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Joshua A. Jacobs April 10, 2024

Elite Price Fixing: Assessing the Competitive Impacts of the 568 Presidents Group

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a thesis submitted to the Faculty of Emory College of Arts and Sciences
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Abstract

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The 568 Presidents Group was a consortium of elite, private universities dedicating to promoting need-blind admission policies and emphasizing need-based aid through the adoption of a common methodology for awarding financial aid to students. In January 2022, this group came under scrutiny for allegedly conspiring to fix the prices of college tuition by restricting financial aid awards to students. This paper examines the theoretical mechanisms behind the group's cooperation and estimates its impact on the net costs of college tuition and student enrollment. Using a panel of institutional-level data from 2008-2021, I estimate the group's impact by employing a staggered difference-in-difference approach examining the effect of an institution exiting the 568-group. Results reveal that members of the group restricted financial aid through their common methodology and raised the net costs of tuition, but these changes in cost had little impact on students' decisions to enroll.

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Elite Price Fixing: Assessing the Competitive Impacts of the 568 Presidents Group

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1 Introduction

In January 2022, a group of former undergraduate students alleged that sixteen members of a "cartel" of elite private institutions conspired to fix the net prices of college tuition in violation of Section 1 of the Sherman Antitrust Act.[1] These universities belong to the 568 Presidents Group which was established in 1998 in an exemption to the Sherman Act allowing members to design a "consensus methodology" enabling universities to offer student aid packages primarily based on financial need rather than merit. The lawsuit claims both that these schools violated needs-blind admission policies, favoring wealthier applicants in waitlist and transfer admissions, and that this methodology was for the purpose of raising the costs of education. Since 2022, the case has been ongoing with several of the accused universities agreeing to settle for a combined $284 million.

The claims in the lawsuit have a significant importance in the discussion of college affordability and economic mobility. Notably, the average prices of college tuition at selective universities have significantly increased over time, but financial aid has not increased at the same pace. This has led to students paying higher prices for college tuition; between 2008 and 2021, the average net

[1] The full list of colleges named in the lawsuit includes Brown, the California Institute of Technology, the University of Chicago, Columbia, Cornell, Dartmouth, Duke, Emory, Georgetown, the Massachusetts Institute of Technology, Northwestern, Notre Dame, the University of Pennsylvania, Rice, Vanderbilt, and Yale.

costs of tuition – calculated as the total price of tuition minus financial aid – at 568 Presidents Group institutions increased by almost 12%, despite a more than 128% rise in members' average endowments during the same period (NCES, 2021).

Restrictions of financial aid have clear negative impacts on student enrollment and students' likelihood to complete college (Dynarski, 2001). As a result, university grant aid enables a significant attenuation of economic inequality in college attainment rates (Goldrick-Rab et al., 2016). If the 568 Presidents Group had been conspiring to restrict financial aid or its members systematically broke needs-blind admission policies, this would have clear negative impacts on students' well being and education outcomes. Given the group's potential harm to students from disadvantaged backgrounds and the fact that the lawsuit has been deemed to have some legal merit, there is a clear need to empirically investigate whether the 568 Presidents Group sought to increase the net prices of college tuition, yet few studies have examined the outcomes of this group within the past two decades.

This paper examines the consequences of 568-group membership on students' net costs of tuition and enrollment outcomes across different income groups. Applying a theoretical foundation of the market for higher education, I develop competiting economic theories on whether the group sought to enhance education access for low-income students or to raise university revenues. I evaluate these hypotheses by assembling a dataset of membership over time and use a staggered difference-in-differences design to study variation in membership generated by the decision to exit the group. I find that from 2008-2021, there is strong evidence that the 568 Presidents Group applied the consensus approach methodology to systematically increase the net prices of tuition for Title IV eligible students, particularly for middle and upper-income students. Contrary to the group's claims, I also find little evidence that their cooperation significantly influenced low-income

students' access to higher education.

2 A Brief History of the 568 Presidents Group

In the 1950s, prestigious northeastern institutes of higher education (IHEs) began meeting to discuss the financial aid packages awarded to students who had been accepted to multiple schools within the group, particularly to avoid effectively bidding for "star" athletes (Carlton et al., 1995). These schools formed the self-named "Overlap" agreement which established three main principles for awarding financial aid: (1) the schools agreed to award all financial aid on the basis of financial need, (2) they agreed to "pool" data on their overlapped students to ensure schools had the latest and most accurate assessment of students financial needs, and (3) they agreed to establish a common "formula" for awarding financial aid (Srinivasan, 1994). This group would eventually include a network of 23 colleges by 1990, including all eight Ivy League institutions and MIT.

According to the involved schools, the purpose of this agreement was to promote overall fairness in how they award financial aid. Through cooperation, they could concentrate their limited resources of financial aid on students who truly needed the assistance rather than bid for the most attractive applicants with less financial need (Stachtiaris, 1993). If Overlap schools differed on their financial aid packages awarded to commonly admitted students, they would use the group's meetings to discuss their justification for their aid packages and compromised on a common figure for about 80-90% of commonly admitted students (Carlton et al., 1995).[2]

In 1991, the antitrust division of the Department of Justice (DOJ) filed suit against the eight Ivy Leagues and MIT charging that the Overlap schools effectively formed a "collegiate cartel"

[2]It is important to note that Overlap schools agreed on the overall net cost of tuition rather than the total amount of aid awarded. This means more expensive schools in the Overlap group would give more financial aid than schools with lower total tuition costs (Salop and White, 1991).

fixing financial aid packages in violation of Section 1 of the Sherman Antitrust Act in *United States v. Brown University*. The DOJ argued that the group's coordination on student aid packages was for the purpose of raising the costs of education by eliminating competition for students. Upon prosecution, the group terminated its annual meetings, and the Ivy League member schools immediately signed a consent decree agreeing to end the group entirely. MIT was the sole institution to fight the suit but was initially found guilty by a district court in 1992. By September of 1993, the Court of Appeals overturned the decision and the DOJ subsequently dropped all investigations of the group. MIT and the government entered a settlement allowing IHEs to continue with most of its practices as it had before the suit. Primarily, IHEs were allowed to provide aid based on need, agree on common principles for determining student need, and exchange financial data of commonly admitted students. IHEs, however, were no longer allowed to discuss or agree upon individual aid packages, contrasting the previous conduct of Overlap schools. Institutions also could only engage in these cooperative activities if they fulfilled the standards of being "need-blind" and meeting the full need of admitted students.

After MIT's long legal battle with the DOJ, Congress effectively wrote their settlement into law in section 568 of the Improving America's Schools Act of 1994. With this law, private IHEs coordinating to admit students on a needs-blind basis were temporarily exempt from antitrust law and could not be prosecuted as anticompetitive. However, the only requirement for coordination was that participating schools met the "need-blind" standard - that is, the institution admits students without considering their financial circumstances. Congress extended this exemption in 1997, 2001, 2008, and 2015. In late 1998, presidents from 28 prestigious IHEs, including several former Overlap schools, exercised this exemption to discuss their beliefs in need-based aid and develop a common methodology for awarding financial aid packages to their admitted students. These colleges formed

would become known as the 568 Presidents Group, and by 2002 they had began implementing a common methodology for awarding financial aid called the Consensus Approach (CA). The 568 Presidents Group was the only collection of institutions to exercise Congress' antitrust exemption. Figure 1 gives a summary of the legal and organization changes connecting the Overlap Group to the lawsuit of the 568 Presidents Group.

The Consensus Approach was used for determining the expected family contribution (EFC) of a student and, as a result, how much need-aid they are eligible to receive. The methodology provides an alternative to the Federal Methodology or Institutional Methodology that many other universities employ. The three methodologies' calculation of the EFC vary in how they consider family assets and income as eligible towards paying for tuition, but most critically, the CA only considers the financial need of a student, not academic merit (Karikari and Dezhbakhsh, 2019). Other discrepancies exist between these methodologies such as how they include family debt, cost of living, and home equity in calculating EFCs (GAO, 2006). 568 Presidents Group membership has varied significantly from its inception to 2022, but its members have almost exclusively been highly ranked, elite institutions predominately located within the northeast of the United States (Figure 2).

The 2022 lawsuit alleged that sixteen members of the 568 Presidents Group effectively violated the terms of section 568 of the Improving America's Schools Act by not adhering to the standard of being need-blind. Particularly, they argue that the defendant institutions had considered applicants' need for financial aid in deciding whether to admit waitlist and transfer students, favoring students from wealthier family backgrounds. In July 2022, the Department of Justice filed a statement of interest urging that the District Courts review the case, as if any of the groups improperly followed the standards of needs-bind admissions, then this would invalidate the exempt status of the 568

Presidents Group. Ultimately, the lawsuit argues that the group acted for the purpose of inflating the net prices of tuition by using the CA methodology to restrict financial aid.

By September 2022, Congress allowed the group's antitrust exemption to expire amidst the claims of the group's price fixing, leading to the 568 Presidents Group officially dissolving on November 4th, 2022. As of March 2024, ten out of the seventeen accused universities reached settlements totaling $284 million, but all colleges have denied the Plaintiffs' allegations of unlawful or wrongful conduct. To date, the majority of institutions accused in the lawsuit continue to fight the case.

