportunities.

3.1 Tax Avoidance Behaviors: Manipulating Metrics to Escape Taxation

3.1.1 Colleges' Strategic Responses to Regulatory Thresholds

The NIIT creates a threshold-based tax liability that may incentivize strategic compliance behaviors. Previous literature reveals that colleges respond strategically to regulatory thresholds in other contexts. For example, GAO (2018) found that colleges hire consultants to help manage their cohort default rates (CDR) by encouraging borrowers to enter forbearance — artificially lowering CDR to avoid disqualification from federal funding without supporting long-term student success. Similarly, Stevens (2004) documented how colleges subject to Title IX requirements manipulate gender equity statistics by counting unfilled roster spots offered to female athletes or excluding walk-on male athletes — improving statistical compliance without achieving actual equity.

These findings suggest colleges are willing to manipulate metrics to address threshold-based regulations. However, most evidence comes from case studies, leaving significant gaps in our understanding of how widespread such behaviors are and their consequences for educational outcomes. This study addresses these gaps by empirically examining how colleges respond to tax thresholds and the resulting effects on educational access.

3.1.2 Nonprofits' Tax Avoidance Strategies

Since the policy targets nonprofit colleges, broader literature on nonprofit tax avoidance provides additional insights. Previous research shows that nonprofits strategically respond to regulatory thresholds by manipulating financial variables (Sansing & Yetman, 2006; St. Clair, 2016; Marx, 2018). For example, St. Clair (2016) and Marx (2018) found nonprofits reduce reported revenue to avoid financial reporting or auditing requirements, while Sansing & Yetman (2006) found private foundations increase payout rates to qualify for lower tax rates.

Importantly, while for-profit entities commonly reduce reported asset values to avoid taxes (Hosono et al., 2018; Cespedes et al., 2021), nonprofits rarely manipulate asset valuations (Marx, 2018). This reluctance stems from donor restrictions (Surysekar et al., 2015; Hung & Berrett, 2021; Prentice & Clerkin, 2023) and the importance of financial transparency for donor confidence (Keating & Frumkin, 2003; Calabrese, 2011; McDonald III & Goodman, 2021). This suggests that while the NIIT allows colleges to manipulate either asset values or student enrollment to avoid taxation, enrollment adjustments are likely to be the preferred strategy.

3.2 Tax Shifting Behaviors: Transferring the Burden to Others

3.2.1 Colleges' Responses to Financial Constraints

For colleges unable to avoid the NIIT, understanding how they respond to financial constraints becomes crucial. While the NIIT represents a novel policy intervention, research on colleges' responses to other financial challenges provides relevant insights.

Studies of endowment shocks — exogenous changes affecting investment returns — reveal patterns of institutional adaptation. Brown et al. (2014) found that colleges reduce endowment payout rates and trim tenured faculty positions following negative investment shocks. Rosen & Sappington (2019) documented that a 10% change in investment returns leads to a 13-14% corresponding change in endowment payouts. Bulman (2022) showed that a 10% increase in endowment values produces a 2.5% increase in core spending, with symmetrical effects for negative shocks. However, Bulman (2022) notably found no evidence that colleges increase tuition or reduce financial aid in response to negative investment returns.

Parallel literature on public colleges' responses to government funding cuts — conceptually similar to removing tax exemptions — provides complementary insights. Studies consistently link funding reductions to tuition increases (Kane & Orszag, 2003; Mumper & Freeman, 2005; Mitchell et al., 2019; Civera et al., 2021). Public colleges also often introduce new charges to offset lost revenue (Kane & Orszag, 2003; Mumper & Freeman, 2005; Filippakou et al., 2019; Civera et al., 2021) and, when unable to raise sufficient revenue through tuition, implement spending cuts (Kane & Orszag, 2003; Mumper & Freeman, 2005; Altundemir, 2012). Other studies also note that colleges would alter their student composition in response to funding structure change (Mitchell et al., 2019; Rosinger et al., 2023).

These findings suggest colleges adapt to financial constraints through a combination of spending adjustments and revenue generation, with the exact mix dependent on institutional context and constraint characteristics. The contrasting findings between endowment shock responses (no tuition increases) and funding cut responses (tuition increases) suggest that the nature, predictability, and permanence of financial constraints matter — raising questions about how the NIIT, a permanent but predictable constraint, will affect institutional behavior.

3.2.2 Nonprofits' Tax Shifting Behaviors

Research examining how nonprofits in other sectors respond to taxation provides additional insights. Studies of nonprofit hospitals — perhaps the closest parallel to higher education — consistently show that they maintain service levels despite varying tax exemption benefits (Rosenbaum et al., 2015; Herring et al., 2018; Propheter, 2019; Zare et al., 2022). Herring et al. (2018) found nonprofit hospitals provide more community services than their for-profit counterparts, regardless of tax exemption generosity, suggesting service maintenance rather than reductions in response to taxation.

Research on private foundations facing the current NIIT is particularly relevant. Sansing & Yetman (2006) examined foundations under a dual tax rate system where higher payout rates qualified for lower tax rates. They found no significant differences in charitable spending between foundations just below and above the tax threshold, suggesting taxation did not reduce service levels.

Similarly, studies examining property tax exemption variations (Grimm Jr, 1999; Fei et al., 2016) found minimal effects on nonprofit activities, though these studies focused more on revenue effects than service delivery changes.

This literature suggests nonprofits typically maintain service levels despite taxation. However, existing research has largely overlooked how nonprofits might shift costs to service recipients through increased charges — a key mechanism I examine in this study.

4 Data and Sample

4.1 Data

This paper incorporated data from the IPEDS and Form 990. The data period for finance variables spanned 2010 to 2021 and was extended to 2022 for other variables. Throughout the paper, the year notation denotes the beginning of the fiscal year or academic year. The IPEDS is an annual survey conducted by the U.S. Department of Education's (ED) National Center for Education Statistics (NCES). 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 (categorized by enrollment status, level of study, and race/ethnicity), and financial information (including subcategories of revenues, expenditures, scholarships, and tuitions).

Form 990 is the tax return filed by tax-exempt organizations. Nonprofit colleges with gross receipts greater than $200,000 or total assets greater than $500,000 are required to file Form 990. Specifically, among approximately 2,000 nonprofit colleges reported in the IPEDS survey, 1,500 (72%) were matched to Form 990 data. Most colleges unmatched are religiously affiliated and, therefore, exempt from filing Form 990.

4.2 Variables

The primary variables determining taxation status are student enrollment and total assets. Full-time equivalent (FTE) students are calculated as full-time students plus one-third of part-time students. For assets, I use the "value of endowment assets at the end of the fiscal year."

When defining the tax and treatment status, this paper uses nominal values to measure financial resources. However, to render the estimates of spending or asset changes comparable over time, the monetary variables are adjusted according to the Consumer Price Index (CPI) and denoted as real dollars for the 2010–11 fiscal year.

4.3 Sample

The samples included in this study consist of private nonprofit colleges that participated in the IPEDS survey from 2010 to 2022 and filed Form 990 every year from 2010 to 2021. Following Fernandez et al. (2023), missing values are imputed using data from adjacent years. I exclude colleges that underwent mergers, major expansions, branch closures, or that have over 50% remote students. These exclusions prevent outcome fluctuations that could distort the analysis.

Colleges were grouped based on enrollment and asset thresholds. Figure 1 shows their distribution by student enrollment (horizontal axis) and endowment assets per student (vertical axis). The upper-right quadrant indicates colleges meeting both thresholds and subject to tax (Figure 1a), while those near the boundary are incentivized for tax avoidance (Figure 1b).

There are only two colleges above the assets cutoff (with more than $500,000 in assets per student) but close to the enrollment cutoff (with student populations ranging from 400 to 600). Due to the small sample size, this paper opts not to focus on this group. Conversely, 17 colleges are above the student cutoff (with a student population of more than 500) but are near the asset cutoff (with assets per student between $400,000 and $600,000). Nine of these are just above the cutoff (with assets per student within $500,000 and $600,000), and another eight are just below the cutoff (with assets per student within $400,000 and $500,000). Table 1 summarizes the sample sizes by student enrollment and assets per student in 2016.

5 Empirical Strategy

The primary empirical strategy in this paper is a DD (difference-in-differences) design, in which I compare the change in outcomes before and after the policy between colleges affected (the treatment group) and unaffected by the policy (the comparison group). The DD framework applies to tax avoidance and shifting analysis, but with varying sample settings and treatment definitions. Section 5.1 details the empirical setting. Additionally, this paper applies the SCM (synthetic control method) to obtain estimates for each college.

A key challenge in the empirical design is that the NIIT applies only to a select number of nonprofit colleges, which differ significantly from institutions unaffected by the policy. This policy's nature makes identifying an ideal comparison group difficult. In the primary analysis, I use all private nonprofit colleges with more than 500 students but not affected by the policy as the comparison group to retain a larger sample size and retrieve more precise estimates, while acknowledging the potential limitations of this approach.

To address the concerns, I conduct two additional analyses. Firstly, in Appendix B, I restrict the sample to institutions of comparable academic standing and reputation (as defined by Barron's Selectivity Index and U.S. News rankings). While colleges affected by NIIT are often high-ranking and selective, some art colleges and medical schools are wealthy enough to be subject to the tax but may not share the same elite status. This restricted sample provides a more plausible comparison but is not used as the main result to avoid excluding some treated colleges.

Secondly, in Appendix C, I apply a triple-difference (DDD) design and introduce an additional comparison group: wealthy colleges (meeting the asset threshold) with fewer students (not meeting the enrollment cutoff) that are thus unaffected by the tax. This approach aims to control for potential trends related to institutional wealth. However, the small sample size of wealthy but small colleges introduces more noise into the estimates.

While each approach has limitations, the consistency of results across these varied methodologies demonstrates the robustness of the findings. By employing multiple strategies and transparently discussing their strengths and weaknesses, this study aims to provide a comprehensive and nuanced analysis of the NIIT's effects on college behavior.

5.1 Difference-in-Differences

The DD model is applied to both tax avoidance and tax-shifting analyses. However, the two analyses use different samples and define treatment and comparison groups differently. Table 2 summarizes the sample construction and treatment status definitions for both analyses. Sections 5.1.1 and 5.1.2 detail the empirical setup.

5.1.1 Examining Tax Avoidance Behaviors

In analyzing tax avoidance, the sample is limited to colleges that meet the tax threshold for student enrollment (with total students greater than 500 in 2016). I also exclude colleges that are far above the tax threshold related to assets per student (with assets per student above $600,000 in 2016), as these institutions are certain to be taxed and have no practical means for tax avoidance. The DD setup compares colleges that are *around* (treatment group) and *far below* (comparison group) the assets-per-student threshold, with distance from the cutoff defined using pre-policy values (as of 2016). This design assumes that only colleges near the threshold are incentivized to manipulate their enrollment and asset values for tax exemption.

Notably, the treatment group includes colleges both just above and below the tax threshold. Table A3 in Appendix A shows colleges' proximity to assets-per-student thresholds. Colleges just above the cutoff require only minor adjustments (0.05–15% asset decrease or 0.05–17% student increase) to qualify for exemption, with some requiring fewer than 50 additional students. Colleges just below the cutoff are also incentivized, as the threshold remains static despite inflation and endowment growth. These institutions would meet the threshold with 7–24% endowment growth, but many experience an average of 3–6% annual growth, potentially becoming subject to the tax within 3 to 4 years. Thus, both groups are strongly incentivized to adjust promptly after policy implementation.

In contrast, colleges far below the cutoff (the comparison group) face no immediate tax liability and thus have no motivation for tax avoidance. The analysis compares outcome changes across time between colleges with and without avoidance incentivization. The estimation equation is:

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

Where Y_{it} is the outcome of interest for college i in year t. $Cutoff_i$ is a dummy variable indicating whether the college is near the cutoff (i.e., having endowment assets per student between $400,000 to $600,000 in 2016). $Post_t$ is a dummy variable indicating whether the policy is effective, with 0.5 for 2017 and 1 after 2018, since the 2017–18 fiscal year was partially affected. In the robustness check, I test various specifications where I treat the year 2017 as 0% to 100% treated or drop the 2017 observations (see Figures A2 and A3). The estimates remain consistent across specifications. θ_i is the college fixed effect. δ_t is the year fixed effect. The equation further includes the time-invariant college characteristics-by-year fixed effect ($X_i \times \delta_t$). This paper includes the Carnegie categorization interacting with the time variable to establish comparisons among institutions of the same type. ε_{it} is the error term. The key parameter of interest is β_1, indicating the responses of colleges near the cutoff following the policy's implementation.

The identification assumption within this setting is that the colleges near the cutoff would have followed the same outcome trend as those far from the cutoff in the absence of the policy. This paper evaluates this assumption by examining the pre-policy parallel trend using an event-study design. Additionally, robustness checks in the Appendix using alternative comparison groups and a DDD design further validate the main findings by addressing potential concerns about differential trends between treated and control institutions.

5.1.2 Examining Tax Shifting Behaviors

Within the tax shifting analysis, attention is directed toward colleges meeting the tax threshold on student enrollment (with total enrollment above 500 in 2016), and compares those *meeting* and *not meeting* the assets per student threshold. Those meeting the threshold would be subjected to the NIIT, while those not meeting it would be exempted. The treatment status is defined using pre-policy values (as of 2016). Additionally, colleges near 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, this analysis compares the change in outcomes over time between colleges subjected to and not subjected to taxation. Specifically, the following equation is estimated:

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

$Treat_i$ is a dummy variable indicating that the colleges met the tax threshold (i.e., had endowment assets per student greater than \$500,000) in 2016. The definitions of Y_{it}, $Post_t$, θ_i, δ_t, X_i, and ε_{it} are the same as in equation (1). The key parameter β_1 in equation (2) captures the relative change in outcomes for taxed colleges versus the control group after policy implementation.

The identification assumption is that colleges subject to the tax should have followed the same outcome trend as those exempt from the tax in the absence of the policy, at least conditionally based on the fixed effect. The event study version of equation (2) ensures that the treatment and comparison groups follow a similar trend prior to the policy. In the robustness check, the empirical setting and sample construction were further adjusted to examine the sensitivity of the analysis. The results are robust across this alternative specification.

5.2 Synthetic Control Method Analysis for Individual Institutions

DD models are helpful in constructing the average treatment effect but would be limited in understanding the heterogeneous response. Since each college is distinct in terms of its proximity to the threshold and the size of the expected tax liability (see Table A2 and A3 in Appendix A), understanding the treatment effect on individual colleges is crucial.