Figure 1: Timeline of Legal and Organizational Changes of the 568 Presidents Group

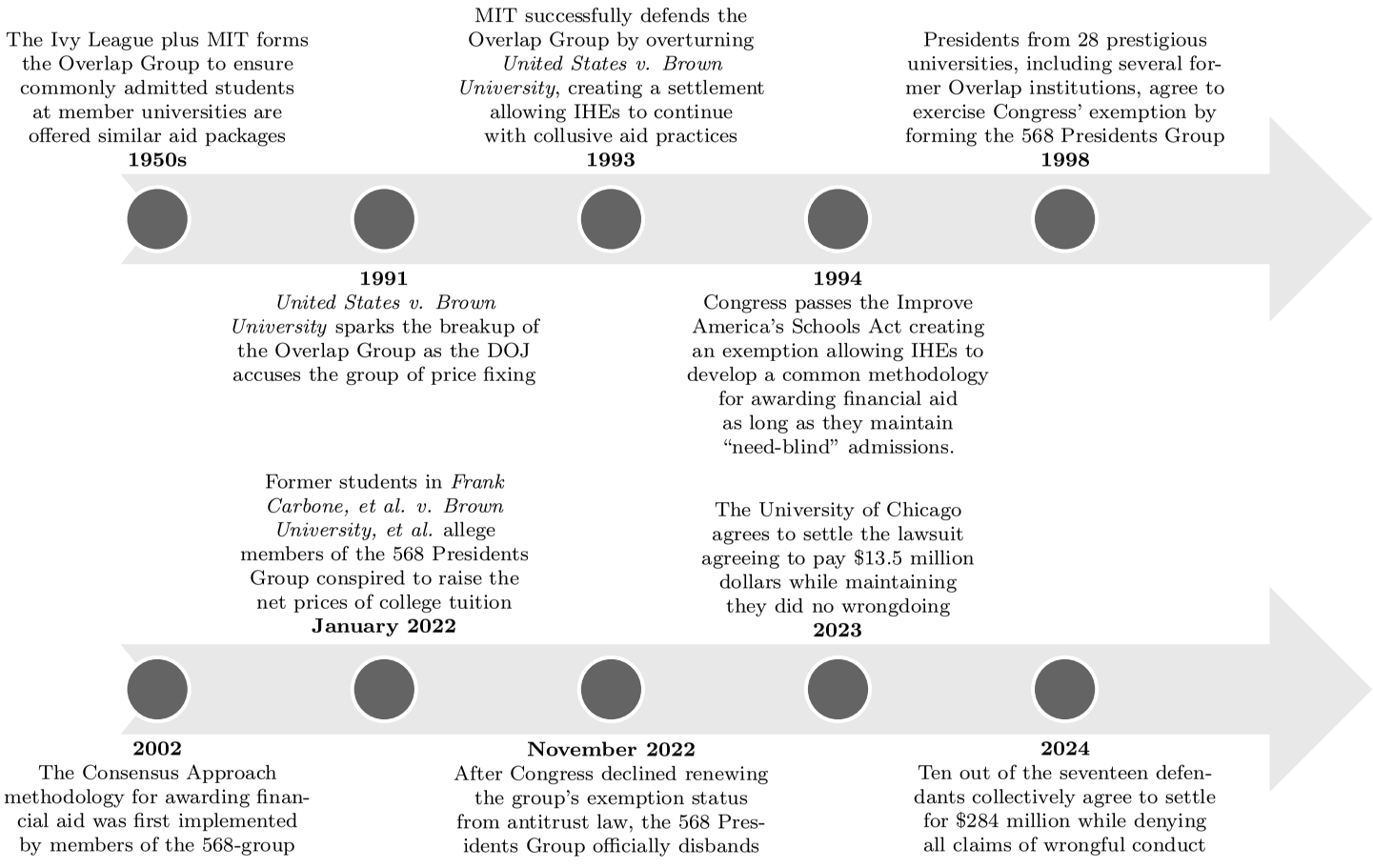


Figure 2: U.S. Map of Institutions in the 568 Presidents Group

Notes: This map of the United States displays all schools who were in the 568 Presidents Group at any period between 2008-2021. Data was obtained from archived captures of the 568-group's website, as detailed in section 5.

3 Literature Review

To date, there is more economic literature on the merits of the Overlap group than the 568 Presidents Group, particularly in regards to studying overall changes in the net costs under the agreement. However, the similarities in the these groups' conduct indicate that studies of the Overlap group would provide critical insight into the alleged price fixing of the 568 Presidents Group. Overall, studies of the Overlap group have shown mixed results on whether the group aimed to enhance the access of higher education to low-income students or to restrict the overall financial aid awarded to students (Salop and White, 1991; Carlton et al., 1995; Hoxby, 2000).

Studies of the Overlap group provide a basis of how to view IHEs within the economic theories of industrial organization. Salop and White (1991), writing while *United States v. Brown University* was ongoing, view private universities as a type of firm that offers differentiated products to prospective students. Colleges compete with each other through horizontally differentiated (such as geographic location or religious affiliation) and vertically differentiated (such as the quality of professors or overall reputation of a school) degrees while also competing through price. Salop and White further explain that since universities have a clear incentive to increase revenues, they would have an economic motivation to fix prices of tuition. This suggested that antitrust law clearly applied to the Overlap group and that they would have the burden of showing that their use of price fixing, a per se antitrust offense, was necessary.

The main burden of the group was to show that there existed a significant market failure in low-income students not being able to access prestigious IHEs and that cooperative behavior would be the only remedy, rather than any individual action from a university. Ultimately, Salop and White viewed that the Overlap group would find it difficult to sufficiently defend the legal

merits of their coordination. Future studies, however, provide empirical evidence supporting the Overlap group and provide greater nuance to the economic theories of IHEs and how they award financial aid. In a study by Carlton et al. (1995), they note that unlike a typical profit-seeking firm, private non-profit universities are not purely motivated by the desire to raise revenue. For example, universities may also desire to promote student welfare or appease donors, both of which could be harmed by raising tuition costs. Considering these impacts, the effect of the Overlap group on overall prices is ambiguous.

Acknowledging this, Carlton et al. developed two competing hypotheses on the intent of the Overlap agreement: the Overlap hypothesis and the price fixing hypothesis. The Overlap hypothesis reflects what was argued by MIT in United States v. Brown University; the agreement was used to benefit lower-income students and fulfill socially desirable goals. Alternatively, the price fixing hypothesis echoes the opinion of the DOJ; colleges wished to decrease financial aid packages so they could better fund other areas like research or faculty salaries. Carlton et al. evaluates these hypotheses using a stacked linear regression of the net costs of tuition in Overlap schools compared to a control group of non-Overlap member schools.[3] To account for baseline differences between these groups that may account for differences in tuition costs, Carlton et al. controls for various factors such as school quality, the financial status of a university, whether a university belongs to the Ivy-league, or whether the school has a religious affiliation. Additionally, as a proxy for studying the enrollment patterns of low-income students, Carlton et al. also examines the differences in minority student enrollment across Overlap and non-Overlap member schools.

The regression results ultimately indicated that there was insufficient evidence in support of the price fixing hypothesis. Overall net costs of tuition in Overlap schools were not significantly

[3]Carlton et al.'s sample control group consisted of both public and private schools within the same five Carnegie Classifications as the Overlap schools.

different from non-Overlap schools. Additionally, Overlap schools exhibited significantly higher rates of Black student enrollment than non-Overlap schools; however, this relationship did not extend to Hispanic student enrollment. From these results, they conclude the Overlap group prevented the flow of aid to high-income students at the cost of lower income students, as argued by the involved universities. Hoxby (2000) further supports these conclusions in a similar study of the Overlap group.

Hoxby employs a difference-in-differences approach using the termination of the group's meetings in 1991 as a treatment intervention towards Overlap schools. They use this methodology to examine how grant aid and enrollment changed in Overlap schools before and after they ceased coordinating on financial aid packages in comparison to a control group of non-Overlap, elite public and private institutions.[4] Hoxby found that the total grant aid awarded by Overlap schools was higher during the group's existence compared to competitive schools outside of the group. Similarly, SAT scores in Overlap schools prior to antitrust intervention had no significant effect on grant aid compared to non-Overlap schools. This indicates the Overlap agreement held to its idea of committing to need-based aid rather than merit-based aid and decreased the net costs of tuition for low-income students.

The question remains of how closely the 568 Presidents Group resembles the Overlap group and whether these conclusions would still apply. As the lawsuit alleges, some 568-group schools may have deviated from truly being need-blind while the Overlap group may have had stricter coordination among its members. Additionally, the fact that schools in the 568-group are unable to directly coordinate on individual student aid packages may weaken the overall effectiveness of the group. Few studies have addressed the impact of the 568-group on net costs of tuition, but

[4]Hoxby defines elite IHEs as being classified as "highly competitive" by Baron's Profile of American Colleges.

Karikari and Dezhbakhsh (2019) offer insight into how implementation of the group's consensus methodology may have influenced low-income student enrollment.

Since net costs of tuition are likely to impact low and middle-income student enrollment, while upper-income students are likely less sensitive to changes in tuition costs, Karikari and Dezhbakhsh (2019) indirectly examine the alleged price fixing behavior of the group. They study the immediate impact of the CA methodology by examining three years of data in 1995, 1999, and 2003 across member schools adopting the methodology and non-members using other methods for calculating expected family contributions. Karikari and Dezhbakhsh also present competing hypotheses on the overall impact of the group. One is that the group's effect on net costs would be ambiguous, as any gains to lower-income students could be offset by more restricted aid to upper-income students, which follows the stated intent of the group. Alternatively, they present the hypothesis that the group is anti-competitive and restricts overall aid awarded to students. Karikari and Dezhbakhsh argue the group enhanced transparency of the financial aid process and helped low-income students, a similar conclusion to studies of the Overlap group.

From this review, we can conclude that there is empirical evidence suggesting the 568 Presidents Group served to promote equal access to higher education, but what was the group's long term impact? Can we conclude that the group was socially beneficial for the entirety of its existence from 2002-2021? Applying a theoretical examination of the market for higher education and the impact of institutional cooperation may help formulate a hypothesis.

4 Theoretical Models of Higher Education

One issue with the previously mentioned studies is that few authors fully examine the context of the market for higher education and how the 568-group's cooperation impacts competition among elite

universities. This is somewhat surprising considering the importance of the group as a cooperative entity, as it would be a mistake to assume the group simply standardized certain aspects of the financial aid process. From the Overlap Group to the 568 Presidents Group first implementing the consensus approach methodology, their stated aims were clear: to limit competition and curb elite universities' growing use of scholarships and low-interest loans to compete for highly prized students (Cartensen, 2000). By applying different theories from industrial organization, we can attempt to answer different questions relating to the 568-group and hypothesize whether the group existed for the purpose of constricting aid. We may further find that this theoretical examination has interesting implications for further empirical analysis.