This paper utilizes the 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 (i.e., the donor pool). The weights are then determined by minimizing the difference in pre-intervention observed characteristics (Abadie et al., 2010).

This paper utilizes the demeaned pre-treatment outcome variables to compute the SCM weights. Specifically, each pre-treatment outcome variable subtracts the mean of the institution during the pre-intervention period. This practice, similar to the inclusion of the institution fixed effect in the DD model, provides the benefit of improving the pre-treatment fit (Doudchenko & Imbens, 2016).

In the tax avoidance analysis, the treatment group is comprised of colleges near the asset cutoff, while the donor pool consists of those far from the asset cutoff. In the tax shifting analysis, the treatment group comprises colleges subjected to the tax, while the donor pool includes colleges that meet the student threshold but not the asset threshold. Colleges near the cutoff are excluded.

The estimation is performed separately for each college using the following formula:

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

Where the estimated treatment effect ($\widehat{\beta_{it}}$) is defined as the difference between the observed demeaned outcome of the treated college ($Y_{it} - \overline{Y_i}$) and the synthetic control ($\sum_{j=1}^{M} w_j^* (Y_{jt} - \overline{Y_j})$, 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. To provide inference statistics, this paper employs a permutation test. The permutation method details are discussed in Appendix D.

6 Empirical Results

6.1 Tax Avoidance Behaviors

6.1.1 Aggregate Responses

The results reveal that colleges near the assets-per-student threshold tend to manipulate their student enrollment rather than asset size. Figure 2a presents the event study estimates on enrollment. The figure confirms the DD assumption by showing common pre-policy trends in enrollment for colleges near and far from the tax cutoff. After the policy takes effect, colleges near the tax threshold begin to increase their student enrollment, with the effect magnitude increasing over time.

Table 3 provides the pooled estimates of the post-policy average effect and reveals a 7.6% increase in FTE enrollment ($p < 0.01$, see Panel A, Column (1)) for colleges with avoidance incentives. This effect represents approximately 500 additional students per institution. The enrollment increase is predominantly driven by full-time students (up 7.7%) and undergraduate students (up 7.1%).

Figure 2b explores heterogeneous responses. Colleges just below the cutoff show more pronounced responses, with effect magnitudes approximately double those of colleges just above the cutoff. However, both groups demonstrate positive and significant effects. Panels B and C of Table 3 also reveal colleges below the tax threshold with larger enrollment expansions than those above, suggesting that institutions manipulate student enrollment to avoid future tax exposure.

Figure 3 examines responses in endowment assets. The event study estimates again demonstrate parallel pre-policy trends. The dynamic treatment effect estimates show that colleges around the cutoff do not reduce their assets; instead, there is an upward trend in endowment assets after 2020, likely due to strong investment market performance following the COVID-19 pandemic.

Table 4 presents average post-policy changes. Colleges near the tax threshold show a statistically insignificant 4.3% increase in total endowment ($p > 0.1$; Panel A, Column (1)), primarily driven by growth in capital and investment assets. Notably, increased enrollment and stable endowments led to a non-significant 2.5% decrease in endowment assets per student (Panel A, Column (2)). Colleges below the threshold show a significant 8.4% reduction in endowment assets per student, primarily due to increased student population (Panel B, Column (2)). This 8% reduction effectively offsets their average asset value growth, potentially preserving their tax-exempt status.

6.1.2 Robustness Check

A key concern is that tax-affected colleges, typically wealthy and prestigious, may respond differently to macro conditions than unaffected institutions. I address this by creating two restricted samples: one including only colleges with high Barron's Selectivity Index ratings (most to very competitive), and another limited to US News top 100 institutions (National Universities or Liberal Arts Colleges). Appendix B reports that the estimation results are consistent with the main findings. Colleges around the cutoff significantly increase their enrollment by 7.6% (selective colleges subsample; see column (1) of Table B2 Panel A) or 5.7% (top-ranking college subsample; see column (1) of Table B2 Panel B), very close to the 7.5% estimate of the main result.

I also conducted a DDD design comparing colleges with similar wealth but lower enrollment. Appendix C provides methodological details and comprehensive results. The results align with the main findings about increased enrollment, though the estimates are noisier. Nevertheless, the event study results (see Figure C2) suggest that the positive trend in student enrollment is likely to be real.

6.1.3 Individual Institution Response

Figure 4 shows the evaluation of effects on individual institutions using SCM. All colleges near the cutoff increased enrollment following the implementation of the policy (see Figure 4e). The University of Chicago had the largest response, with an enrollment increase of 18%, followed by Colby College (13% increase), Washington University in St. Louis (11%), and Duke University (11%). The average estimate among all colleges is 0.085 ($p = 0.008$), which aligns with the DD model result.

Regarding the response related to assets per student, half (9 of 17) of the colleges show a negative change in this variable, ranging from a negative 14% to a positive 16% (see Figure 4f). The institutions with the most substantial negative responses were Wabash College (–13%), the University of Chicago (–12%), and Northwestern University (–9%).

Using SCM-derived counterfactuals, I identified colleges that avoided tax liability through manipulation. The manipulation allows two colleges — University of Chicago and Berry College — that could have been taxed in 2018 to remain exempt. In 2019 and 2020, Trinity University and Northwestern University joined the group that "successfully avoided the tax." In 2021, Wabash College could have met the threshold but has been exempted due to manipulation. Vassar College and Colby College were subjected to the tax in 2021 and should have continued in 2022, but due to increases in enrollment, they were exempted. Overall, tax avoidance behavior has allowed seven colleges to be (temporarily) exempted or delay the timing they would be subjected to taxation. The estimated tax loss due to avoidance is $31 million (in 2010 real dollars) over five years.

6.2 Tax Shifting Behaviors

6.2.1 Aggregate Responses

This study finds no evidence of reduced spending due to taxation. The event study evidence in Figure 5a shows good common trends in total expenditure between the treatment and comparison groups prior to the policy. There is no substantial change in total spending after the policy's implementation.

Table 5 provides the average effect in the post-treatment period, suggesting that taxation leads to an insignificant 2% increase in total spending (see Panel A, Column (1)). Figure 5b and Table 5 Panels B and C separate the samples into research universities and liberal arts colleges. Both show no significant changes.

In contrast, colleges respond to taxation by shifting costs to students. Figure 6 presents the event-study evidence on student enrollment and tuition setting. The pattern shows an increase in student enrollment at liberal arts colleges but not research universities (see Figure 6a). However, both groups show an increase in tuition. Research universities increased graduate tuition by 4% in 2019 and increased it by approximately 7% in 2022 (see Figure 6c). Liberal arts colleges increased undergraduate tuition by 2% in 2018 and by 6% in 2022 (see Figure 6b).

Table 6 presents the average post-treatment policy effect, finding that taxed colleges increased their listed tuition and charges for room and board after the policy went into effect. Substantial heterogeneous responses exist across institution types. While liberal arts colleges increased their undergraduate tuition by 3.4% (Panel C, Column (2)), research universities opted to increase their graduate tuition by 6.8% (Panel B, Column (3)). Liberal arts colleges also increased their charges for room and board by 5% (Column (4)).

The results reveal increased enrollment, but only among liberal arts colleges, which experienced a significant 6% increase in student enrollment ($p < 0.01$, see Panel C, Column (1)). Increasing enrollment might be a strategy to boost revenue, as evidenced by a 21% increase in total tuition revenue (see Table 6 Panel C, Column (5)) despite the listed tuition only increasing by 3%.

6.2.2 Robustness Check

A concern is that colleges in the comparison group differ greatly from those in the treatment group, potentially failing to provide a valid counterfactual. Appendix B addresses this issue by using colleges with equivalent selectivity and reputation as the comparison group. The results mirror the main findings, with taxed colleges maintaining their spending but increasing listed tuition by 2–3 %, close to the main estimate.

I employed a DDD design to further address this concern. Appendix C presents the results. The findings show a null response in spending and an increase in tuition. The point estimate on tuition increase is larger than the main results, potentially because small, wealthy colleges were able to maintain lower tuition during the pandemic while large, wealthy colleges (the taxed colleges) did not. Despite some variation in magnitude, the key insights remain consistent across these robustness checks.

6.2.3 Individual Institution Response

Figure 7 examines the individual institutional responses using the SCM. The estimated responses of the effect on total expenditure range from a decrease of 16% to an increase of 12% (see Figure 7e). However, most estimates are not significant. The average treatment effect retrieved from pooled SCM is 0.00004 ($p = 0.135$), which is essentially null.

In terms of tuition revenue, 20 out of 24 colleges saw increases in total tuition revenue. The magnitudes range from an increase of 27% to a decrease of 4% (see Figure 7f). The average treatment effect retrieved from pooled SCM is 0.07 ($p = 0.01$), close to the DD model's estimate. The analysis here utilizes total tuition revenue as a summarized index of change in the listed tuition prices and total enrollments. When separately examining tuition changes, 22 colleges increased their undergraduate tuition, and 21 colleges increased their graduate tuition.

To further examine how taxes paid by colleges compared to the burden shifted to students, I further estimate the amount shifted to students through charge increases for each college. A comprehensive estimate using SCM for individual institutions over 5 years shows $1,186 million shifted through tuition and $249 million through auxiliary charges (2010 real dollars). In contrast, the estimated tax revenue from the NIIT for the same analysis sample is approximately $1.621 billion (in 2010 real dollars) throughout the 5-year sample period. Combining these calculations, colleges shifted 88% of their tax burden to students. Thus, for each $1 of taxes paid for the NIIT, colleges increase students' attendance cost by $0.88.

6.3 Impact on Student Composition

Earlier results show that colleges increase student enrollment to qualify for tax exemption (Section 6.1) and raise tuition to shift their tax burdens (Section 6.2). This section examines how these responses affect educational opportunities by analyzing changes in student racial/ethnic composition and financial aid status.

Table 7 presents enrollment changes by race/ethnicity. Tax avoidance-driven enrollment increases appear to benefit all student groups. Panel A shows enrollment increases across all racial categories, with White students showing a significant 9.1% increase ($p < 0.01$; Column (1)). While Black, Hispanic, and Asian student enrollments also increase, these changes are not statistically significant. Other minorities show a substantial 20% increase ($p < 0.01$; Column (5)), primarily driven by students identifying as two or more races or ethnicities.

However, increased education costs from tax shifting disproportionately affect historically underrepresented groups. Tax-paying colleges experience a significant 13% decrease in Hispanic enrollment ($p < 0.01$; Panel B, Column (3)). Conversely, international student (nonresident alien) enrollment increases by 10% ($p < 0.1$; Panel B, Column (6)), suggesting colleges may be recruiting students who can pay higher tuition rates.

While liberal arts colleges increase overall enrollment, the growth is largely driven by international students (16% increase, $p < 0.05$, Table 7 Panel D, Column (6)). White and Asian enrollment shows non-significant increases (5% and 6%, respectively), while Hispanic decreases significantly by 13% ($p < 0.05$, Column (3)). These patterns suggest that tax-shifting-driven enrollment increases primarily benefit international students but harm domestic underrepresented groups.

Table 8 examines enrollment changes based on financial aid status among first-time degree-seeking undergraduate students (the only group with mandatory reporting). Tax avoidance-driven enrollment increases particularly benefit Pell Grant recipients — typically low-income students — showing a 20% increase ($p < 0.01$; Panel A, Column (3)). The absence of significant changes in institutional aid recipients (Panel A, Column (5)) suggests that while colleges expand enrollment opportunities, they do not support additional students with institutional financial aid.

Conversely, tax shifting most severely affects students relying on Federal Student Loans, who are typically from middle-low-income families ineligible for Pell Grants and are unable to self-finance their education. These students face a substantial 28.5% enrollment decrease ($p < 0.01$; Panel B, Column (4)). While Pell Grant recipients show a 15% enrollment increase ($p < 0.01$; Panel B, Column (3)), this implies that the federal government may bear the burden of increased costs. The unchanged enrollment among institutional aid recipients (Panel B, Column (5)) indicates that colleges do not expand aid programs despite raising student costs.

The enrollment increase in tax-paying liberal arts colleges appears primarily driven by students receiving no financial aid (see Panel D, Column (1)), consistent with the earlier finding of increased international student enrollment (Table 7).

7 Conclusion

This paper explores how nonprofit colleges respond to the NIIT introduced by the TCJA. This policy represents the government's first attempt at regulating college endowments and taxing their investment income. The context provides a unique opportunity to evaluate colleges' responses to the government's regulatory threshold and financial shock imposed through taxation. This paper also investigates how colleges' behavioral responses affect educational access.

This paper identifies two key findings. Firstly, it reveals that nonprofit colleges engage in tax avoidance behavior but in a manner that improves college access. The NIIT targets colleges with more than $500,000 in endowment assets per student, allowing colleges to manipulate either their student enrollment or endowment assets to maintain their tax exempt status. The findings suggest that colleges near the tax threshold responded by increasing enrollment rather than reducing endowment assets. Consequently, the policy pushes colleges to expand educational opportunities despite the loss of government revenue. While the increase in enrollment is most pronounced among White students, the estimates are positive across all racial groups.

Secondly, this paper examines tax-shifting behavior, revealing that taxed colleges increase tuition and charges for on-campus facilities and pass the tax burden onto students. However, they do not reduce financial aid or expenditures, despite claims in public statements and lobbying. This aligns with previous studies indicating that taxes on nonprofits might not affect service levels (Grimm Jr, 1999; Fei et al., 2016; Herring et al., 2018). Colleges' choice to increase tuition instead of reducing services aligns with studies finding that colleges facing financial fluctuations maintain or improve their quality (Bulman, 2022).

The response pattern also has implications for college access. Colleges facing taxes choose not to reduce their enrollment numbers or reduce educational spending but instead, increase tuition and charges. While this behavioral response does not reduce the total number of students served, it changes who can access these institutions. Specifically, analysis suggests that tuition increases shift enrollment away from historically underserved groups (particularly Hispanic students) toward international students who typically have greater financial resources. Additionally, the higher costs particularly disadvantage students from middle-to-low-income families who rely on student loans to finance their education. These findings align with previous studies suggesting that minority and disadvantaged students are more vulnerable to college tuition increases (Flores, 2010; Villarraga-Orjuela & Kerr, 2017; Allen & Wolniak, 2019).

Regarding the magnitude of the response, the SCM estimation suggests that for each \$1 paid to the government, colleges increase the attendance cost to students by \$0.88. This response magnitude concurs with the ranges seen in prior literature on the tax-shifting behaviors of firms. Specifically, past studies of various goods found that for each \$1 increase in tax, retail prices increased by \$0.6 to \$1.4 (Marion & Muehlegger, 2011; Espinosa & Evans, 2013; Bonnet & Réquillart, 2013).

However, this response magnitude is greater than those observed in previous studies on colleges' responses to endowment shocks. For example, Bulman (2022) found a 10% endowment shock driven by the investment market leads to a 2.5% change in core spending, which is much lower than the estimate in the present study. The reason that these colleges' response magnitudes are more aligned with firms' tax-shifting behaviors rather than how colleges respond to their endowment returns could be due to the structure of the income shock. Changes in spending or revenue require budget adjustments that are difficult to significantly alter in a short period. While the NIIT is based on endowment returns, colleges must pay the bill only after the return is realized and not until the following year when the tax return is due. Hence, it is easier for colleges to adjust budgets in response to taxation. Additionally, tax payments might be viewed as an institutional cost, while investment shocks may be considered temporary, with losses in one year potentially compensated in another. Therefore, institutions might respond more strongly to taxation than to investment shocks.

Based on these findings, this paper offers several policy recommendations regarding the NIIT and regulations on colleges in general. Firstly, while the NIIT on colleges has some negative consequences, the worst-case scenario (cutting spending and financial aid) did not occur. Additionally, the benefits (tax revenue gained) generated from the policy exceed the negative costs (burden shifted to students), so reversing the policy is not recommended since returning tax payments to colleges may not ensure the money is used to improve educational equity. Bulman (2022) and Brown et al. (2014) found that colleges often use endowment returns to become more selective or to accumulate wealth rather than enhance equity. Thus, the government could use the revenue to improve access to higher education and redesign the taxation to offer incentives for positive responses. The findings on tax avoidance also suggest colleges are willing to expand enrollment to gain tax exemption status. Therefore, the policy could grant tax exemptions or deductions based on the proportions or amounts spent from endowment assets, incentivizing colleges to improve education quality and equity.

Secondly, for higher education policy in general, this paper identifies that colleges strategically respond to regulatory thresholds and shift burdens onto students through financial means. The results inform policy design to take these behavioral responses into consideration to avoid unintended consequences. However, the evidence in this paper also suggests that a well-designed tax structure or regulatory framework can encourage colleges to respond in ways that align with desirable social outcomes, particularly expanding educational access and opportunity.

Tables

Table 1: Sample Size by Student Enrollment and Endowment Asset Per Student

	Endowment Assets Per student			
	Below 400 K	400 to 500 K	500 to 600K	Above 600K
Students Enrollment above 500	752	8	9	24
Students Enrollment below 500	121	5	2	20

Notes: The number of total students is the sum of full- 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 assets are reported in nominal values.

Table 2: Sample Construction of DD Setting

	Sample	Treatment Group	Comparison Group
Tax Avoidance			
Sample	Private non-profit colleges with more than 500 students and with less than $600,000 assets per student in 2016.	Colleges around the assets-related tax threshold — with assets per student between $400,000 and $600,000 in 2016.	Colleges far below the assets-related tax threshold — with assets per student less than $400,000 in 2016.
# Colleges	769	Just Below Cutoff: 8 Just Above Cutoff: 9	752
Tax Shifting			
Sample	Private non-profit colleges with more than 500 students in 2016 and *excludes* colleges around the tax threshold — with assets per student between $400,000 and $600,000 in 2016.	Colleges above the assets-related tax threshold — with assets per student greater than $600,000 in 2016.	Colleges below the assets-related tax threshold — with assets per student less than $400,000 in 2016.
# Colleges	776	24	752

Notes: The number of total students is the sum of full- 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 assets are reported in nominal values.

Table 3: Student Enrollment-related Tax Avoidance Behavior

	(1)	(2)	(3)	(4)	(5)
	Log FTE	By Enrollment Status		By Student Level	
	Enrollment	Full-time	Part-time	Undergraduate	Graduate
Panel A: All Colleges					
$Cutoff \times Post$	0.076***	0.077***	0.003	0.071***	–0.032
	(0.022)	(0.022)	(0.116)	(0.026)	(0.177)
Observations	9,997	9,997	9,997	9,997	9,997
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	9,880	9,880	9,880	9,880	9,880
Baseline Mean (Thousand)	5.578	5.288	0.870	3.242	2.336
Panel C: Colleges Above the Assets Threshold					
$Cutoff \times Post$	0.046	0.046	–0.045	0.037	–0.225
	(0.031)	(0.031)	(0.145)	(0.035)	(0.153)
Observations	9,893	9,893	9,893	9,893	9,893
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. Panel B restricted the treatment group to colleges with assets per student between \$400,000 and \$500,000 in 2016. Panel C restricted the treatment group to colleges with assets per student of between \$500,000 and \$600,000 in 2016. For both panels, the comparison group consists of colleges with assets per student less than \$400,000 in 2016. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 4: Endowment and Asset-related Tax Avoidance Behavior

	(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								
$Cutoff \times Post$	0.043	–0.025	0.094	0.066**	0.075*	0.100**	–0.788	0.166*
	(0.039)	(0.038)	(0.251)	(0.032)	(0.040)	(0.047)	(0.826)	(0.091)
Observations	9,228	9,228	9,228	9,228	9,228	9,228	9,228	9,228
Baseline Mean (Million)	3,463	0.485	2,217	2,377	2,802	4,221	12	1,853
Panel B: Colleges Below the Assets Threshold								
$Cutoff \times Post$	0.013	–0.084*	–0.074	0.074	0.067	0.044	–1.093	0.046
	(0.054)	(0.046)	(0.218)	(0.047)	(0.069)	(0.054)	(1.258)	(0.083)
Observations	9,120	9,120	9,120	9,120	9,120	9,120	9,120	9,120
Baseline Mean (Million)	2,432	0.426	1,247	1,805	1,639	2,845	22	1,167
Panel C: Colleges Above the Assets Threshold								
$Cutoff \times Post$	0.070	0.029	0.249	0.057	0.084**	0.149**	–0.482	0.276*
	(0.050)	(0.050)	(0.318)	(0.037)	(0.036)	(0.066)	(0.958)	(0.142)
Observations	9,132	9,132	9,132	9,132	9,132	9,132	9,132	9,132
Baseline Mean (Million)	4,380	0.538	3,079	2,885	3,835	5,443	4	2,462

Note: The coefficients are estimated using equation (1). Standard errors clustered at the institution level in parentheses. Panel B restricted the treatment group to colleges with assets per student between \$400,000 and \$500,000 in 2016. Panel C restricted the treatment group to colleges with assets per student of between \$500,000 and \$600,000 in 2016. For both panels, the comparison group consists of colleges with assets per student less than \$400,000 in 2016. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 5: Expenditure-related Tax Shifting Behavior

	(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)	(0.088)	(0.097)	(0.047)	(0.046)	(0.160)
Observations	9,312	9,312	9,312	9,312	9,312	9,312	9,312
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
	(0.070)	(0.072)	(0.173)	(0.144)	(0.092)	(0.075)	(0.131)
Observations	3,756	3,756	3,756	3,756	3,756	3,756	3,756
Baseline Mean (Million)	2,866	957	411	15	227	871	227
Panel C: Liberal Arts Colleges							
$Treat \times Post$	0.019	0.006	–0.075	0.126	0.053	–0.014	0.259
	(0.042)	(0.051)	(0.104)	(0.131)	(0.061)	(0.058)	(0.212)
Observations	5,556	5,556	5,556	5,556	5,556	5,556	5,556
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. Outcomes are log expenditures by category: (1) total expenditure, (2) instruction and academic support, (3) research and independent operations, (4) public service, (5) institutional support (operations, administration, management), (6) auxiliary facilities, hospitals, and student services, and (7) net institutional grant aid (scholarships and fellowships). All dollars are adjusted by CPI and denoted in 2010 real dollars. 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.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 6: Enrollment and Charge-related Tax Shifting Behavior

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log FTE Enroll.	Log Listed Price			Log Revenue			
		Tuition		Room & Board	Tuition		Auxiliary	
		Undergrad	Graduate		Total	Per Stdnt.	Total	Per Stdnt.
Panel A: All Colleges								
$Treat \times Post$	0.034**	0.026***	0.002	0.040**	0.137***	0.107***	0.031	0.014
	(0.016)	(0.009)	(0.026)	(0.017)	(0.034)	(0.032)	(0.046)	(0.046)
Observations	10,088	10,088	10,088	10,088	9,312	9,312	9,312	9,312
Baseline Mean (Thousand)	6.037	42.853	31.228	12.572	178,833	26.235	67,258	10.067
Panel B: Research Universities								
$Treat \times Post$	–0.005	0.015	0.068***	0.022	0.023	0.017	0.071	0.075
	(0.022)	(0.011)	(0.023)	(0.031)	(0.036)	(0.026)	(0.088)	(0.089)
Observations	4,069	4,069	4,069	4,069	3,756	3,756	3,756	3,756
Baseline Mean (Thousand)	11.127	46.025	43.484	13.497	334,854	25.547	125,134	10.406
Panel C: Liberal Arts Colleges								
$Treat \times Post$	0.060***	0.034**	–0.040	0.052***	0.212***	0.166***	0.005	–0.027
	(0.019)	(0.013)	(0.039)	(0.018)	(0.045)	(0.047)	(0.049)	(0.047)
Observations	6,019	6,019	6,019	6,019	5,556	5,556	5,556	5,556
Baseline Mean (Thousand)	1.795	40.210	21.015	11.800	48,815	26.808	19,028	9.785

Note: The coefficients are estimated using equation (2). Standard errors clustered at the institution level in parentheses. 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. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 7: Impact 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						
$Cutoff \times Post$	0.091***	0.040	0.007	0.052	0.204***	0.062
	(0.030)	(0.039)	(0.047)	(0.045)	(0.055)	(0.068)
Observations	9,997	9,997	9,997	9,997	9,997	9,997
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	10,088	10,088	10,088	10,088	10,088	10,088
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)	4.933	0.614	0.929	1.589	0.468	2.301
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	6,019	6,019	6,019	6,019	6,019	6,019
Baseline Mean (Thousand)	0.911	0.106	0.171	0.216	0.090	0.208

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

Table 8: Impact on Student Enrollment by Financial Aid Status

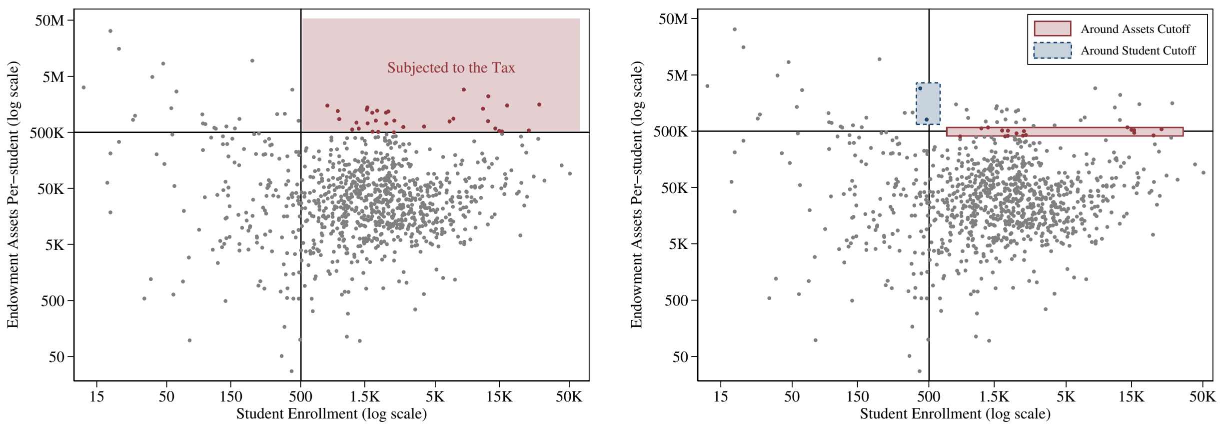
	(1)	(2)	(3)	(4)	(5)
	Log Number of Student				
	No Fin. Aid	Any Fin. Aid	Pell Grant	Federal Loan	Instutional Aid
Panel A: Tax Avoidance, All Colleges					
$Cutoff \times Post$	0.090	0.045*	0.195***	–0.070**	0.006
	(0.134)	(0.026)	(0.028)	(0.032)	(0.042)
Observations	8,388	8,388	8,388	8,388	8,388
Baseline Mean (Thousand)	1.638	2.253	0.552	1.002	0.516
Panel B: Tax Shifting, All Colleges					
$Treat \times Post$	0.266**	–0.002	0.149***	–0.285***	0.000
	(0.120)	(0.023)	(0.025)	(0.028)	(0.037)
Observations	8,448	8,448	8,448	8,448	8,448
Baseline Mean (Thousand)	1.654	2.221	0.553	0.801	0.498
Panel C: Tax Shifting, Research Universities					
$Treat \times Post$	–0.029	–0.073**	0.155***	–0.445***	–0.041
	(0.151)	(0.033)	(0.040)	(0.041)	(0.041)
Observations	3,696	3,696	3,696	3,696	3,696
Baseline Mean (Thousand)	2.695	3.392	0.815	1.108	0.739
Panel D: Tax Shifting, Non-Research Universities					
$Treat \times Post$	0.460***	0.044	0.145***	–0.179***	0.028
	(0.175)	(0.031)	(0.032)	(0.039)	(0.056)
Observations	4,752	4,752	4,752	4,752	4,752
Baseline Mean (Thousand)	0.683	1.128	0.308	0.514	0.274

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 the log number of full-time, first-time degree/certificate-seeking undergraduate students based on different financial aid statuses. 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. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Figures

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

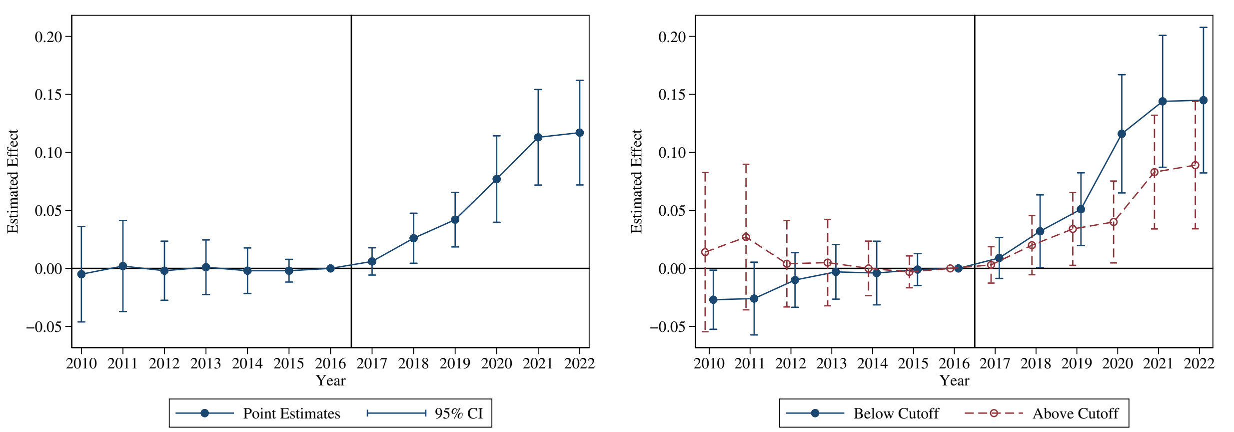
(a) Colleges Subjected to the Tax (b) Colleges Around the Tax Cutoff



Note: 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.