In the previous literature, Carlton et al. (1995) stressed the importance of recognizing that the involved universities are non-profits, that is they may be concerned with promoting revenues but have other goals which are uncommon to a conventional profit maximizing firm. Non-profit institutions may have a interest in appealing to donor and alumni interests, who would like costs to stay low, or a true humanitarian interest in promoting student well-being, but university motivations are just one of the many wrinkles to the conventional models of industrial markets that our theory must incorporate.

In Appendix A, I give a discussion of the unique characteristics of the market for higher education and compare different theories explaining competition between IHEs. This discussion yields three critical insights about the market: first, institutions in the market operate within a hierarchy categorized by university funding (endowments) and student selectivity (acceptance rates). The 568-group operates within the top band of hierarchy and are able to charge high tuition prices but award high aid to compete for the most attractive students. Second, without cooperation, elite institutions are greatly motivated to offer financial aid primarily on the basis of

merit. Otherwise, high-achieving, high-income students would be motivated to enroll in another institution. With cooperation, the 568-group is able to increase market power to coordinate a system where aid is awarded primarily on the basis of financial need, even though it does not create a monopoly within the market. The question then becomes whether this cooperation is designed to promote equal access to higher education or to raise university revenues.

4.1 Hypotheses of the 568 Presidents Group

I will evaluate the outcomes of the 568-group's cooperation by exploring two competing hypotheses, as done in previous studies (Carlton et al., 1995; Karikari and Dezhbakhsh, 2019). The first is the "cooperative hypothesis." In this scenario, schools cooperate in the 568 Presidents Group exactly as its members allege: schools offer aid primarily on the basis of financial need and participate in needs-blind admission policies. The institution does not admit students considering their ability to pay for their education, and they are fully committed to meeting students' needs. By using our framework and model of the market for elite higher education, we can try to evaluate the outcomes of this policy.

When a university is making admissions decisions, they primarily care about two dimensions of prospective students: merit and willingness to pay (WTP). Let N represent the total number of students applying to a college and k represent how many the university is able to enroll. Universities in the top-tier of the market are able to be highly selective on these characteristics as the total students who apply to these schools far exceeds how many students can enroll ($N >> k$). For each applicant $i \in \{1, \ldots, N\}$, let λ_i represent their maximum willingness to pay for a degree and let γ_i represent the value of student i's productivity (i.e. their level of merit) where $\lambda_i, \gamma_i \in [0, 1]$ for all applicants i. Applicants have varying combinations of merit and WTP under some joint probability

distribution.[5]

Under needs-blind admission, the university would only admit student i on the basis of γ_i, the student's merit. The institution must then must choose the minimum amount of merit a student must demonstrate to be admitted, $\gamma*$. Figure 3 gives an illustration of this policy. The decision boundary for needs-blind admission (solid line) is then simply a horizontal line at $\gamma*$. That is that all students i with $\gamma_i \geq \gamma*$ will be admitted. By contrast, a system of needs-aware admissions would introduce elasticity in this decision boundary with respect students' WTP. The university's decision boundary can then be described as a function of λ as shown in figure 3 (dotted line). Assuming this boundary is downward sloping, students above this boundary either must possess sufficiently high merit, high WTP, or a combination of both. As the elasticity of the decision boundary increases with respect to λ, it will begin to approach a vertical line where students are admitted solely on the basis of income. Clearly, using needs-blind admissions will result in more students from lower-income backgrounds to be admitted compared to using needs-aware admission. If we assume that schools in the 568 Presidents Group are needs-blind, then their admitted students should have diverse levels of financial need.

After the admissions process, colleges must decide how much financial aid to award each student. Let p^* represent the institution's optimal price of tuition absent any financial aid, or the "sticker price" of tuition, where $0 < p* < 1$. If the college admits n students, let NC_j represent the net cost of tuition for student $j \in \{1, \ldots, n\}$. If members of the 568-group keep to their promise of fully meeting students' demonstrated financial need, then for all students j, $NC_j = p^* - WTP_j$. Figure 4 gives an illustration of this practice. If we reduce the dimensionality of admitted students

[5] In practice, colleges estimate applicants λ_i using forms of financial information like the FAFSA to generate student EFCs, and they would predict γ_i by analyzing student test scores, high school grades, recommendation letters, etc. for each student.

to just their WTP, we may construct something similar to a demand curve which reflects that as we increase net costs, the total amount of students who can afford the education will decrease. Colleges then match the difference between a fixed p^* and this demand curve with the shaded area representing the total amount of financial aid awarded. This illustration shows multiple interesting outcomes.

First, we see that all students who are accepted would be able to afford to attend the institution, in contrast to the outcomes of merit-aid. Low-income students who otherwise would receive insufficient merit aid can now afford a top-tier education, but some students are clearly worse off. Assuming $p^* < 1$, students with the highest WTP would receive no financial aid and have to pay the full price of tuition to attend. upper-income students who receive some amount of need-based aid are still likely receiving less than they would if the institution awarded primarily based on merit. For students from middle-income backgrounds, the impact of a need-aid versus merit-aid regime is ambiguous. Middle-income students with sufficiently high merit would be worse off as they could receive more from a merit-aid school, but many lower achieving middle-income students would benefit from need-aid and gain access to top-tier education if they would otherwise not receive sufficient merit-aid to attend.[6]

It is important to note, however, that this model only explains financial aid offers, not *accepted* aid packages. Students with high incomes and high merit may prefer an institution outside of the 568-group if they are given some level of merit aid, for example. In this outcome, competitive, elite institutions outside of the 568-group would be motivated to offer some level of merit aid as a means of attracting these students. Students may also have strong horizontal preferences for rival

[6]In the conventional language of welfare maximization, when consumers are charged up to their maximum WTP, we would say that consumers extract zero consumer surplus. It is then worth asking if students are overall worse off in the need-aid case compared to the merit-aid case. The answer is that student WTPs are highly subject to income constraints and may not reflect the actual value of receiving an elite education. A student with little means to pay for college has a low WTP, but they clearly see large benefits from attendance.

universities such as campus location, athletic division, academic programs, etc. that may influence their decision to enroll. The group's cooperation still ensures that they have sufficient market power to be able award aid on the basis of need without losing too many students to their competition.

It is also important to consider the role of the CA methodology in facilitating this cooperation. The CA methodology critically is not itself what binds colleges to awarding need-aid, as institutions could choose whether or not to adopt certain parts of the methodology at their own discretion.[7] Instead, the methodology ensures that members have some uniformity in estimating students' EFCs and will award similar aid packages to commonly admitted students. Members are then able to limit competition among themselves on the dimension of price. A student's choice to enroll in one member institution or another is then solely based on horizontal preferences rather how much aid they receive.

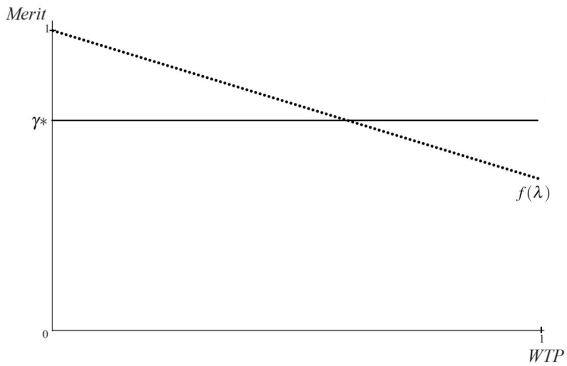
The cooperative hypothesis relies on some assumptions that may not hold in the real world. For instance, what if schools do not abide to the standard of being need-blind, as the 2022 lawsuit alleges? The second hypothesis is the "collusive hypothesis" and makes many of the same assumptions as in the cooperative case. We assume that members of the 568-group primarily award need-aid and have sufficient market power to charge individual students net costs above the zero-profit level, but we will relax the assumption that colleges adhere to the standard of being need-blind. Member institutions then are need-aware and will likely admit more students from wealthy backgrounds. Contrasting the model shown in figure 4, we can longer assume that the slope of the student demand curve is relatively constant. Instead, the elasticity of student demand will become much less sensitive to price. We can still assume that the actual mechanism of setting

[7] In the 2005-2006 academic year, the GAO (2006) reported that only 13 school out of 28 member institutions implemented all elements of the Consensus Approach while many other members only adhered to specific options, such as how the methodology evaluates home equity, family loan debt, or student assets.

net costs is the same as in the first hypothesis. That is members will fully meet the demonstrated need of admitted students with financial aid. Needs-aware IHEs can choose who is accepted based on merit and WTP, so they then have little reason to admit a student just offer them insufficient aid to attend. The actual aid packages offered, holding income fixed, should not change.

Low, middle, and upper-income students who are accepted to a member IHE should see the same level of aid in either hypothesis; however, as we can see visually in figure 5, the shaded area representing the total amount of aid awarded to students is significantly smaller than in figure 4. The amount of students who receive no financial aid is also larger if colleges are need-aware. Holding k (the number of admitted students) constant, we can conclude then that the average net costs across all students should be significantly larger in the collusive outcome. In contrast to the cooperative hypothesis, benefits in student diversity and enrollment would be at best ambiguous compared to the outcomes of using merit-aid. Low and middle-income students who are accepted may be guaranteed to be able to afford the education, but if they are ultimately disadvantaged in the admissions process due to their high need, then many will be denied entry altogether and be better off with a merit-based institution who is more fair in the admissions process.

Figure 3: Illustration of Need-Blind vs. Need-Aware Admission Policies

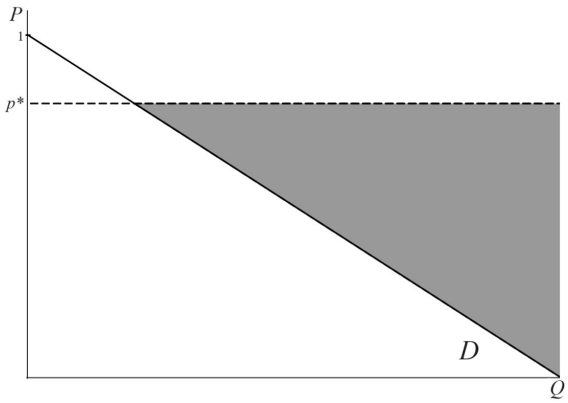


Notes: This figure illustrates the admission policies for schools under need-blind (solid) and need-aware (dotted) admission policies. The dotted and solid lines represent decision boundaries for student acceptance based on merit and willingness to pay (WTP) where all applicants above the decision boundary would be admitted.