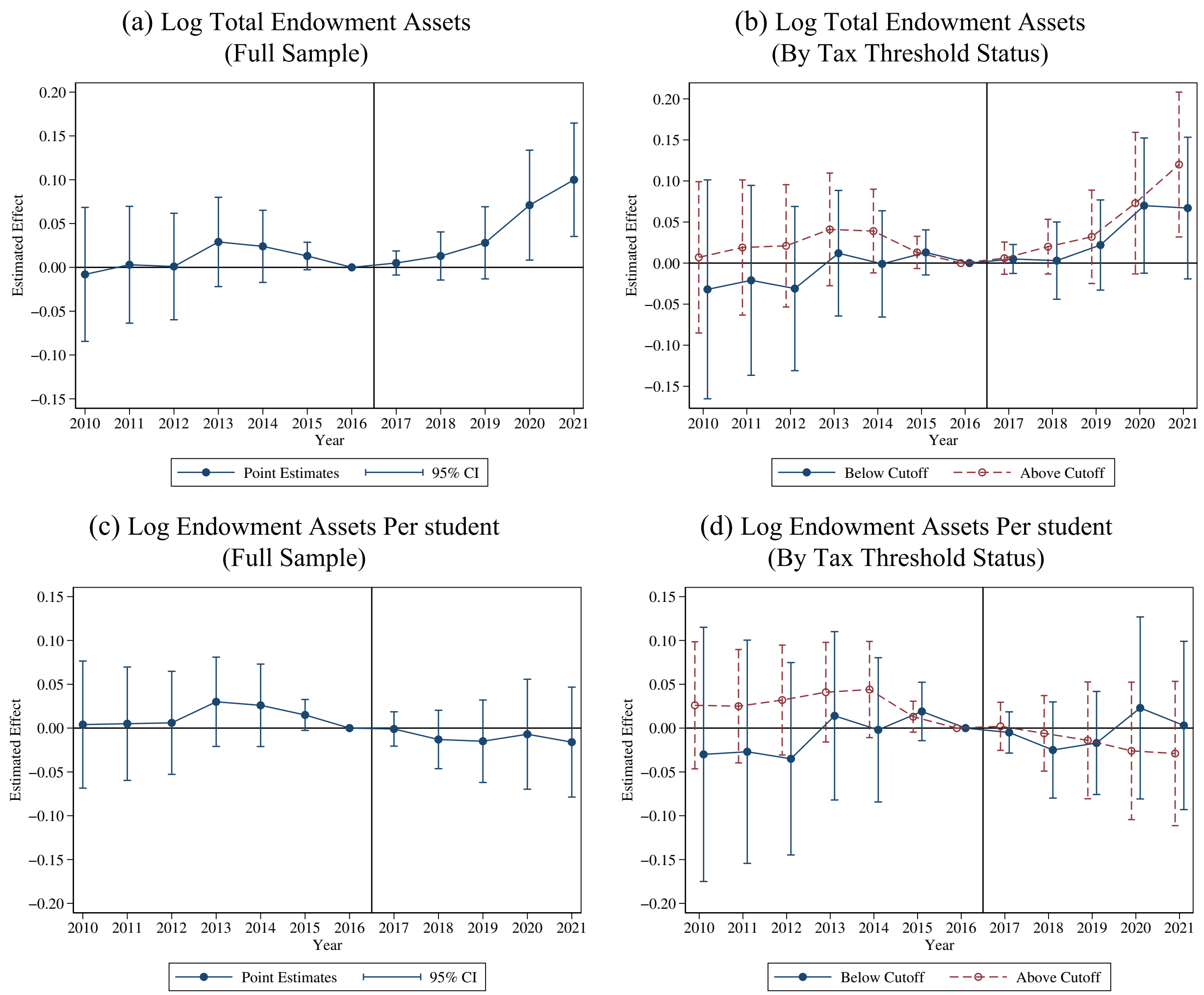
Figure 2: Event Study: Student Enrollment-Related Tax Avoidance Behavior

(a) Full Sample (b) By Tax Threshold Status



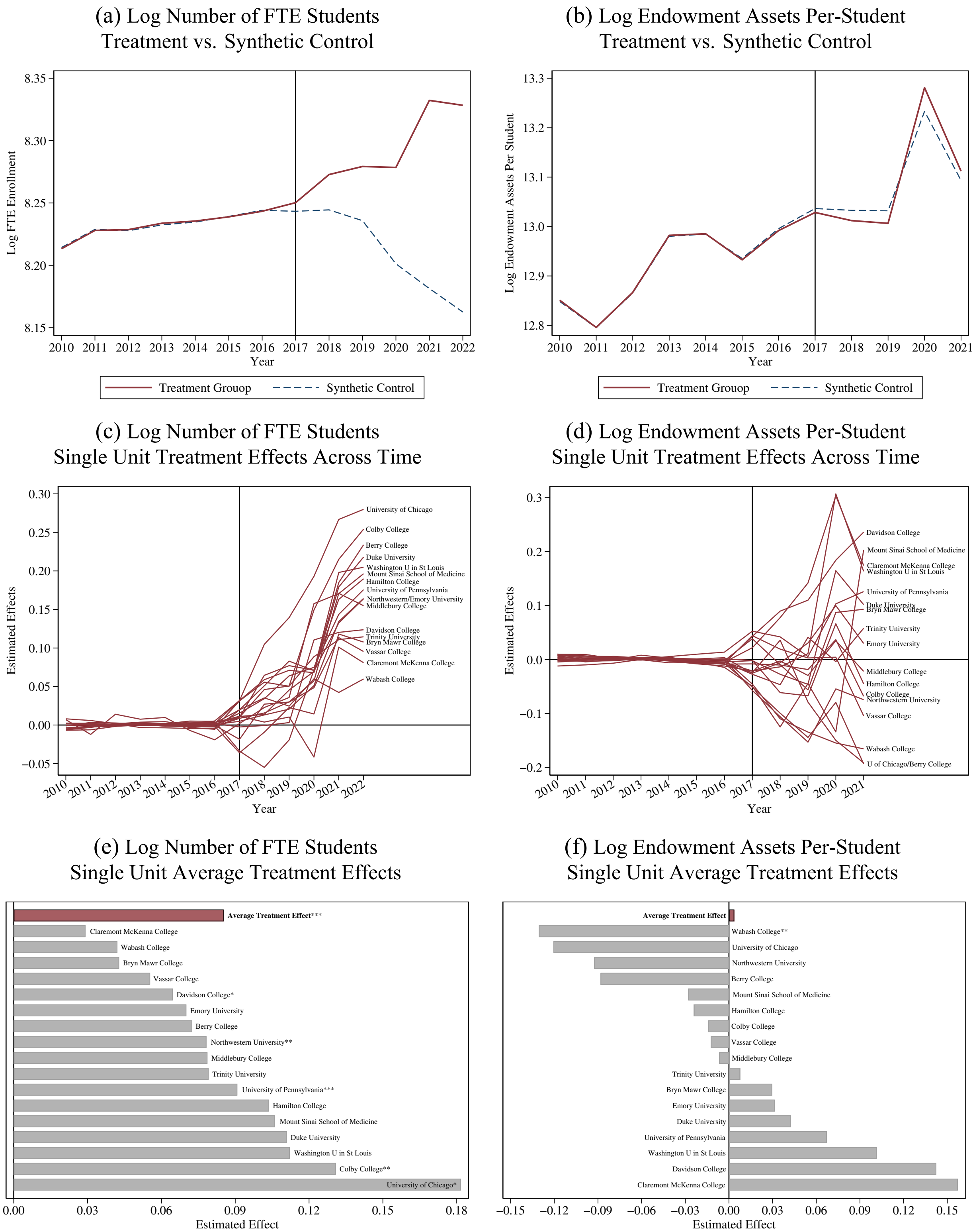
Note: The coefficients are estimated using the event study version of equation (1). The error bars denote the 95% confidence interval. The outcome variables are the log number of FTE student enrollment.

Figure 3: Event Study: Endowment-Related 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 outcome variables are the log endowment assets and log endowment assets per student.

Figure 4: Synthetic Control Method: Tax Avoidance Behavior

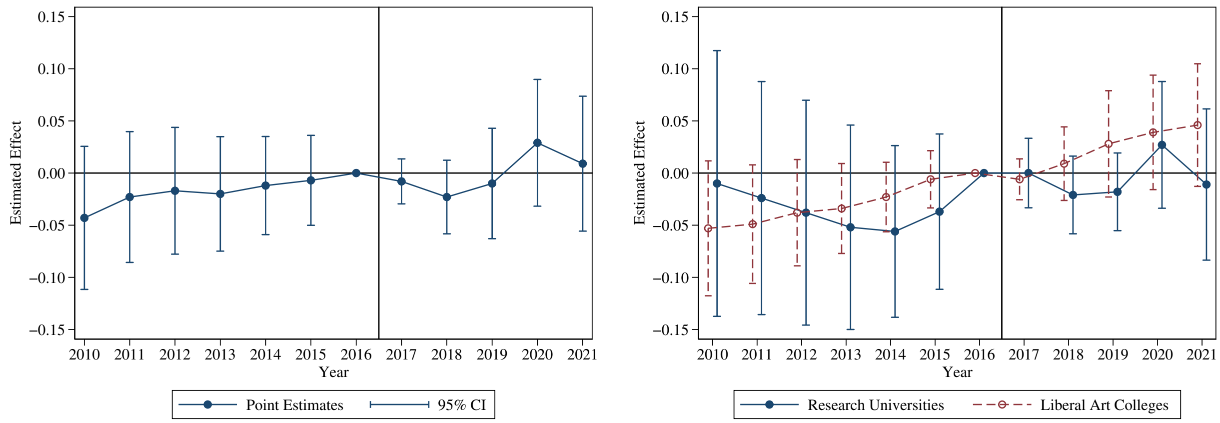


Note: The synthetic controls are estimated using SCM. The treatment effects are estimated using equation (3). The error bars denote the 95% confidence interval. The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022, with a student population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

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

Figure 5: Event Study: Expenditure-Related Tax Shifting Behavior

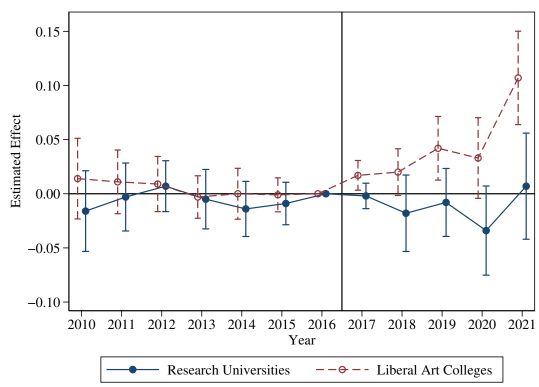
(a) Full Sample | (b) By Institution Category



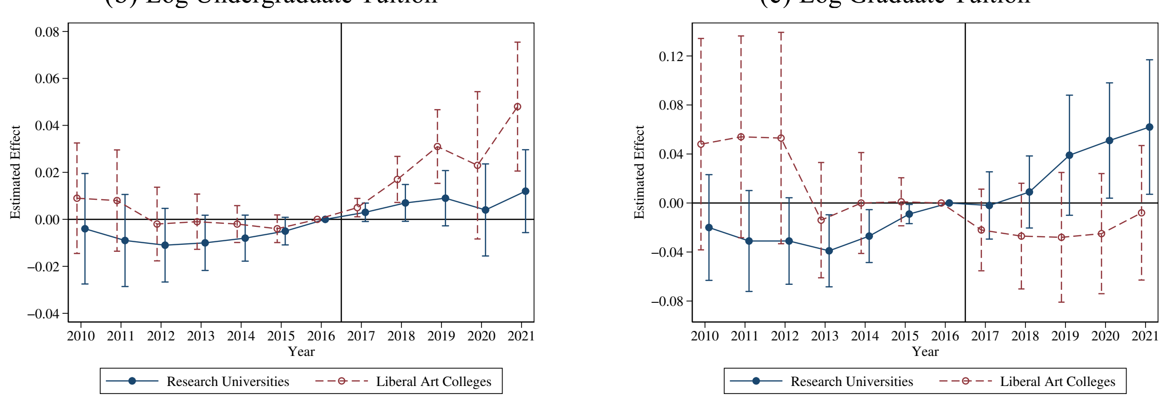
Note: The coefficients are estimated using the event study version of equation (2). The error bars denote the 95% confidence interval.