Overall, it is clear that in the cooperative hypothesis, students will generally be better off as many low and middle-income students will pay lower net costs and be more likely to attend an elite institution. In the collusive hypothesis, students are generally worse off as some low and middle-income students would be harmed by needs-aware admission policies and be less likely to attend. In both hypotheses, upper-income students will generally pay more than if members of the 568-group primarily awarded merit-aid. The difference is that in cooperative hypothesis, wealthier students pay more to benefit low-income students while in the collusive hypothesis, wealthier students pay more to benefit the university itself. The importance of members maintaining the need-blind standard is also further supported by the law underlying the 568-group. Written into the group's antitrust exemption is the requirement that colleges adhere to the policy of being need-blind, suggesting lawmakers saw this aspect to the group as critical to ensuring it would cooperate to benefit students.

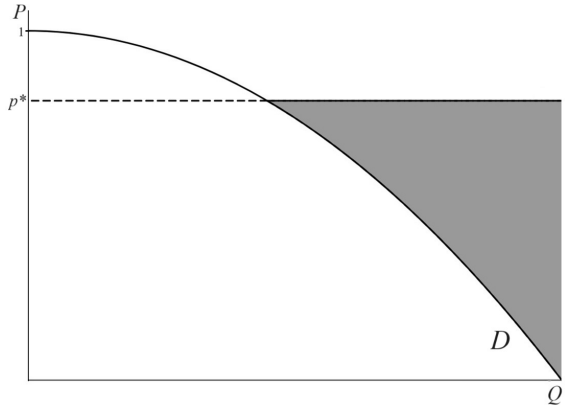
It is difficult to say precisely which hypothesis most accurately reflects the true intentions of the 568-group. According to the 2022 lawsuit, schools repeatedly violated the standards of needs-blind admissions by choosing students off wait lists based on their WTP. Other practices like legacy admissions, which many members of the 568 Presidents Group utilize, could further be interpreted as violating the standard of being need-blind. Without a concrete mathematical model, it is difficult to say whether these potential needs-aware policies are sufficient to invalidate the group's potential contributions to a more egalitarian access to education. It is for these reasons that we seek to empirically estimate how the group has impacted student net costs and attendance across its existence.

Figure 4: Institutions Awarding Need-Aid under Needs-Blind Admissions



Notes: This figure illustrates student outcomes when aid is awarded by financial need and universities utilize need-blind admission policies. D represents the number of students willing to pay the price of tuition p to enroll. p^* represents the "sticker price" of tuition which is constant for all students. The shaded gray area represents the total amount of financial aid awarded to students by the university.

Figure 5: Institutions Awarding Need-Aid under Needs-Aware Admissions



Notes: This figure illustrates student outcomes when aid is awarded by financial need and universities utilize need-aware admission policies. D represents the number of students willing to pay the price of tuition p to enroll. p^* represents the "sticker price" of tuition which is constant for all students. The shaded gray area represents the total amount of financial aid awarded to students by the university.

4.2 Exit and Entry from the 568 Presidents Group

The principle goal of further causal analysis is to identify the impact of the 568 Presidents Group on the market for higher education. Ideally, this would involve comparing group members when they are using the CA methodology to the counterfactual world of members primarily offering merit aid. We would then easily be able to evaluate our competing hypotheses. This method, of course,

would be impossible as we do not observe the counterfactual outcomes of merit-aid, but what study designs can we use approximate this comparison?

One could apply linear regression among a cross-section of group members and their competitors to isolate impacts of the group membership, as done by Carlton et al. (1995). The issue with this methodology is that the model could easily suffer from omitted variable bias. We would have to assume that our model controls for all possible confounders that could bias the estimated impact of membership. Hoxby (2000) and Karikari and Dezhbakhsh (2019), instead exploit major events in the group's history to study what occurred after the Overlap group's cooperation unilaterally ended in 1991 and started once again with the adoption of the CA methodology in 2002. The expiration of Section 568 in 2022 then may be another major event to study, as we could observe what occurs when all members of the group stop cooperation. Unfortunately, this event is too recent. No data is yet available to study the change in net costs and attendance between the 2022-2023 and 2023-2024 academic years. I will instead utilize the fact there was extensive exit and entry in the 568-group over the course of its existence.

When a top-tier institution enters the group, they change from being a competitor to joining in the group's cooperation. What impact do we expect this have on the entering institution? An entering institution would be bound to primarily awarding need-aid as well as adopting at least some parts of the CA methodology. Conversely, an institution exiting the group would no longer be bound to need-aid and can use their own method for calculating students EFCs. From our theory, we would expect that a competing institution would rely more on merit-aid and gain a competitive advantage in attracting upper-income, high-achieving students. What is unclear then is the motivation behind exit and entry into the group. Why would a school join if they have a competitive advantage? What drives institutions to leave the group if they previously found

cooperation to be a beneficial?

There are several benefits an institution would have received when they entered the 568 Presidents Group. Under the cooperative hypothesis, schools may have a genuine interest in joining the group to improve diversity and to promote equal access to their education. With the assumption that the 568-group sufficiently limits market power, the school could choose to adopt a system of need-based aid outside of the group, but they would then not be able to coordinate as efficiently. If they do not adopt the CA methodology, then the school may offer students contrasting aid packages compared to the 568-group and lessen the effectiveness of adopting need-aid.

Additionally, schools may see benefits in their reputation if they become members. Publicly committing to the principles of need-aid and needs-blind admissions may signal to low-income students that member universities are particularly fair in its admission policies compared to competitors outside the group (Hoxby, 2000). This may lead to low-income students being more encouraged to apply to member schools and further support the entering institution's goal of promoting student diversity and access.[8]

Under the collusive hypothesis, schools enter in order to increase overall tuition revenue compared to if they primarily offered merit-aid. Similarly, institutions would not be motivated to primarily award need-aid outside of the group, as adopting the CA methodology would ensure they can coordinate most effectively with schools inside the 568-group. Institutions may also still see reputations benefits from joining. High-achieving, low-income students may see membership as a signal of fair admission and aid policies. Even if schools are not maintaining their needs-blind

[8]The extent to which students were aware of the group's cooperation is somewhat questionable. In Yale University's student run newspaper, *Yale Daily News*, several interviewed students were unaware of the group's existence when Yale announced it would exit in 2008. Still, information on group membership was publicly available and could have been known by prospective students.

promise, students unaware of this reality may still be more inclined to apply.[9] For universities exiting the group, it must be that these motivations change.

Under the cooperative hypothesis, an institution may be motivated to exit if they find the group is too generous in its financial aid awards. For example, an institution may find the CA methodology is too costly and the school would be better off using merit-aid or breaking from needs-blind admission policies in order to better target high-achieving students with a little financial need. Critically, an institution would not be able to use higher merit-aid while in the group and "free-ride" on the benefits of group membership. While there is no strict enforcement mechanism in the 568-group, members are likely able to observe if a school is deviating from the group's principles, and the free-riding institution would generally be seen as "unwelcome" in the group (Hoxby, 2000). This means that if a school wants to shift to using greater merit-aid or breaking needs-blind, they would have to exit the group entirely.

If we relax the assumption the group is needs-blind, an institution may be motivated to exit if they wish to promote fairness in their admission policies. As we saw in the collusive outcome, upper-income students pay substantially more while low and middle-income students are harmed from need-aware admissions policies. Offering more merit aid would then be a way correct these harms to student welfare, as high-merit upper and middle-income students would be more fairly compensated for their productive contributions to the university. Alternatively, the institution may want to combat these harms by awarding greater need-aid than what is permissible under the CA methodology. The institution would then be encouraged to exit the group so they can freely award

[9] Dynarski et al. (2021) studied a policy at the University of Michigan which signaled to low-income students that they would receive high aid. Even though the actual policies of need-aid had not changed, simply signaling that students would qualify for high aid significantly increased the likelihood of high-achieving, low-income students to apply.

more aid without the group's restrictions.[10]

It is important to note that many of the members of the 568 Presidents Group offer relatively little aid on the basis of student achievement. As of 2021, 5% of all institutional aid awarded at 568-group institutions was awarded on the basis of merit. My hypothesized shifts in using merit-based aid after exit or entry would then likely be very modest; however, the average amount of total merit aid at member institutions totaled $5.5 million in the same year.[11] Schools could then feasibly shift towards using more or less aid on the basis of achievement and significantly impact student well being and outcomes, even if merit-aid still encompasses a small part of their total aid awarded.

For this study, I will focus on members exiting the group as more members left from 2005-2021 than entered, giving us a larger sample size of institutions to examine. My main goal is then to see how net costs and enrollment changes for students in different income backgrounds when a university exits the 568 Presidents Group. To estimate this effect, I will need to construct a control group of institutions that serve as an appropriate comparison to exiting members of the 568-group. The remainder of this paper will outline the data, identification strategy, and empirical results that can help us evaluate my competing hypotheses.

5 Data

To date, there is no publicly available dataset of membership in the 568 Presidents Group throughout its existence. The U.S. Government Accountability Office (GAO) released a report detailing

[10]These hypothesized motivations are validated by press releases from former members. After Emory University exited the group in 2013, they subsequently announced they would begin to more "strategically utilize merit aid funds." Yale University stated they wished to implement more generous need-aid policies than the methodology would allow, prompting their exit in 2008.

[11]These figures were obtained from 2021-2022 releases of the Common Data Set (CDS) published by each member university.

the 28 institutions using the Antitrust Exemption as of May 2006; however, due to extensive entry and exit into the group, membership was not consistent from 2006 to 2022. For these reasons, I compiled a new dataset of membership in the 568 Presidents Group by using archived web pages from the group's website which contain the most updated lists of group membership.[12]

Archives of the website are available from 2005-2021 with one gap in 2010. I was then able to use these lists to form a complete record of membership throughout almost the entire period the CA methodology was used by member institutions, as while the group was formed in 1998, the CA approach was not implemented until the 2002-2003 academic year. Optimally, I would have recorded an institution as being a group member in a particular year if they were on the membership list as of a particular date, such as January 1st. Due to significant inconsistency in how often these websites were archived, institutions were recorded as being in the group if they were recorded as a member at any point in the year.[13]

From 2005-2022, a total of 33 institutions were in the 568 Presidents Group. Figure 6 shows the total number of institutions in the group by year. The main observation is that there is a clear downward trend in membership from the group's inception, peaking at 28 members, to its expiration, falling to 20 members.[14] Notably, the list of 28 institutions in 2006 aligns with the list from the GAO (2006) report.

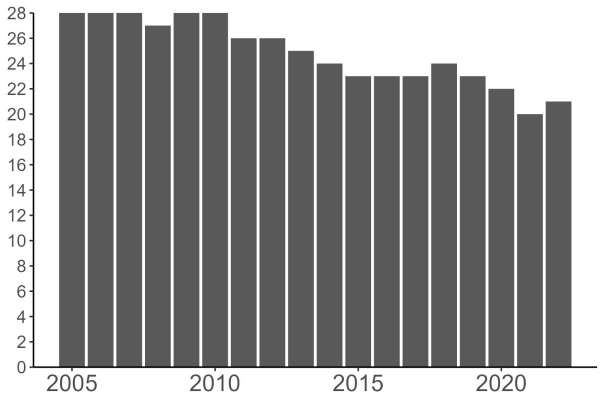
All data in this study relating to the net costs of college tuition, institutional characteristics, and enrollment statistics were retrieved from the Integrated Postsecondary Education Data System (IPEDS) (National Center for Education Statistics, 2024). The IPEDS dataset is an institutional-

[12]Captured images of the group's website, 568group.org, were obtained using the internet archive Wayback Machine.

[13]Based on subsequent press releases from Emory, Brown, and Yale University, institutions' actual entry/exit appears to correspond closely to what is displayed on the 568-group's website.

[14]The membership values in 2010 were interpolated with the value in 2009. For 22 of the 28 institutions in 2009, this is a reasonable assumption as their membership was the same in 2011. Four institutions exited and two entered the group at some point between 2009-2011. Future work should try and find external sources indicating when these membership changes occur.

Figure 6: 568 Presidents Group Membership 2005-2022



Notes: All membership data is collected from archived captures of the 568-group's official website. Due to missing website captures, 2010 membership data was interpolated with values from 2009.

level dataset which covers over 6000 schools throughout the United States, including all members of the 568-group. For the initial data retrieval, I only included schools that were public or non-profit 4-year universities, Title IV participants, and primarily offer baccalaureate-level degrees or above.[15] The main purpose of this was to eliminate community colleges or for-profit institutions from our sample, as they would not serve as appropriate comparison institutions to the 568 Presidents Group. Finally, I linked this retrieved data from IPEDS to the manually-collected 568-group membership data using institution names.

There is some ambiguity on what institutions would be most appropriate to compare to the 568 Presidents Group. For example, Carlton et al. (1995) limits their sample to institutions that share the same Carnegie Classifications as institutions in the Overlap Group. If we limit our control group to institutions that share the same Carnegie Classifications as members of the 568-group but are not themselves members, we observe that these comparison institutions differ significantly

[15]To be Title IV eligible, institutions must meet three basic criteria: they be legally authorized by a state to provide a postsecondary education program in that state, be accredited, and admit as regular students only individuals with a high school diploma or its recognized equivalent (such as a GED) or individuals beyond the age of compulsory school attendance.

from members of the 568-group.[16] However, we can use these schools to conduct preliminary data analysis and examine how members of the 568-group compare to the average university outside of the group.

Table 1 shows the average values of various competitive, financial, and enrollment statistics from 2008-2021 between 568-group members and other institutions with the same Carnegie Classifications. From this table, we can see that schools in the 568-group are much more competitive than other institutions with about 43% lower acceptance rate and significantly higher SAT scores of enrolled students. Additionally, 568-group members have much higher national rankings by the *U.S. News and World Report* (USNWR) compared other institutions, indicating that members are generally recognized as being more prestigious.[17] This confirms that member schools tend to be highly-competitive, elite institutions that operate within the top of the university hierarchy. Members also have much higher endowments, on average being over $3 billion greater than non-members, even though they have significantly smaller first-time student populations (i.e. enrolled freshmen). Within the 568-group, however, there is a high standard deviation of endowments which suggests there is significant variation in funding among members. We can conclude that member institutions not only have more funds available to contribute to financial aid, but they also have fewer students whose educations they need to finance as their student bodies are significantly smaller.

Further contributing to this is the fact that students enrolled in member universities tend to have students with less financial need. From 2008-2021, the distribution of first-time, Title IV eligible students at 568-group schools tends to be skewed toward higher household income groups than Title IV eligible students at public or non-member private schools (Figure 7).[18] For example,

[16]These classifications are "Doctoral Universities: Highest Research Activity" (R1), "Doctoral Universities: Higher Research Activity" (R2), and "Baccalaureate Colleges: Arts & Sciences Focus."

[17]USNWR rankings were obtained from Reiter (2024) and merged to the IPEDS dataset using IPEDS ID numbers.

[18]Students eligible for Title IV are allowed to receive federal student aid such as Pell grants, subsidized loans, federal work study, etc.

Table 1: Summary Statistics by 568 Presidents Group Membership

	Non-568 Schools			568-Group Schools			
	Mean	SD	N	Mean	SD	N	p-value
Acceptance Rate	62.43	20.05	5662.00	19.34	12.98	462.00	0.00
USNWR National Ranking	81.02	42.51	3306.00	14.60	16.12	459.00	0.00
Endowment (Millions of $)	609.69	2339.40	5641.00	3936.55	4544.84	461.00	0.00
Graduation Rate	64.80	17.35	5732.00	91.87	4.91	462.00	0.00
SAT Score, 75th Percentile	1273.09	130.41	4825.00	1527.17	43.72	416.00	0.00
SAT Score, 25th Percentile	1058.13	141.68	4825.00	1357.51	70.89	416.00	0.00
First-Time Student Pop.	841.73	844.40	5773.00	457.85	327.54	462.00	0.00

Notes: This table displays sample means, standard deviations, and number of observations for various university statistics from 2008-2021 between institutions outside of the 568-group and group members. Non-568 schools must be Title-IV eligible, public or non-profit private universities, and share the same Carnegie Classifications as members of the 568-group. p-values represent the significance level of difference-in-mean tests between these groups. SAT score percentiles are calculated among admitted, first-year students. First-time student populations include the total students in their first year of undergraduate education, and graduation rates represent the proportion of undergraduate students who successfully complete their degree within 6 years.

around 28% of Title IV students at public schools come from household income of less than $30,000 a year compared to only 13% of students at member institutions. Additionally, 44% of students at member institutions come from an income background of more than $110,000 per year compared to 35% at private non-member schools and 20% at public schools. We should also note that these student populations do not encompass the entirety of students at these colleges. Students eligible for Title IV financial aid must be U.S. citizens, demonstrate financial need, and maintain satisfactory academic progress. The proportion of Title-IV eligible students being "upper-income" would then likely be smaller than the true proportion of all students being upper-income, as this data omits students from the wealthiest income backgrounds who have no financial need. Additionally, international and undocumented domestic students would be omitted from these figures.

Based on Figure 7, it appears that upper-income students have greater access to 568-group schools than other public or private universities; however, we can not necessarily credit this to the group allegedly violating needs-blind admission policies. Notably, the group's higher student selectivity likely provides greater barriers for low-income students to be accepted into a member

institution. Member schools favoring students with higher standardized test scores particularly disadvantages low-income students, as it has frequently been noted that students from low-income backgrounds score significantly worse on standardized tests like the SAT (Dixon-Roman et al., 2013). Among Ivy-Plus member schools like MIT, The University of Chicago, and Yale University, Chetty et al. (2023) cites factors like legacy admissions, the schools' weight of non-academic credentials, and athletic recruiting as being some of the main factors contributing to high-income students' greater attendance. While these admission factors may be driving greater upper-income student enrollment at 568-group IHEs, their cooperation's effect on the net costs of tuition may also have an impact on student enrollment.

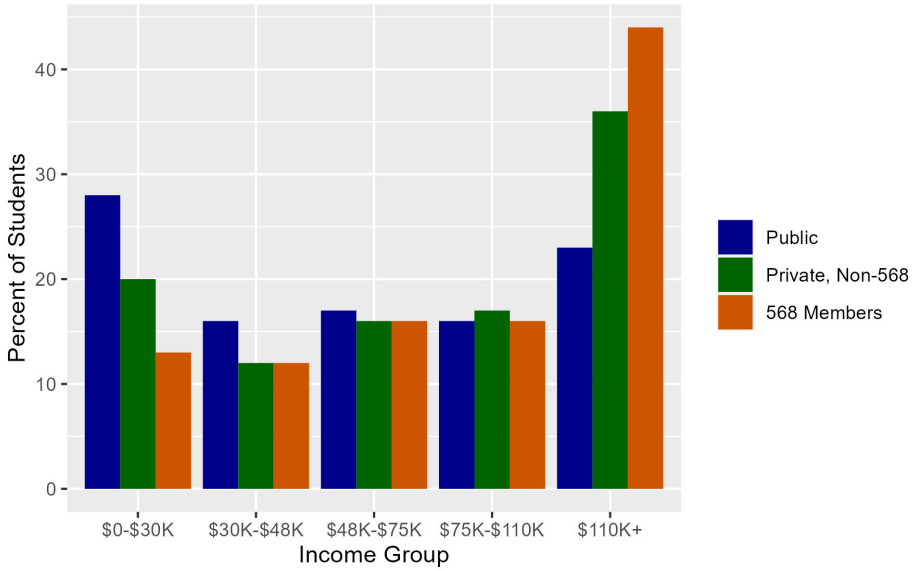
In IPEDS, data on the average net costs of college tuition by institution only include costs for first-time, full-time, undergraduate students who qualify for Title IV financial aid. Net costs are defined as the "sticker price" of tuition minus all federal, state/local government, and institutional grant and scholarship aid. This data happens to be an ideal measure of student costs. According to the group's website, the CA methodology applied "primarily" to first-year students, so we may expect institutions to not have used the method to calculate the EFCs for upper-level students as rigorously. Net costs for part-time students should also not be included in our study as these students will likely pay lower prices for tuition and often receive smaller aid packages. These net costs of tuition are available over all students as well as by income group.[19] Due to institutions only recently being required by law to report statistics on net costs and enrollment by income-level, this data is only available from 2008-2021.