Figure 6: Event Study: Enrollment and Charge-Related Tax Shifting Behavior

(a) Log FTE Enrollment

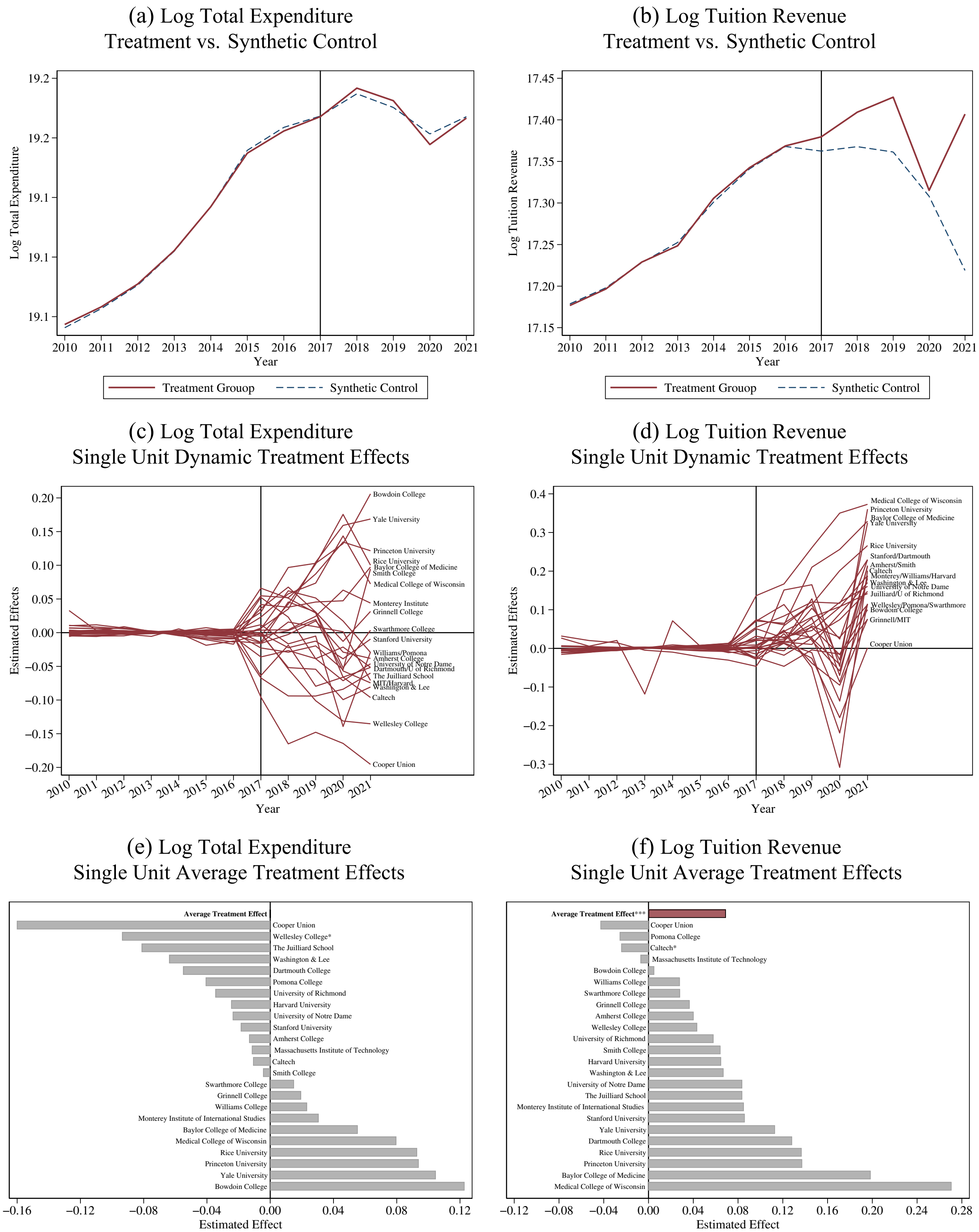


(b) Log Undergraduate Tuition | (c) Log Graduate Tuition



Note: The coefficients are estimated using the event study version of equation (2). The error bars denote the 95% confidence interval.

Figure 7: Synthetic Control Method: Tax Shifting Behavior



Note: The synthetic controls are estimated using SCM. The treatment effects are estimated using equation (3). 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.

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

List of Tables and Figures

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Online Appendix: For Online Publication

Appendix A: Additional Results

Table A1: 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 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.

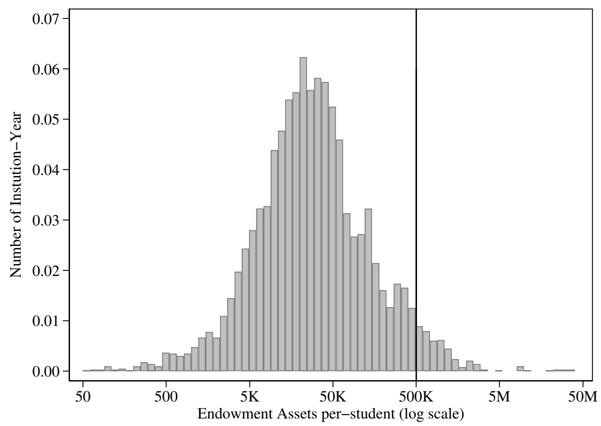
Table A3: Distance of Endowment Assets and Student Enrollment from Tax Threshold

	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%

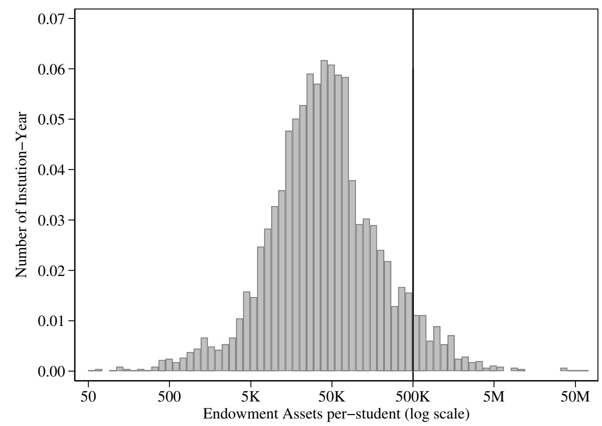
Note: The distances from the endowment threshold are calculated as the amount/number/proportion of endowment/students needed to be increased or decreased in order to make a college meet the tax threshold to be exempted from the tax or a college below the thresholds to be subject to the tax. The average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

Figure A1: Distribution of Endowment Assets Per-student

(a) Fiscal Year 2010 to 2016



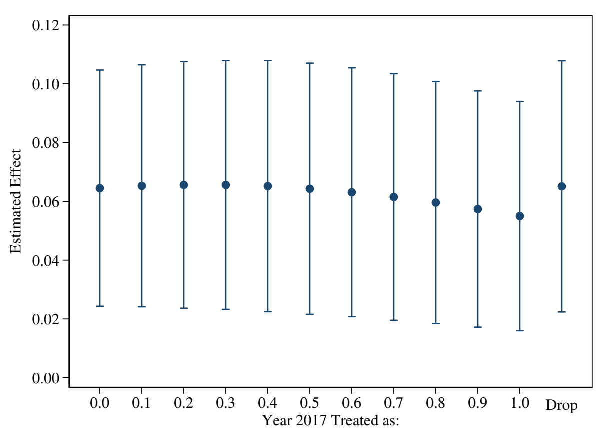
(b) Fiscal Year 2017 to 2021



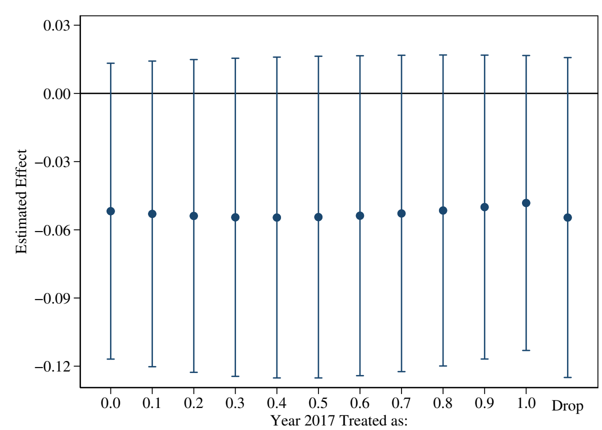
Note: The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022. Endowment assets per student are calculated as endowment asset values divided by full-time equivalent (FTE) students (with one part-time student taken into account as one-third of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

Figure A2: Tax Avoidance Behaviors: Robustness Check by Definitions of Treated Period

(a) Log Number of FTE Students



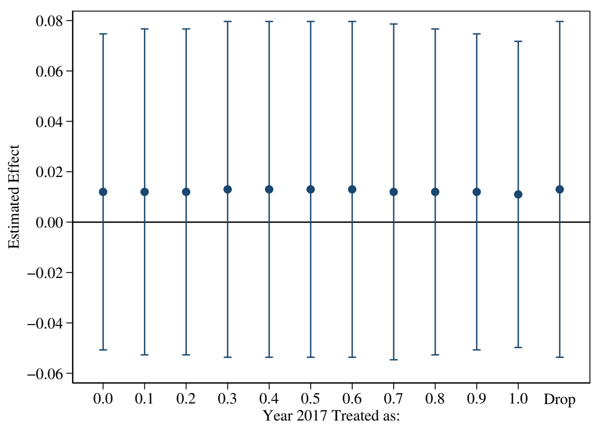
(b) Log Endowment Assets Per student



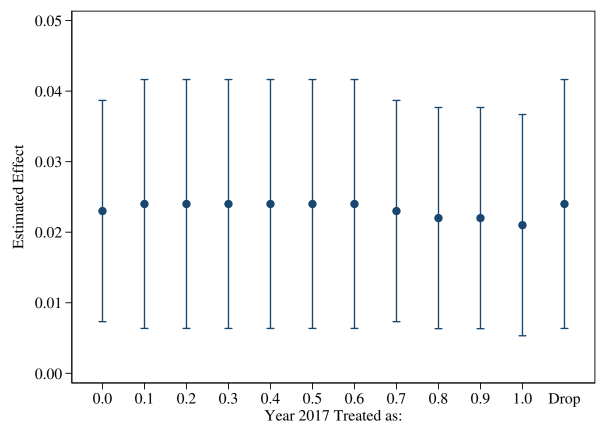
Note: The coefficients are estimated using equation (1). The error bars denote the 95% confidence interval. The samples are private nonprofit colleges that reported in IPEDS and filed Form 990 every year from 2010 to 2022, with a student population above 500 in 2016. FTE (full-time equivalent) is calculated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

Figure A3: Tax Shifting Behaviors: Robustness Check by Definitions of Treated Period

(a) Log Total Expenditure



(b) Log Tuition



Note: The coefficients are estimated using 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. FTE (full-time equivalent) is calculated as the sum of full-time and one-third of part-time students.

Appendix B: Restricting Sample to Selective Colleges

B1 Empirical Design

A primary concern in the DD setting of the main analysis is the potential disparity between the treatment group (colleges taxed or near the tax threshold) and the comparison group, which typically consists of less wealthy and less selective institutions. This fundamental difference raises questions about the validity of the comparison group as a counterfactual for the treatment group.

To address this concern, I restrict the comparison group to institutions more closely resembling those in the treatment group. Beyond their wealth, most colleges subject (or potentially subject) to the NIIT are characterized by high selectivity and prestige. For instance, among the 41 colleges in our treatment group (including those taxed and those very close to the threshold), 32 are categorized as "most selective" in the Barron's Selectivity Index, three are classified as "highly competitive," and one is considered "very competitive." The remaining five are categorized as "specialized institutions." Furthermore, in the U.S. News Rankings, 32 of these colleges ranked in the top 50 (either of the ranking list of National Universities or Liberal Arts Colleges), with one ranked between 50-100 and another between 100-150.

It is reasonable to posit that colleges with similar levels of selectivity and prestige might react similarly to macroeconomic environments. These highly selective institutions typically compete with one another to attract students, and they tend to pursue similar admission strategies (Smith et al., 2018). Colleges with comparable reputations and academic rankings also tend to share similar financial metrics and management strategies (Volkwein & Sweitzer, 2006). Previous studies suggest that restricting comparisons to institutions with similar academic standing could provide a more reliable basis for analysis (Stange, 2015; Zhu et al., 2021; Bennett, 2022).

To construct more appropriate comparison groups, I link the dataset to the 2016 Barron's Selectivity Index and U.S. News rankings (for both National Universities and Liberal Arts Colleges). I created two sub-samples: one restricting to institutions in Barron's top three selectivity categories and another including those ranked in the top 100 by U.S. News in 2016.

Table B1 details the sample sizes in these sub-samples. It is important to note that while this approach restricts the comparison group to institutions more similar to the treatment group, it also excludes some treatment group institutions that are less selective and prestigious than their counterparts. This refined sample selection strategy aims to create a more comparable control group, addressing concerns about the uniqueness of the treated institutions and the potential lack of a reasonable counterfactual. By focusing on institutions with similar prestige and selectivity, we enhance the validity of our DD design, although we acknowledge the trade-off in sample size and the potential exclusion of some treated institutions.

Table B1: Number of Units in Each Sub-sample

	Number of Units	
Sub-sample	Treatment Group	Comparison Group
Tax Avoidance		
Main Results	17	752
Barrons Selectivity Index Above Very Competetive	16	268
US News' Ranking Top 100	14	108
Tax Shifting		
Main Results	24	752
Barrons Selectivity Index Above Very Competetive	20	268
US News' Ranking Top 100	19	108

B2 Empirical Results

B2.1 Tax Avoidance

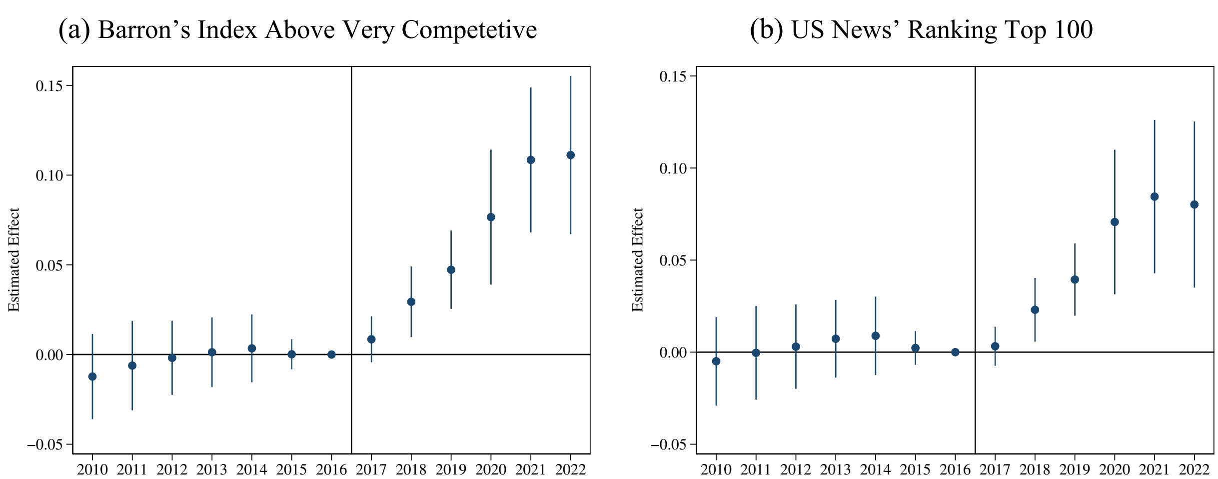
Table B2 replicates the main results of colleges' manipulation behaviors related to student enrollment using our alternative, more selective samples. The findings suggest that colleges around the cutoff increased their FTE enrollment by 5.4% to 6.6%, closely aligning with our main estimate of 6.4%. This consistency across sample specifications strengthens our confidence in the robustness of these results. The decomposition results by enrollment status and education level also echo the main findings. Figure B1 demonstrates the dynamic effect based on the event study design, with the trajectory of the response aligning closely with the main results.

Table B2: Student Enrollment-related Tax Avoidance Behavior: Selective Colleges

	(1)	(2)	(3)	(4)	(5)
	Log FTE	By Enrollment Status		By Student Level	
	Enrollment	Full-time	Part-time	Undergraduate	Graduate
Panel A: Barron's Rank Above Very Competetive					
$Cutoff \times Post$	0.076***	0.077***	0.024	0.068***	0.051
	(0.019)	(0.020)	(0.124)	(0.024)	(0.187)
Observations	3,640	3,640	3,640	3,640	3,640
Baseline Mean (Thousand)	7.272	6.955	0.950	4.010	3.262
Panel B: US News' Ranking Top 100					
$Cutoff \times Post$	0.057***	0.057***	0.064	0.045*	0.119
	(0.020)	(0.020)	(0.136)	(0.026)	(0.212)
Observations	1,560	1,560	1,560	1,560	1,560
Baseline Mean (Thousand)	7.988	7.630	1.072	4.274	3.714

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. Panel A restricts the sample to those with Barron's Rank as most competitive, highly competitive, or very competitive. Panel B restricts the sample to those with US News Ranking among the top 100 in 2016.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Figure B1: Tax Avoidance Behavior: Log Number of FTE Students



Note: The coefficients are estimated using the event study version of equation (1). The error bars denote the 95% confidence interval. 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. Figure B1a restricts the sample to those with Barron's Rank as most competitive, highly competitive, or very competitive. Figure B1b restricts the sample to those with US News Ranking among the top 100 in 2016.

Table B3 examines endowment asset manipulation. Consistent with the main results, I find a null response in total endowment and across various asset categories. This consistency suggests our results are not driven by differences between highly and less selective institutions. Figure B2 illustrates the event study analysis, showing temporal patterns of endowment responses mirror our main analysis, reinforcing the robustness of our results across institutional profiles.

Table B3: Endowment and Asset-related Tax Avoidance Behavior: Selective Colleges

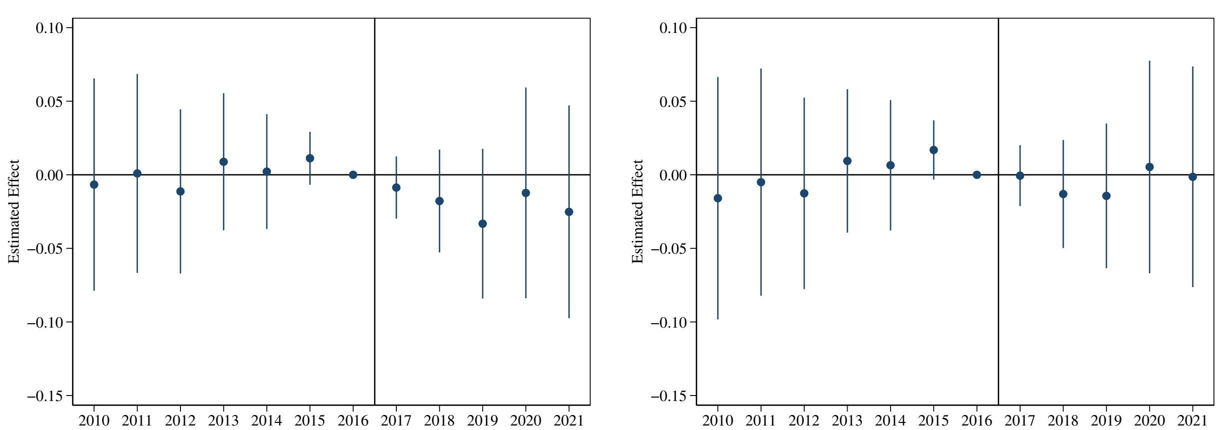
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log Endowment		By Restricted Status		By Category			
	Total	Per-student	Non-restricted	Restricted	Capital	Investment	Others	Liability
Panel A: Barron's Rank Above Very Competetive								
$Cutoff \times Post$	–0.006	–0.095*	–0.041	0.047	0.071	0.024	–0.934	0.055
	(0.056)	(0.049)	(0.220)	(0.047)	(0.068)	(0.052)	(1.261)	(0.080)
Observations	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360
Baseline Mean (Thousand)	3,637	0.481	2,338	2,480	2,865	4,439	13	1,883
Panel B: US News' Ranking Top 100								
$Cutoff \times Post$	–0.011	–0.088	–0.126	0.040	0.074	0.016	–1.101	0.030
	(0.062)	(0.054)	(0.245)	(0.049)	(0.077)	(0.059)	(1.446)	(0.091)
Observations	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440
Baseline Mean (Thousand)	4,002	0.481	2,625	2,710	3,220	4,919	15	2,131

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. Panel A restricts the sample to those with Barron's Rank as most competitive, highly competitive, or very competitive. Panel B restricts the sample to those with US News Ranking among the top 100 in 2016.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Figure B2: Tax Avoidance Behavior: Log Endowmenr Per Student

(a) Barron's Index Above Very Competetive

(b) US News' Ranking Top 100



Note: The coefficients are estimated using the event study version of equation (1). The error bars denote the 95% confidence interval. 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. Figure B2a restricts the sample to those with Barron's Rank as most competitive, highly competitive, or very competitive. Figure B2b restricts the sample to those with US News Ranking among the top 100 in 2016.

B2.2 Tax Shifting

Table B4 presents a similar analysis focusing on tax-shifting behaviors. The results show a null effect on total spending and in most spending categories, consistent with our main findings. The only exception is the estimate of total spending on institutional grants. While the main result shows no significant impact on institutional grants, the subsample focusing on selective colleges demonstrates a 9% to 41% increase in grant spending ($p < 0.1$). However, it is important to note that due to the smaller sample size, these estimates are less precise. Figure B3 illustrates the dynamic effects based on the event study design. The Barron's Index sample shows a pattern very similar to the main findings, while the US News sample demonstrates a minor, non-significant negative trend in total spending after policy adoption.

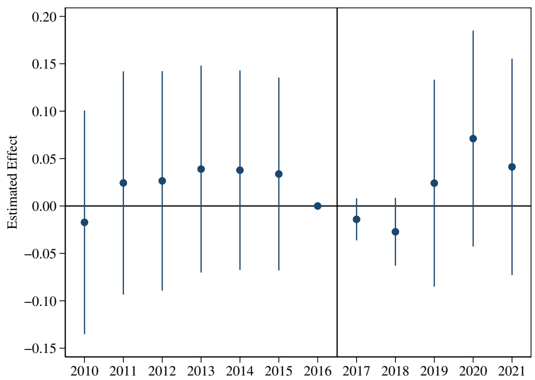
Table B4: Expenditure-related Tax Shifting Behavior: Selective Colleges

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log Expenditure						
	Total	Instruction	Research	Public Service	Institution Support	Auxiliary Facilities	Institution Grant
Panel A: Barron's Rank Above Very Competetive							
$Treat \times Post$	0.005	–0.004	0.096	0.129	–0.053	0.017	0.418*
	(0.036)	(0.038)	(0.114)	(0.140)	(0.054)	(0.050)	(0.232)
Observations	3,324	3,324	3,324	3,324	3,324	3,324	3,324
Baseline Mean (Million)	1,614	552	222	8	134	490	143
Panel B: US News' Ranking Top 100							
$Treat \times Post$	–0.055	–0.028	0.142	0.089	–0.167*	–0.107	0.093*
	(0.050)	(0.058)	(0.218)	(0.306)	(0.088)	(0.067)	(0.052)
Observations	1,380	1,380	1,380	1,380	1,380	1,380	1,380
Baseline Mean (Million)	1,731	591	239	9	143	526	151

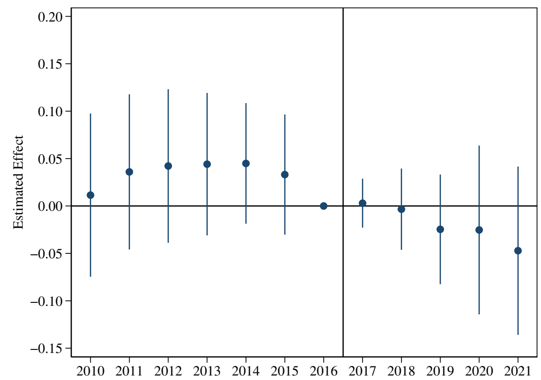
Note: The coefficients are estimated using equation (2). Standard errors clustered at the institution level in parentheses. The outcomes are the log expenditure by spending category. Column (1) is the total expenditure. Column (2) is the sum of instructional and academic support expenditures. Column (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 A restricts the sample to those with Barron's Rank as most competitive, highly competitive, or very competitive. Panel B restricts the sample to those with US News Ranking among the top 100 in 2016. The observation period is from 2010 to 2021.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Figure B3: Tax Shifting Behavior: Log Total Expenditure

(a) Barron's Index Above Very Competetive



(b) US News' Ranking Top 100

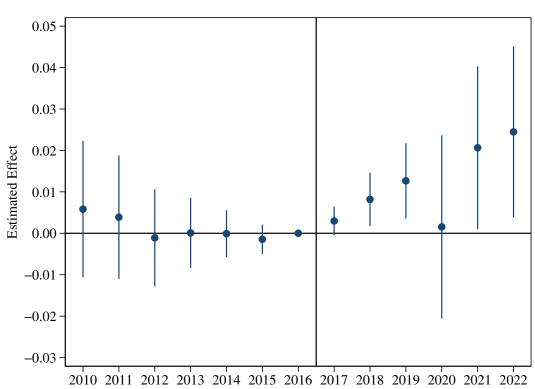


Note: The coefficients are estimated using the event study version of equation (2). The error bars denote the 95% confidence interval. Samples are private non-profit colleges that reported in IPEDS and filed Form 990 yearly from 2010 to 2022, with a student population above 500 in 2016. Figure B3a restricts the sample to those with Barron's Rank as most competitive, highly competitive, or very competitive. Figure B3b restricts the sample to those with US News Ranking among the top 100 in 2016.

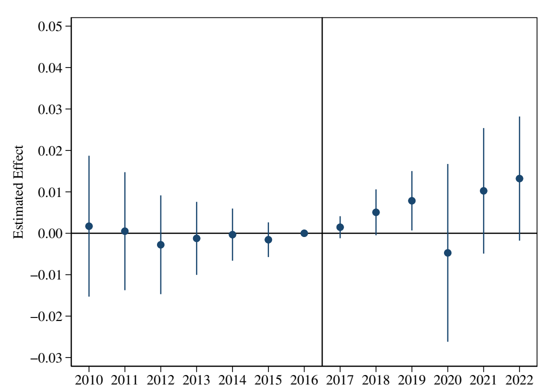
Table B5 investigates responses in tuition and charges. The results indicate that taxed colleges increase listed undergraduate tuition by 1.8% to 2.7%, close to the main estimate of 2.4%. Figure B4 demonstrates the dynamic effects based on the event study design. Both samples show similar trends, though the US News sample exhibits a smaller magnitude of effect. The response in room & board charges shows some variation across samples. Results restricted to institutions with higher Barron's Selectivity Index demonstrate an increase in charges of 4.4% (close to the main estimate of 4.2%), while results based on top-ranking colleges show an insignificant 1.8% response.

Figure B4: Tax Shifting Behavior: Log Listed Undergraduate Tuition

(a) Barron's Index Above Very Competetive



(b) US News' Ranking Top 100



Note: The coefficients are estimated using the event study version of equation (1). The error bars denote the 95% confidence interval. 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. FigureB4a restricts the sample to those with Barron's Rank as most competitive, highly competitive, or very competitive. Figure B4b restricts the sample to those with US News Ranking among the top 100 in 2016.

Table B5: Enrollment, Tuition, and Charge-related Tax Shifting Behavior: Selective Colleges

	(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: Barron's Rank Above Very Competetive						
$Treat \times Post$	0.015	0.027*	0.007	0.044***	0.109**	0.014
	(0.027)	(0.014)	(0.027)	(0.015)	(0.047)	(0.064)
Observations	3,601	3,601	3,601	3,601	3,324	3,324
Baseline Mean (Thousand)	6.917	43.415	28.498	12.995	187,940	71,791
Panel B: US News' Ranking Top 100						
$Treat \times Post$	0.009	0.018*	0.023	0.018	0.042	–0.010
	(0.025)	(0.010)	(0.030)	(0.014)	(0.050)	(0.078)
Observations	1,495	1,495	1,495	1,495	1,380	1,380
Baseline Mean (Thousand)	7.321	43.915	27.851	12.990	200,481	76,417

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 A restricts the sample to those with Barron's Rank as most competitive, highly competitive, or very competitive. Panel B restricts the sample to those with US News Ranking among the top 100 in 2016. The observation period is from 2010 to 2022 for columns (1) to (4) and 2010 to 2021 for columns (5) and (6).
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

B2.3 Enrollment Composition

Table B6 explores the effects on student enrollment by race/ethnicity. In general, the results align well with the main findings. Tax avoidance behaviors lead to an increase in student enrollment across almost all racial/ethnic groups (with the exception of Black students in the US News subsample). Conversely, tax-shifting behaviors result in a significant decrease in Hispanic student enrollment. The US News sample additionally identifies a significant negative effect on Black student enrollment. These results from more selective subsamples largely corroborate our main findings, suggesting that the observed effects on enrollment composition are consistent across different institutional profiles.