Figure 8 shows the net costs of college tuition for Title-IV eligible students at 568-group

[19]Lower income students are defined as coming from a household income of less than $30,000 annually, lower-middle income students come from a household income of $30,001-$48,000, middle-income students come from a household income of $48,001-$75,000, upper-middle income students come from a household income of $75,001-$110,000, and upper-income students come from a household income of more than $110,000 annually.

schools, non-568 private schools, and public schools from 2008-2022.[20] Overall, it appears that member schools and other private institutions share very similar trends in the net costs of tuition, with member schools showing slightly lower costs. Within each income group, however, there is more significant deviation. For all groups except for upper-income students, 568-group institutions show a marked decline in net costs of tuition from 2008-2022, being more affordable to students from poorer household incomes than other private or public institutions. Member institutions also appear to charge significantly higher net costs of college tuition to upper-income students compared to other public and private schools, steadily increasing from 2008-2021.

Figure 7: Distribution of Title IV Eligible Students by Sector and Income Level, 2008-2021



Notes: This figure charts the proportion of Title-IV eligible students in each household income group by university sector and 568-group membership. All 568-group members are private institutions. Student enrollment is averaged from 2008-2021. Sample private and public institutions must be Title-IV eligible and share the same Carnegie Classifications as members of the 568-group.

These observations appear to support the cooperative hypothesis and stated aims of the 568-group. It seems that over time, lower-income students were given greater financial aid packages

[20] Net costs of tuition for public schools only include students paying in-state prices of tuition.

which makes college more affordable. Then the less income-constrained, upper-income students paid higher net costs of tuition as they have less of a need for financial aid. The caveat to this observation is that while the highest income group contains students from a household income of $110,000 a year or more, we likely cannot assume that students within the group come from particularly wealthy family backgrounds. All students in the sample are eligible for Title IV financial aid, meaning they have some amount of financial need. In this case, 568-group institutions expecting an average family contribution of about $45,000 in 2020 would be particularly costly for families earning around $110,000 annually. Considering the fact that 44% of students at member institutions come from this income background, this could significantly mitigate the benefit of the antitrust exemption in regards to promoting student well-being.

In addition, there could some element of a "survivor bias" present in this sample, as we are not seeing the average aid packages awarded to admitted students. The data only reflects students who have enrolled in the institution full-time. For low-income students who have significant income constraints, they would likely only enroll in an institution if they receive sufficient financial aid and can afford to attend. This means that if schools under the antitrust exemption were not fully meeting students' demonstrated need, or that CA methodology's calculation of students' EFCs overestimated the actual ability for students to pay, then we may only see impacts to enrollment, not to the accepted aid packages for students.

Considering these observations from this preliminary data analysis, there are two main insights that should be considered in developing a suitable estimation method. First, we likely need to construct a more suitable control group to 568 Presidents Group institutions by using more than just Carnegie Classification codes. To eliminate the vast differences in endowments, student selectivity, and student body size, it may be necessary to limit our control group to "elite" universities in the

top-tier of the hierarchy. This would help alleviate these differences and make it easier to identify the effect of the schools' cooperation. Second, as also discussed in section 4, it will be critical to examine both the group's impact on the net costs of college tuition and student enrollment by income group.

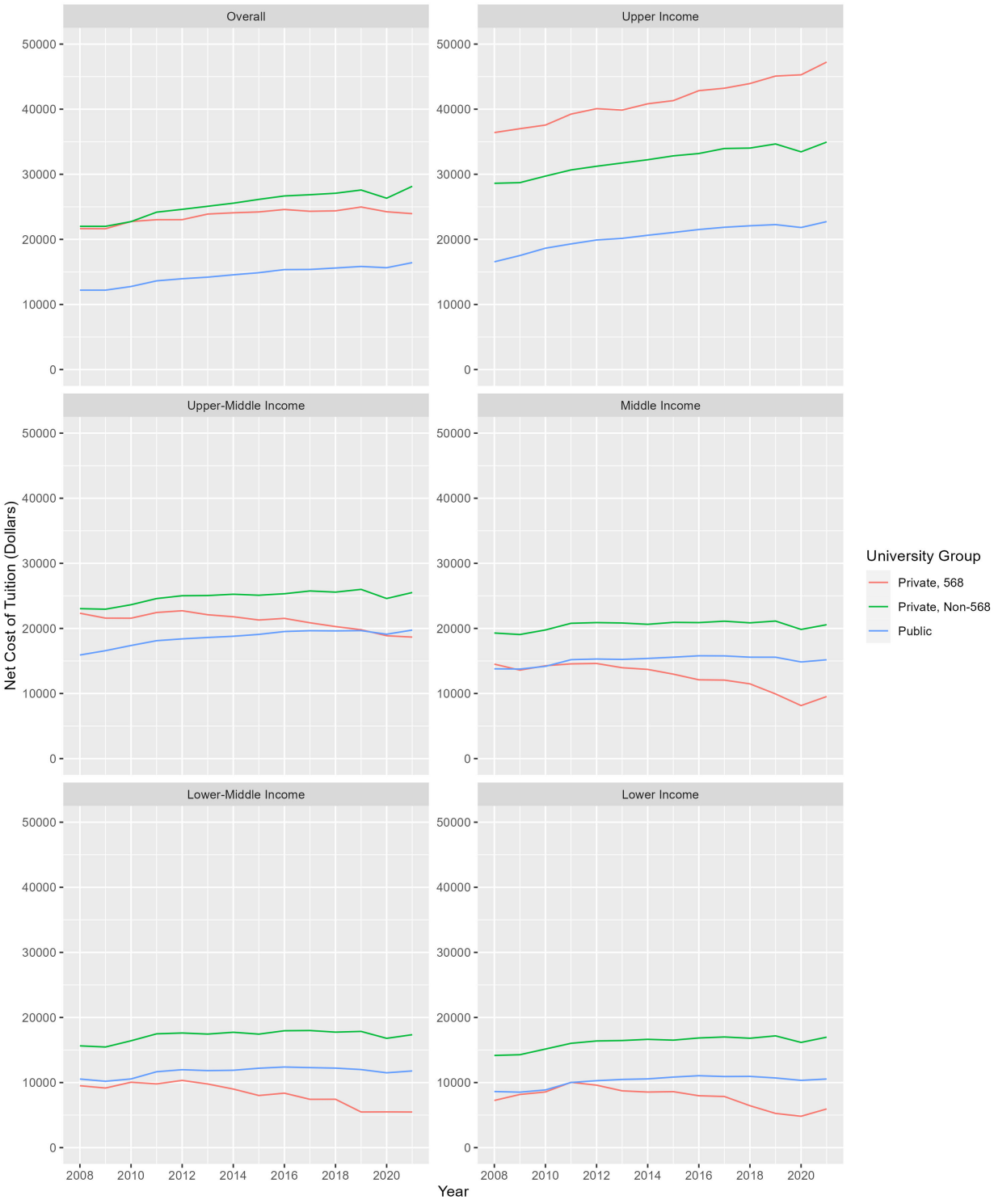
Overall, the impact of the 568-group on tuition costs and enrollment is still ambiguous from these figures and summary statistics. Considering the fact that member institutions have significantly higher endowments compared to many other universities, they likely have a greater ability to provide student aid than many other institutions outside the group. Instead, we need to be able to estimate a true counterfactual of what the net prices of tuition at these institutions would be if they were not cooperating.

For this study, the control group of institutions will instead consist of 568-group members who never exit the group from 2008-2021, as these schools are relatively similar to the treated institutions who exit.[21] Table 2 shows that the control and treated institutions have similar first-time student populations and enrolled student SAT scores, indicating the universities have similar selectivity. By contrast, control schools have significantly lower acceptance rates, are ranked more highly, and have higher graduation rates compared to treated institutions. Control schools tend to also have higher endowments, but these differences in funding are not statistically significant ($p > .10$). This could indicate that schools who remain in the group tend to be higher-quality and have greater excess demand, but these differences may be less important.

There are some differences between treated and control institutions, but overall, they compete within the same upper-tier of the market. Universities that exit the group are still consistently ranked in the top 40, are highly funded, and admit high-quality students. Since these "bands" of

[21] The list of schools included in these groups are shown in Table 7 (Appendix).

Figure 8: Average Net Costs of Tuition by Income and Sector, 2008-2021



Notes: This figure graphs trends in the average net costs of tuition by university sector and 568-group membership from 2008-2021. Net costs of tuition only include students who are Title-IV eligible. Sample private and public institutions must be eligible to receive Title IV federal funding and share the same Carnegie Classifications as members of the 568-group.

the market are ultimately what determine universities' optimal strategies and pricing, we would assume that even if there are some baseline differences in quality, members that exit are still sufficiently similar to those who do not. We may then expect these institutions to be able to offer similar aid packages and have similar trends in pricing over time. Due to the irregularity of exit from the group, estimating these differences between the control and treated groups still may be difficult.

Table 2: Summary Statistics by Treated and Control Institutions

	Control Schools			Treated Schools			
	Mean	SD	N	Mean	SD	N	p-value
Acceptance Rate	16.01	7.22	210.00	23.94	16.56	196.00	0.00
USNWR National Ranking	10.39	8.51	210.00	20.53	21.71	193.00	0.00
Endowment (Millions of $)	3724.74	3396.86	210.00	3275.91	3089.84	196.00	0.17
Graduation Rate	93.54	1.72	210.00	90.16	6.61	196.00	0.00
SAT Scores, 75th Percentile	1526.24	37.53	205.00	1520.66	48.55	157.00	0.22
SAT Scores, 25th Percentile	1353.07	57.60	205.00	1350.71	75.55	157.00	0.74
First-Time Student Pop.	485.47	402.96	210.00	466.97	245.08	196.00	0.58

Notes: This table displays sample means, standard deviations, and number of observations for various university statistics from 2008-2021 between treated and control institutions. p-values represent the significance level of difference-in-mean tests between these groups. SAT score percentiles are calculated among admitted, first-year students. First-time student populations include the total students in their first year of undergraduate education, and graduation rates represent the proportion of undergraduate students who successfully complete their degree within 6 years.

6 Methodology

Regardless of whether the 568 Presidents Group had a positive or negative impact on society, the group should principally have an impact on the net costs of college tuition and/or attendance. Once a school exits the group and becomes a competitor, we can interpret their resulting changes in net costs and attendance as evidence for one of our competing hypotheses. This presents an opportunity for a natural experiment given the extensive exit from the group highlighted in Figure 6. This exit can be viewed as a "treatment" and the average impact of an institution exiting on

outcome Y is the "average treatment effect on the treated" (ATT) I wish to estimate. The primary goal of this section is to identify an unbiased estimator for the ATTs and outline the necessary assumptions for this analysis.

The difference-in-differences (DiD) design has been a widely implemented tool in economic research and policy analysis for decades. Canonically, the DiD design involves two groups: units who receive the treatment and units who are untreated. Then by comparing the average outcomes of institutions in each group, we are able to observe the ATT by calculating the difference between the groups' outcomes over time (Cunningham, 2021). Estimating treatment effects in the canonical DiD design is well understood, but it assumes that all treated units receive the treatment at the same time. In the 568-group, treated institutions exited at varying time periods between 2008-2021, reflecting a "staggered" adoption of the treatment.

The staggered DiD approach relaxes the assumption of homogeneous treatment timing, and it has been a popular tool used by applied econometricians in the past two decades, particularly in the study of corporate finance and market trends (Baker et al., 2022). However, this design comes at the cost of complicating how to estimate the ATT. Prior to 2020, much of the literature on staggered DiD approaches utilized a two-way fixed effects (TWFE) model which leverages panel OLS regression models with time and unit-fixed effects. Such as in the model shown below:

$$Y_{it} = \alpha_0 + \delta D_{it} + X_{it} + \alpha_i + \alpha_t + \epsilon_{it} \tag{1}$$

where D_{it} is a binary variable representing whether unit i is treated at time t. In this model, by controlling base-line differences between treated groups (α_i) and differences in time trends (α_t), the hope is that after controlling for covariates X, we can estimate a parameter $\delta = \hat{ATT}_{TWFE}$.

While widely applied, the TWFE method has recently been scrutinized for producing estimates of the treatment that are difficult to interpret. Goodman-Bacon (2021) provides a decomposition of the $\hat{ATT}_{TWFE}$ estimator which reveals that these estimates are highly sensitive to units with specific treatment timing. Given a cohort of units grouped by when they adopt the treatment, factors like the sample size of each treated cohort or whether they are "early" or "late" adopters of the treatment will greatly influence how the treatment effect of each group is weighted in the estimation of the ATT. If treatment effects are heterogeneous across different cohorts, this can introduce bias in our estimates. In the context of the 568 Presidents Group, this is likely to be problematic.

As discussed in section 4, institutions were able to pick and choose which portions of the CA methodology to adopt creating some differences in how student EFCs would be calculated. This could lead to some variation in the estimated treatment effect group membership, as some schools may have adhered more strictly to the methodology than others. It would then be unreasonable to assume a homogeneous treatment effect, and the TWFE model would not be a reliable estimator for this study. For these reasons, we will apply the more robust staggered DiD design developed by Callaway and Sant'Anna (2021). Rather than assuming a homogeneous treatment affect across different groups and over time, this design attempts to model $ATT(g,t) = E[Y_{i,t}(g) - Y_{i,t}(0)|G_g = 1]$.[22] That is the treatment effect on outcome Y for each cohort g at time t. In order to apply this study design, there are five assumptions about that must hold.

Assumption 1: Treatments are not "forgotten." Assumption 1 assumes that if $D_{i,t} = 1$, then $D_{i,t+1} = 1$ almost surely. Once an institution is treated, we must assume that they remain treated for the remainder of the panel. This implies the treatment cannot "turn off" or be

[22] G_g is a binary variable which is 1 if a unit is first treated at time g and 0 otherwise, and $Y_{i,t}(g)$ is the potential outcome for unit i at time t given they were first treated at time g

"forgotten" by the institution. If an institution ceases being a member, we must assume they never rejoin from their year of exit to 2021, the end of the panel. Additionally, we must assume that $D_{i,1} = 0$ almost surely. Institutions then cannot be included in our study if they exit the group in 2008, the first time period in the panel.

For the large majority of institutions in the control group, this assumption would seem reasonable as 12 of the 14 exiting institutions are never recorded as reentering the group, but two institutions rejoin some period after exit and effectively turn off the treatment.[23] Clearly, these two institutions could bias our results and underestimate the impact of exiting the 568-group. One solution would be to drop these institutions from the dataset, but this would have the clear drawback of decreasing our sample size. I will instead drop the years after the institution rejoins the group. This will create an unbalanced panel that has the benefit of more closely fitting this assumption but has the drawback of making the results somewhat more difficult to interpret. Running this specification can then be a robustness check to ensure that the results are not significantly biased by this reentry.

Assumption 2: Random sampling. Assumption 2 implies that the panel data of observed outcomes and treatment status is independent and identically distributed (IID). This means that each unit i is randomly drawn from a large population of interest. In this study, we may imagine the large population to be elite universities in the United States.

Assumption 3: No treatment anticipation. Assuming no treatment anticipation implies that if a unit receives the treatment at time g, then for any time period $t \in \{1, 2, \ldots, T)$ such that $t < g$, $D_{i,t} = 0$. This assumption could be violated, for example, if an institution anticipated their exit from the 568-group a year ahead of time and then decides to abandon certain parts of the CA

[23] Middlebury College exited the 568-group in 2010 be rejoined in 2013. Rice University exited in 2011 but rejoined in 2017.

methodology. This may have an impact on the observed outcomes of student net costs before we officially record the school as treated and bias our estimates of their treatment effect. Callaway and Sant'Anna (2021) allow for a weaker assumption of "limited treatment anticipation" assuming that anticipation of the treatment is isolated to some $\delta \geq 1$ period prior to treatment. For the remainder of this study, we prefer the assumption of no treatment anticipation ($\delta = 0$).

Assumption 4: Unconditional Parallel Trends. For all cohorts and time periods $t \in \{2, \ldots, T\}$ such that $t \geq g$, we will assume that

$$E[Y_t(0) - Y_{t-1}(0)|G_g = 1] = E[Y_t(0) - Y_{t-1}(0), C = 1].$$

This means that the post-treatment trends in potential outcomes of our control institutions must reflect the trends in potential outcomes of our treated units had they never exited the group. This assumption of parallel trends is unconditional as we will not control for any covariates X that may differ between control and treated groups.

Callaway and Sant'Anna (2021) offer flexibility in whether to assume parallel trends hold unconditionally or whether they hold only in the post-treatment period. Due to the small sample size of control institutions in our data, for practical reasons, we will not condition our estimates of average treatment effects by any covariates.[24] Since this imposes a strong assumption of parallel trends, it may be more prudent to make no assumptions of pre-treatment parallel trends. For the reasons highlighted in Callaway and Sant'Anna (2021), we will then only include "never-treated" observations in our control group as this allows us to only assume the standard of post-treatment

[24]Ideally, I may want to condition on factors like acceptance rates, university rankings, or graduation rates as these could influence trends in net costs and are imbalanced between the treated and control institutions (Table 2). However, missing data for these covariates creates a problem where several institutions are omitted from the regression. This would increase the DiD model's variance and could introduce another form of bias, so I decide to use the unconditional estimator of the ATT.

parallel trends. Given that we cannot observe $E[Y_t(0) - Y_{t-1}(0)|G_g = 1]$, this assumption is untestable, but there are some ways to evaluate the credibility of this assumption by evaluating pre-treatment trends in outcomes. In the following section, I will further discuss whether assumptions 1-4 are reasonable given the composition of the treated units, control group, and evidence of parallel trends.

The main finding of Callaway and Sant'Anna (2021) is that of a doubly robust estimator which allows the experimenter calculate treatment effects under conditional parallel trends; however, their assumptions can be adjusted to the unconditional case, as shown above. We assume that for our treatment and control groups, unconditional parallel trends hold and that there is no treatment anticipation. In this case, Callaway and Sant'Anna (2021) specify the following unconditional estimator for the ATT using never-treated observations as a control group:

$$ATT^{nev}_{unc}(g,t,\delta) = E[Y_t - Y_{g-\delta-1}|G_g = 1] - E[Y_t - Y_{g-\delta-1}|C = 1]. \tag{2}$$

In this specification, we calculate the differences in observed outcomes between the cohort g and a control group of never-treated units at time t compared to time $g - \delta - 1$. I will calculate the ATT^{nev}_{unc} running the linear regression model as follows:

$$Y = \alpha_1^{g,t} + \alpha_2^{g,t} \times G_g + \alpha_3^{g,t} \times 1\{T = t\} + \beta^{g,t} \times (G_g \times 1\{T = t\}) + \epsilon^{g,t} \tag{3}$$

In the above formula, $\alpha_2^{g,t}$ is the cohort fixed-effect on outcome Y while $\alpha_3^{g,t}$ is the time fixed-effect at t where $t > g$.[25] Units included in the regression then either belong to the treated cohort g ($G_g = 1$) or are in the control group ($C = 1$). For example, $ATT(2013, 2015)$ would be the

[25] See Callaway and Sant'Anna (2021) for information on the doubly robust DiD estimator which allows for conditional parallel trends and limited treatment anticipation.

observed treatment effect of units treated in 2013 two years after they received the treatment. This resembles the previously mentioned TWFE model in equation 1; however, this model only includes units treated in cohort g at time t rather than an aggregated treatment affect over all cohorts in the post-treatment period. Under assumptions 1-4, $\beta^{g,t} = ATT^{nev}_{unc}(g,t) = ATT(g,t)$, but are these assumptions reasonable in our study?