Table B6: Student Enrollment-related Tax Avoidance and Shifting Behavior by Race/Ethnicity

	(1)	(2)	(3)	(4)	(5)	(6)
	Log FTE Enrollment					
	White	Black	Hispanic	Asian	Other Minority	NRA
Panel A: Tax Avoidance, Barron's Rank Above Very Competetive						
$Cutoff \times Post$	0.085***	0.019	0.106**	0.069*	0.212***	0.018
	(0.024)	(0.033)	(0.043)	(0.038)	(0.051)	(0.056)
Observations	3,900	3,900	3,900	3,900	3,900	3,900
Baseline Mean (Thousand)	3.447	0.433	0.572	0.950	0.259	1.318
Panel B: Tax Avoidance, US News' Ranking Top 100						
$Cutoff \times Post$	0.072***	–0.038	0.091***	0.046	0.184***	0.035
	(0.022)	(0.030)	(0.029)	(0.032)	(0.054)	(0.045)
Observations	1,807	1,807	1,807	1,807	1,807	1,807
Baseline Mean (Thousand)	3.723	0.480	0.607	1.074	0.283	1.495
Panel C: Tax Shifting, Barron's Rank Above Very Competetive						
$Treat \times Post$	0.002	–0.037	–0.105***	0.022	–0.018	0.111**
	(0.022)	(0.030)	(0.039)	(0.035)	(0.046)	(0.051)
Observations	3,692	3,692	3,692	3,692	3,692	3,692
Baseline Mean (Thousand)	3.135	0.387	0.592	0.956	0.304	1.336
Panel D: Tax Shifting, US News' Ranking Top 100						
$Treat \times Post$	–0.012	–0.078***	–0.124***	0.028	0.011	0.042
	(0.020)	(0.026)	(0.026)	(0.028)	(0.048)	(0.040)
Observations	1,625	1,625	1,625	1,625	1,625	1,625
Baseline Mean (Thousand)	3.315	0.412	0.615	1.017	0.319	1.426

Note: The coefficients in Panel A and B are estimated using equation (1). The coefficients in Panel C and 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 C and D exclude colleges with endowment assets per student between $400,000 and 600,000 in 2016 (i.e., only include the donut sample). Panel A and B restrict the sample to those with Barron's Rank as most competitive, highly competitive, or very competitive. Panels C and D restrict the sample to those with US News Ranking among the top 100 in 2016. The observation period is from 2010 to 2022.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Appendix C: Triple-Difference Design

C1 Empirical Strategy

In the main analysis, I use the DD framework to estimate colleges' tax avoidance and shifting behaviors. In the tax avoidance analysis, the treatment group consists of colleges near the asset threshold of the NIIT, while the comparison groups include those far away from the threshold. In the tax shifting analysis, I compare colleges subjected to the tax (treatment group) with those that meet the student threshold but not the asset threshold (the comparison group). However, in both settings, given the substantial difference between treatment and comparison groups, concern exists about whether they would have shared the same trend in the outcome variables. Despite the event study analysis demonstrating a parallel pre-treatment trend (at least conditional on the fixed effect), the concern of the DD setting still remains.

Hence, this study further applies a triple-difference (DDD) framework to test the robustness of the results. In the main analysis, I only included colleges that met the student threshold and separated the samples into treatment and comparison groups depending on the distance to the assets threshold. In the DDD design, I further introduce those colleges that do not meet the student threshold as additional comparison groups. The setup slightly differs between the tax avoidance and shifting analysis.

C1.1 Tax Avoidance

In the tax avoidance analysis, I compare the colleges around the assets threshold and those far away between those meeting the student threshold and those not. In other words, I compare two differences: (1) the difference between the cutoff sample (with endowment assets per student within $400,000 to $600,000 in 2016) and the non-cutoff sample within large colleges (with student enrollment greater than 500 in 2016); (2) the same difference but within small colleges (with student enrollment less than 500 in 2016). And then, I track the change in the gaps between these two differences across time. Specifically, I estimate the following equation:

$$Y_{it} = \alpha_0 + \beta_1 Large_i \times Cutoff_i \times Post_t \tag{C1}$$
$$+ \theta_i + Large_i \times \delta_t + Cutoff_i \times \zeta_t + Above_i \times \phi_t + \varepsilon_{it}$$

Where $Large_i$ is a dummy variable indicating that the colleges had a student population above 500 in 2016. $Cutoff_i$ is a dummy variable indicating that the colleges had endowment assets per student within \$400,000 and \$600,000 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 the distance to the cutoff status by year fixed effect ($Cutoff_i \times \zeta_t$) accounts for the potential difference in trends between those colleges that have similar levels of wealth and those not. θ_i is the institution fixed effect, which absorbs the interaction term of $Large_i \times Cutoff_i$. These three terms stand for the full interactions to establish the DDD setting. Similar to the equation (1), the specification includes the above-cutoff-status-by-year fixed effects ($Above_i \times \phi_t$) to account for potential differences in trends between those subject and those not subject to the tax. The key parameter is β_1, which indicates the behavioral response of colleges that have the motivation of tax avoidance.

The empirical assumption of the DDD is that the difference in outcomes between "large, around assets cutoff" and "large, not around assets cutoff" colleges would have followed the same trend as the difference between "small, around assets cutoff" and "small, not around assets cutoff" colleges in the absence of the policy. This assumption might be valid as the primary factors determining colleges' enrollment and finance metrics would be their student body and available resources.

C1.2 Tax Shifting

In the tax shifting analysis, 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.

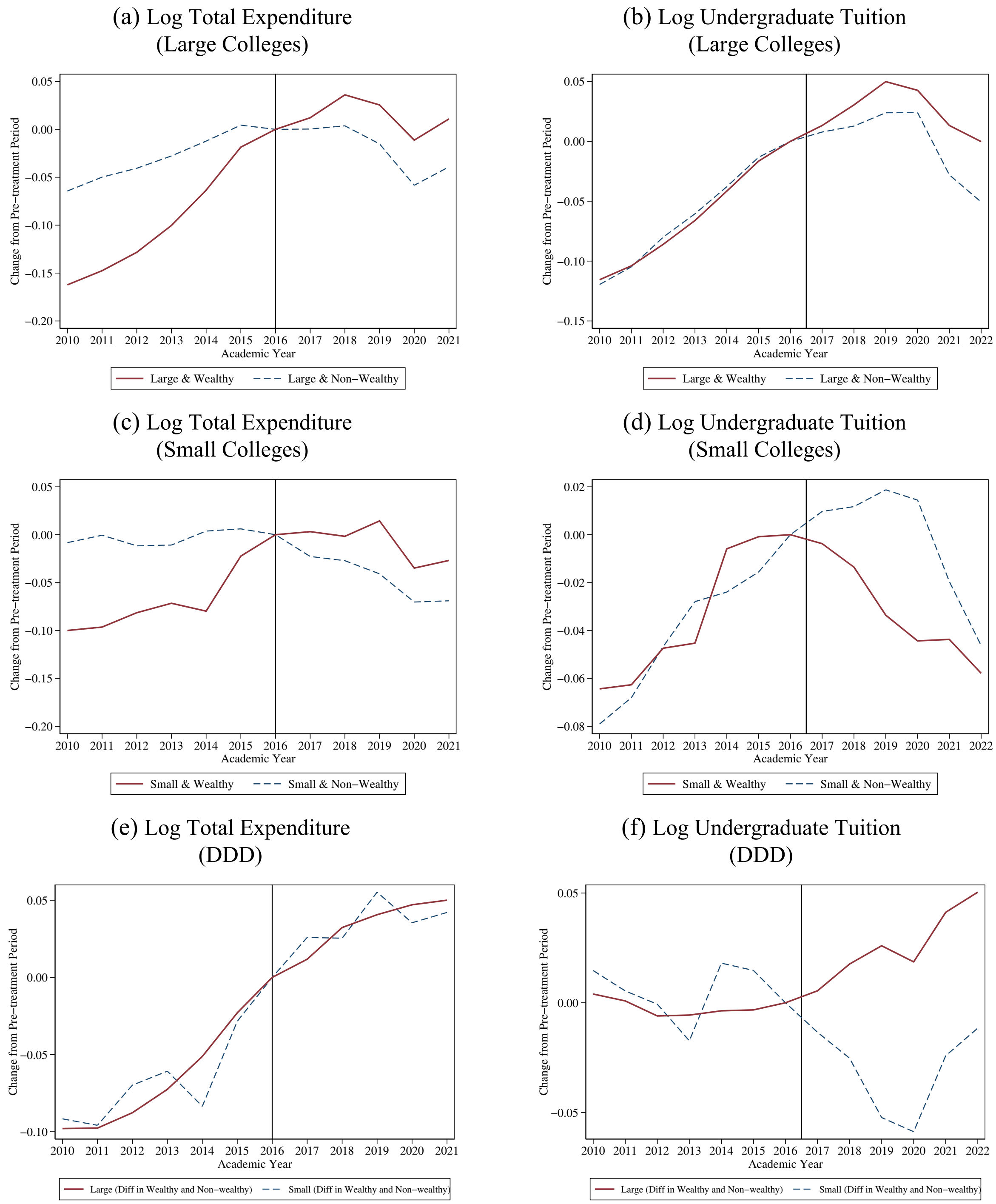
The basic idea of the DDD setting is to compare the changes in the gap between large wealthy and large non-wealthy colleges as well as the gap between small wealthy and small non-wealthy colleges. This analysis consists of all colleges (including those that unmet the student threshold) but still excludes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

$$Y_{it} = \alpha_0 + \beta_1 Large_i \times Wealthy_i \times Post_t + \theta_i + Large_i \times \delta_t + Wealthy_i \times \zeta_t + \varepsilon_{it} \qquad \text{(C2)}$$

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 \zeta_t$) accounts for the potential difference in trends between wealthy and non-wealthy colleges. θ_i is the institution fixed effect, which absorbs the interaction term of $Large_i \times Wealthy_i$. These three terms stand for the full interactions to establish the DDD setting. 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" and "large, non-wealthy" colleges would have followed the same trend as the difference between "small, wealthy" 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. 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 C1a), the same pattern appears in the comparison between "small, wealthy colleges" versus "small, non-wealthy colleges" (see Figure C1c). Figure C1e compares the gap in two paired comparisons and shows the same trend over time.

Figure C1: 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.

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.

C2 Empirical Results

C2.1 Tax Avoidance

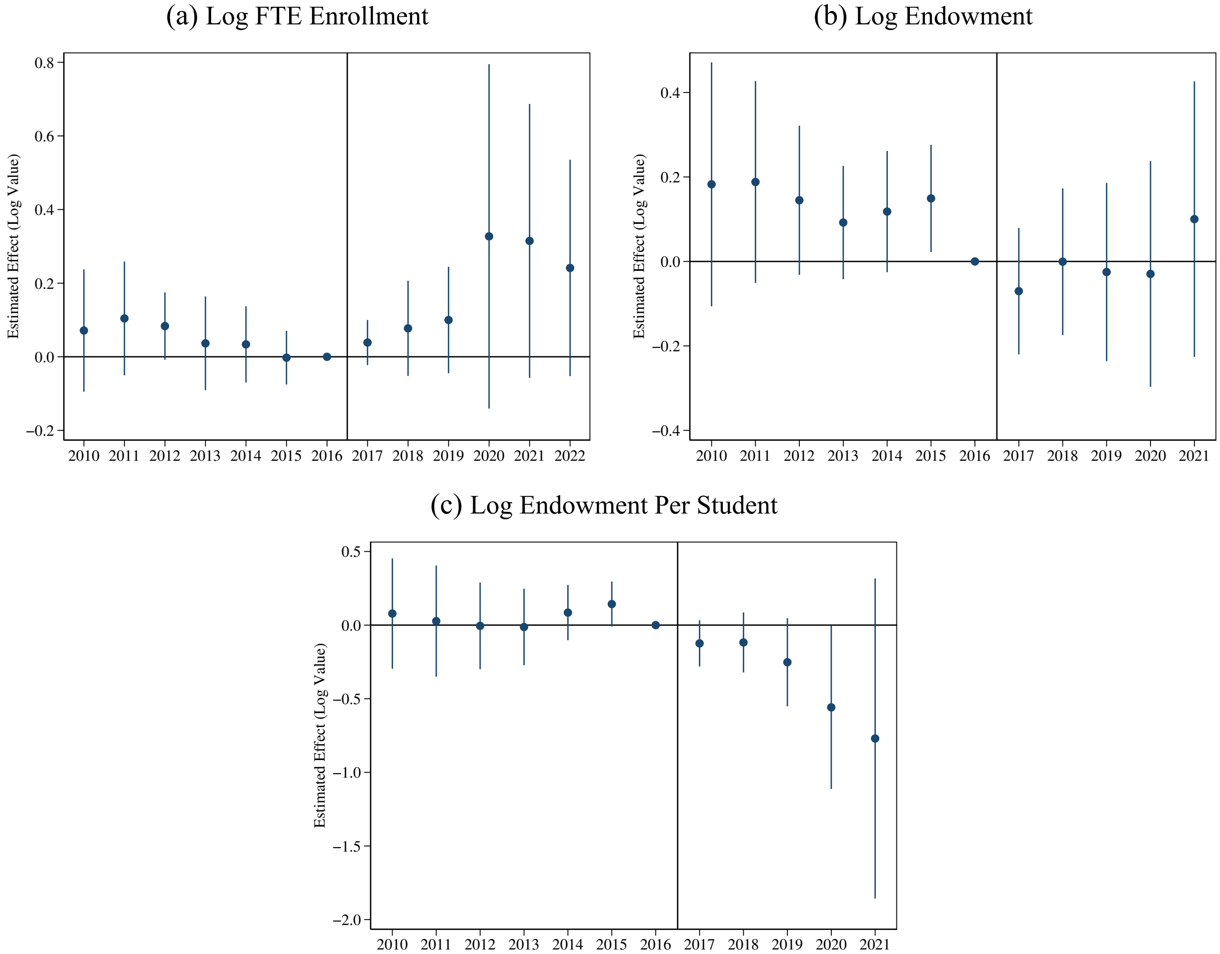
The DDD results of the student enrollment-related tax avoidance align with the main findings, though with larger standard errors. Table C1 demonstrates that colleges around the cutoff increase their FTE enrollment by 16% after the policy implementation, despite the estimate being non-significant. The event study results in Figure C2a show a good pre-treatment common trend and a clear pattern of increase in enrollment among the "large and around cutoff" group, despite all estimates being non-significant. The noisier estimates are likely due to fluctuations in student enrollment among smaller colleges. Despite this limitation, the pattern in student enrollment among affected colleges is still evident and aligns with the main findings.

Table C1: Student Enrollment-related Tax Avoidance Behavior: DDD Setting

	(1)	(2)	(3)	(4)	(5)
	Log FTE	By Enrollment Status		By Student Level	
	Enrollment	Full-time	Part-time	Undergraduate	Graduate
$Large \times Cutoff \times Post$	0.181	0.198	0.095	0.066	0.213
	(0.134)	(0.162)	(0.139)	(0.100)	(0.248)
Observations	11,661	11,661	11,661	11,661	11,661
Baseline Mean (Thousand)	4.928	4.715	0.639	2.678	2.250

Note: The coefficients are estimated using equation (C1). 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.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Figure C2: Event Study Estimates: Avoidance Behavior



Note: The coefficients are estimated using the event study version of equation (C2). 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).

Table C2 explores the manipulation behaviors on endowment assets. The results demonstrate a 12% non-significant drop in total endowment for colleges with motivation for tax avoidance. Despite the non-trivial point estimate, the event study result in Figure C2b shows no clear pattern of a drop in asset values after the policy implementation. The overall findings still align with the main results.

Due to the increase in enrollment and unchanged endowment assets, the results show a drop in endowment assets per student (see Column (2) in Table C2 and Figure C2c). Overall, the tax avoidance findings from the DDD setting corroborate the main findings.

Table C2: 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
$Large \times Cutoff \times Post$	–0.136	–0.536**	–0.041	0.126**	0.050	0.096	–0.873	–0.080
	(0.132)	(0.249)	(0.234)	(0.063)	(0.094)	(0.076)	(0.937)	(0.186)
Observations	10,764	10,764	10,764	10,764	10,764	10,764	10,764	10,764
Baseline Mean (Thousand)	2,249	0.442	1,432	1,541	1,811	2,731	8	1,196

Note: The coefficients are estimated using equation (C1). 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. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

C2.2 Tax Shifting

The DDD results of the tax shifting response on total expenditure are quite similar to the DD estimations. Table C3 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.

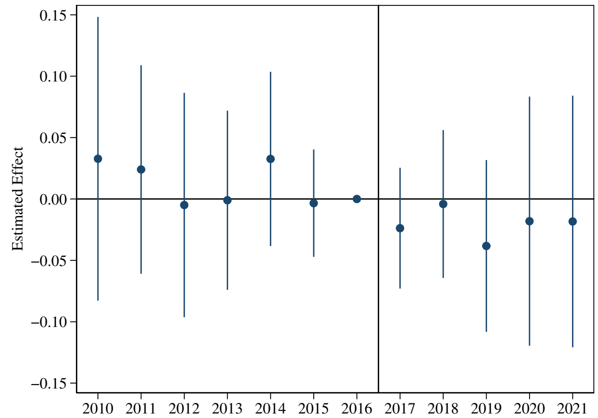
Table C3: Expenditure-related Tax Shifting Behavior: DDD Setting

	(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 (3). 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. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

The event-study estimation reassures the findings. Figure C3 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.

Figure C3: Event Study Estimates: Tax Shifting Behavior on Total Expenditure



Note: The coefficients are estimated using the event study version of equation (C2). 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).

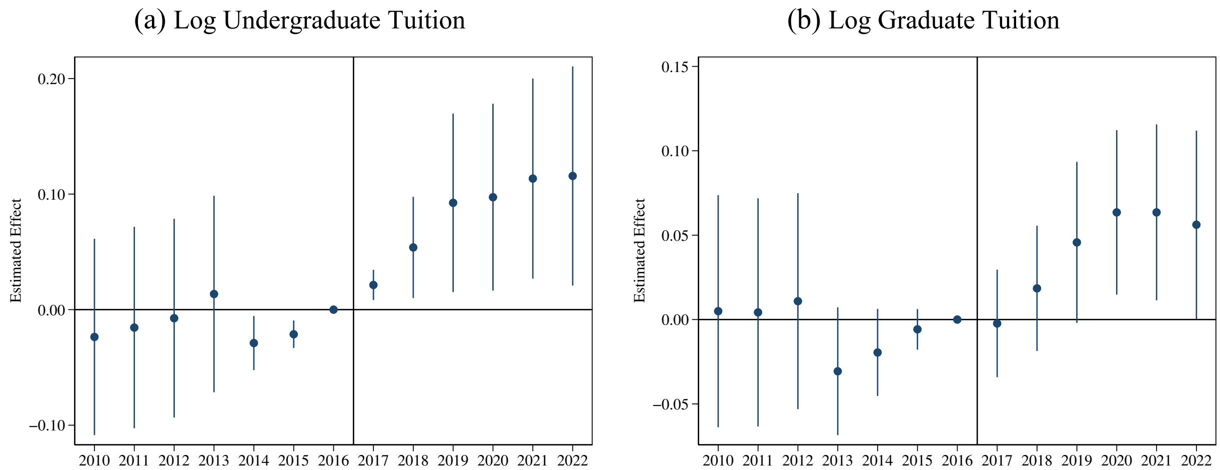
The results on tuition hikes align with the DD results but with larger estimates. Table C4 finds that taxed colleges underwent a 10% increase in undergraduate tuition ($p < 0.01$, see Column (2)), 5% increase in graduate tuition ($p < 0.1$, see Column (3)), and 6% increase in room and board charge ($p < 0.01$, see Column (4)). Despite the larger magnitude, the 95% confidence intervals overlap with the DD estimates. The event-study estimates (see Figure C4), confirm the parallel trend in the pre-intervention period and show that the tuition has gradually increased over time.

Table C4: Enrollment, Tuition, and Charge-related Tax Shifting Behavior: 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 (3). 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.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Figure C4: Event Study Estimates: Tax Shifting Behavior



Note: The coefficients are estimated using the event study version of equation (C2). 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 C1 provides insight into the inconsistency in effect sizes between the DD and DDD models. As demonstrated in Figure C1b, 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 C1d 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 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.

Appendix D: 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

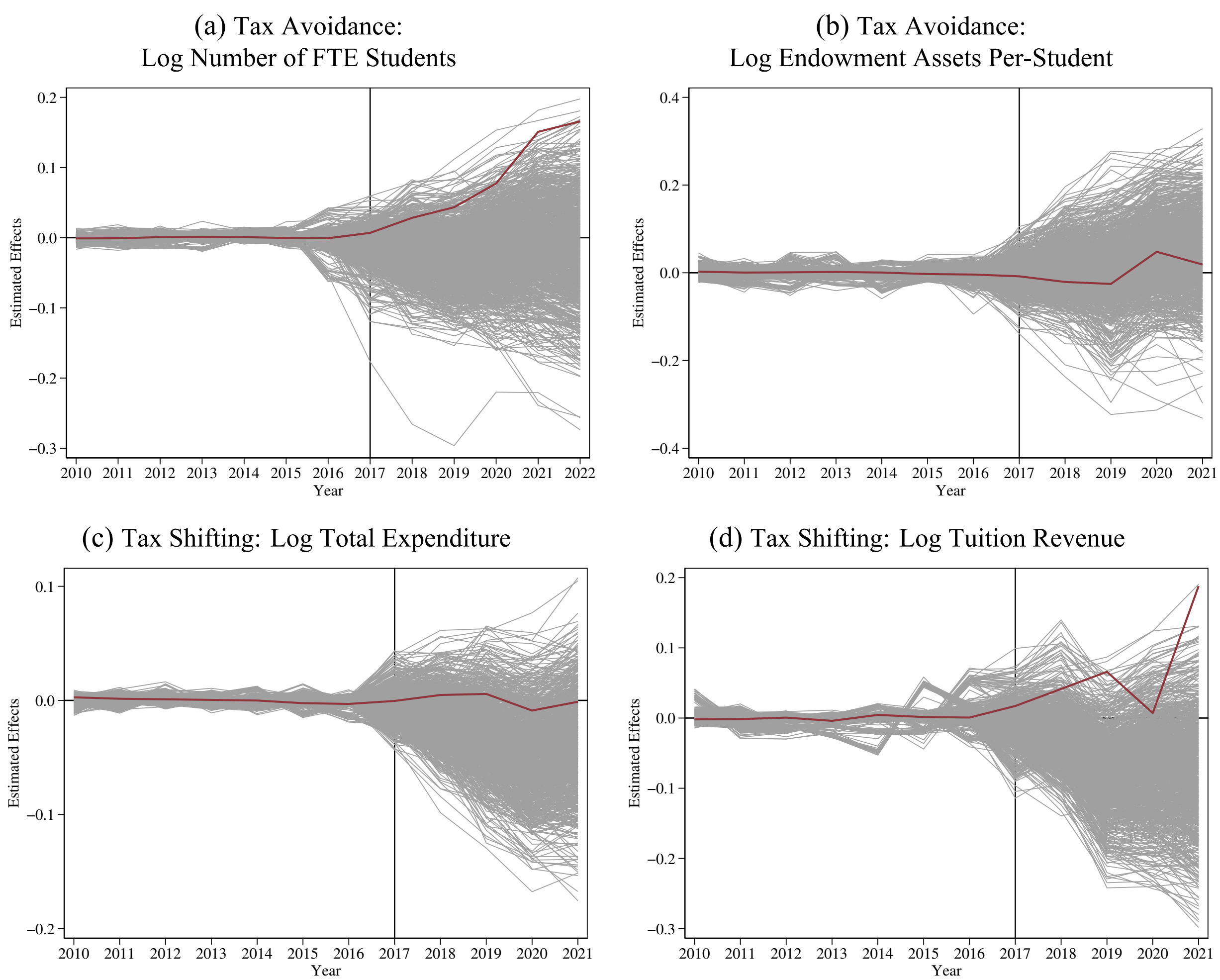
Step 2: Estimating placebo treatment effects:

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 (C1)). 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.

$$\overline{\beta_t} = \frac{1}{N}\sum_{i=1}^{N}\beta_{it} \tag{C1}$$

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).

Figure C1: SCM Permutation Test: Dynamic Treatment Effect



Step 3: Calculating permutation p-value for ATT:

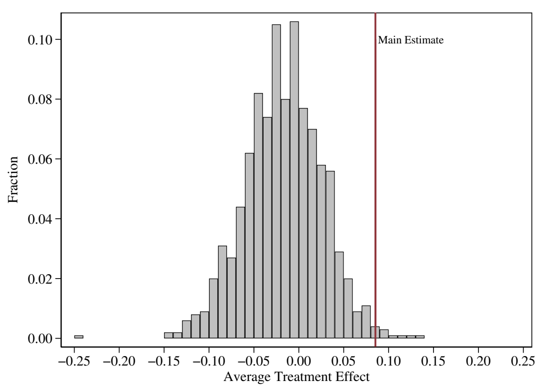
The former step obtains the dynamic treatment effect for the placebo units. I then apply equation (C2) to compute the ATT for the entire post-treatment period.

$$ATT = \frac{1}{T - T_0 + 0.5}\left(0.5 \times \overline{\beta_{t=T_0}} + \sum_{t>T_0}^{T} \overline{\beta_t}\right) \tag{C2}$$

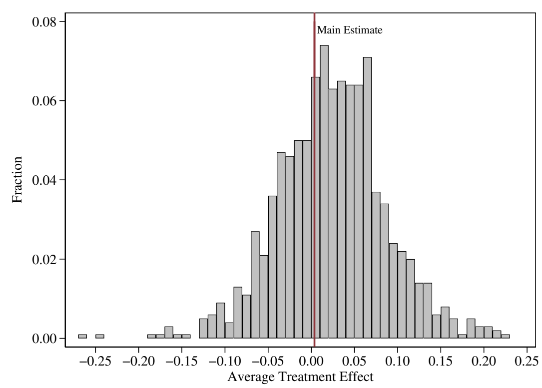
Figure C2 demonstrates the distribution of placebo estimates (the histogram) and the location of the actual ATT (vertical line). The permutation p-value is calculated by counting the number of placebo estimates in excess of the actual estimate. In the case of tax avoidance impact on enrollment, the permutation p-value is 0.008 as only 8 out of 1000 placebo ratio excess the actual value (see Figure C2a). Table C2 to C5 report the ATT and permutation p-value of each variable.

Figure C2: SCM Permutation Test: Average Treatment Effect

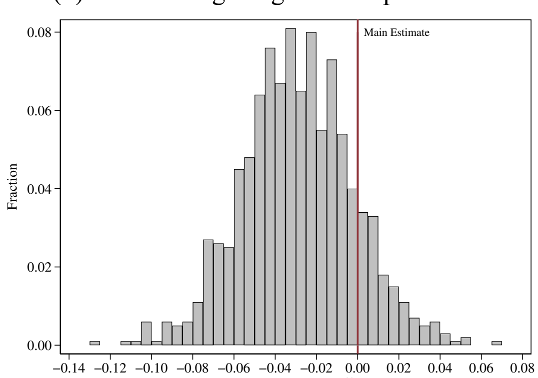
(a) Tax Avoidance:
Log Number of FTE Students



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



(c) Tax Shifting: Log Total Expenditure



(d) Tax Shifting: Log Tuition Revenue

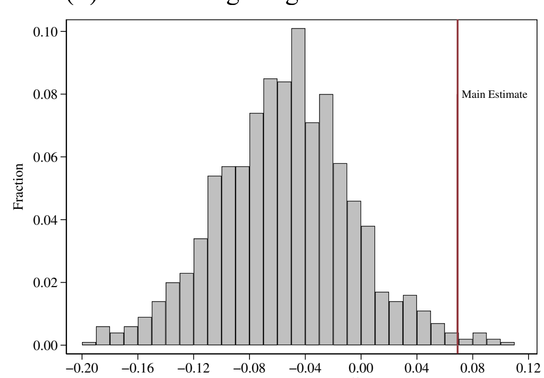


Table C2: Enrollment-related Tax Avoidance Behavior: SCM Results

	(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 (C2). 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: Endowment and Assets-related Tax Avoidance Behavior: 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 (C2). 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: Expenditure-related Tax Shifting Behavior: 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 (C2). 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: Enrollment, Tuition, and Charge-related Tax Shifting Behavior: 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 (C2). 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:

$$MSPE\,ratio = \frac{\frac{1}{T-T_0}\sum_{t>T_0}^{T}\left(\overline{\beta_t}\right)^2}{\frac{1}{T_0-1}\sum_{t<T_0}^{T_0-1}\left(\overline{\beta_t}\right)^2} \tag{C3}$$

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 4 and 7 in the manuscript.