One way we can evaluate the assumption of unconditional parallel trends is by calculating average treatment effects in the pre-treatment period. Under parallel trends, it should then hold that $ATT(g,t) = 0$ such that $t < g - \delta$. That is there is no observed treatment effect if an institution has not yet exited the group. To test this assumption, we can calculate "pre-trend" ATTs for treated units before they exit the group. These can easily be estimated by adjusting our DiD estimand. Instead of comparing post-treatment outcomes for cohort g at time t ($Y_t - Y_{g-\delta-1}$), we compare the "short differences" (Y_t - Y_{t-1}) for some $t < g$. Note that while pre-trend tests are relatively common in event-study designs, Roth (2022) explains that these have low power in detecting parallel trend violations and may introduce selection bias if we alter the data-generating process to pass these tests. Kahn-Lang and Lang (2020) further argues that even if the pre-trend test is accurate, pre-trends holding is neither necessary nor sufficient for post-trend parallel trends. With this in consideration, these counterfactual treatment effects should not be interpreted as conclusive evidence for the validity of assumption 4. Instead, they can suggest the degree to which we should be concerned with trend violations, and if so, what direction it may bias our post-treatment estimates of the ATT.

Given the expansive time period of our data ($T = 14$) and number of cohorts ($G = 9$), this data-generating process will create many pre- and post-treatment group-time $ATTs$ and be difficult to interpret, warranting a method of aggregating these treatment effects into more concise estimates.

In place of the TWFE model, we will use four different aggregation approaches to calculate different dimensions of the observed treatment effect.

Callaway and Sant'Anna (2021) provide various ways of aggregating the cohort-time specific treatment effects into more informative statistics. The first of these is to calculate a "simple" weighted average treatment of all values $ATT(g,t)$ such that $t > g$:

$$\theta_W^\circ = \frac{1}{k} \sum_{g \in G} \sum_{t=2}^{T} 1\{t \geq g\} ATT(g,t) P(G = g | C \neq 1), \tag{4}$$

where $k = \sum_{g \in G} \sum_{t=2}^{T} 1\{t \geq g\} P(G = g | C \neq 1)$ is the number of post-treatment $ATTs$ over all cohorts and time periods and G is the set containing all cohorts. In this study, the θ_W° will calculate the average impact of exiting the 568 Presidents Group on net costs or student enrollment for all cohorts over time. This estimator is very concise compared to interpreting k group-time average treatment effects, but it creates two estimation concerns. First, this will tend to "overweight" units treated earlier in the panel as they will have more post-treatment $ATTs$ than units treated later in the panel. Second, we may want to place further restrictions on the window of time we want to estimate treatment effects. For example, we may not want to weigh observed treatment effects 10 years after treatment equally to observed treatment effects the year after treatment if we only anticipate parallel trends to hold e time periods after treatment.

The second aggregation method in this paper is the "event-study" aggregation which highlights treatment effect heterogeneity with respect to the length of exposure e, holding cohort-wise treatment effects constant:

$$\theta_{es}(e) = \sum_{g \in \mathrm{G}} 1\{g + e \leq T\} P(G = g | G + e \leq T) ATT(g, g + e). \tag{5}$$

In the context of the 568 Presidents Group, $\theta_{es}(e)$ is the average effect of an institution leaving the 568 Presidents Group e years after exiting. These estimates will allow us to see whether exiting the group has a significant impact on net costs or student enrollment within a given event window.[26] Furthermore, this aggregation method will allow to us to aggregate our pre-treatment ATTs by averaging the observed differences in outcomes at e time periods before the treatment period.

As an alternative to the simple weighted average treatment effects θ_W°, we can also average these event-study treatment affects into an overall treatment effect across all event times. If we limit our event window to K_U years after treatment, we calculate the following:

$$\theta_{es}^{\circ} = \frac{1}{K_U + 1} \sum_{e=0}^{K_U} \theta_{es}(e) \tag{6}$$

Equation 6 can also be adapted to calculating the average pre-treatment difference in outcomes between all treated cohorts and the control group. We achieve this by calculating the mean of all $\theta_{es}(e)$ from K_L years prior to treatment up to the year prior to treatment.

Finally, we may be interested in highlighting treatment effect heterogeneity across different calendar years. For instance, did membership in the 568-group have the same impact on net costs in 2011 as it did in 2020? The average effect of being treated in year t (across groups that have adopted the treatment by year t) is given by:

$$\theta_c(t) = \sum_{g \in \mathrm{G}} 1\{t \geq g\} P(G = g | G \leq t) ATT(g, t) \tag{7}$$

Given the staggered DiD set-up, the validity of these results heavily depend on whether we

[26] Callaway and Sant'Anna (2021) argue that using a "balanced" event study aggregation approach would be most effective at comparing dynamic treatment effects from times e_1 to e_2. This would involve only including units treated for e' time periods to calculate $\theta_{es}(e, e')$. Due to the relatively small number of institutions in each cohort, we will not be implementing this approach as this will cause the variance of the estimation to be too large.

are utilizing the appropriate control group. If we simply compare members of the 568 Presidents Group to our large sample of colleges, it may be unreasonable to assume unconditional parallel trends. For instance, public institutions face unique influences to net costs compared to members of the 568-group, such as changes in government structure or political influences (Lowry, 2001). These changes would not be included in the model and could lead to a violation in parallel trends. Our control group must instead follow similar trends in net costs to institutions who exit from the 568 Presidents Group. From sections 4 and 5, we have clear insight into what schools approximate these trends: group members who do not exit from 2008-2021.

It is for this reason that I limit the control group to 568-group members who never exit, as we can more reasonably assume that members and former members see parallel post-treatment trends. Institutions who adopt the CA methodology are likely to be more similar than institutions who do not; schools should only bind to similar financial aid and admission strategies if they have similar funding, student selectivity, and applicant pools. Also, if our goal is to compare outcomes of an exiting institution with the counterfactual outcomes had they never exited, then using never-treated group members is a much more intuitive way of approximating this counterfactual. Specifying this control group should then allow us to more easily interpret the treatment effects of exiting the group.

7 Results

Table 3 shows the simple weighted aggregated treatment effects of exit from the 568 Presidents Group on the net costs of tuition for Title IV eligible students. From this table, there is weak evidence suggesting that students were awarded more financial aid if the institution had exited the group. Upper-middle income students payed an average of about $2236 less at institutions once

they left the 568-group ($p < .10$). The ATTs of exit on net costs are also negative across all other income groups and overall, but they are not statistically significant. There are several potential issues with these simple estimates. First, the event window underlying these estimates is very wide, averaging ATTs up to 12 years after treatment. Since few institutions were treated very early in the panel, it would be very difficult to capture significant treatment effects many years after an institution has left the group. Second, these findings do not give any indication as to whether the assumption of parallel trends is met. A more robust aggregation scheme is to aggregate treatment by the length of time an institution has left the group, as discussed in section 6.

Event aggregated ATTs are reported in Table 4. For these estimates, I restricted the "event window" of 3 years prior to treatment and 3 years after treatment. These show that exiting the 568-group significantly decreased overall net costs for Title IV eligible students. At the year of exit, institutions decrease tuition by an average of about $1,950 compared to other schools still in the group. This estimate is significant at the 1% confidence level. Looking at the pretrend estimates, there could be evidence of a violation of parallel trends. One year prior to exiting the group, schools that will exit charge significantly higher net costs than other member schools compared to two years prior to treatment ($p < .05$). These pretrends indicate that schools that *will* exit the group may award less overall financial aid or have higher tuition prices than those who remain in the group. While this may present a bias in our estimates of the treatment effects, the direction of this bias would be unlikely to reverse our estimates of the treatment effect. Even though our target institutions may be more expensive than the control institution prior to the treatment, post-treatment, they still show lower net costs of tuition compared to the control. As a result, this evidence of a pretrends violation may not be very concerning.

Figure 9 shows the ATTs from a wider event window of 10 years prior to 10 years after treat-

ment. Here, we see that estimates after period 3 are negative but insignificant. One interpretation of this would be that some treated schools eventually begin to raise net costs after leaving the group because of unrelated changes to financial aid methodologies over time. There is also significant evidence of a pretrends violation at four years prior to treatment ($p < .05$), but the direction of this potential bias is still positive.

Observing overall decreases in net costs upon exit is most consistent with the collusive hypothesis, as this theory argues that members use need-aware policies to admit more upper-income students who receive little need-aid. Upon exit, we would then expect institutions are motivated to award greater merit-aid to upper-income students while aid packages for low and middle-income student may be expected to stay the same. Surprisingly, students in the highest income level did not pay significantly different net costs after an institution was treated. At the year of treatment, upper-income students paid about \$1240 less in net costs ($p < .10$), but the average treatment effect across the event window was not statistically significant. However, upper-middle income students paid an average of around \$1860 less in the post-treatment period ($p < .05$). This result is surprising as we would expect students with the least financial need to benefit most from the adoption of merit-aid, but this does not appear to be the case.

In contrast to our predictions of the collusive hypothesis, low and middle-income students did not pay significantly different net costs once an institution exited the group. This is with the exception of lower-middle income students who paid significantly lower net costs, saving around \$1670 in the average post-treatment period ($p < .10$).[27] If anything, the group may have actually created higher net costs for all students, regardless of family income.

Defenders of the group may argue that while the institutions' cooperation raised the net costs

[27]Event aggregated net costs over all years of the panel are available in Appendix B Figures 10-14.

of tuition for upper-income students, the group still may have had beneficial impacts on student outcomes by promoting the attendance of low-income students. In tables 5 and 6, we examine the impact of exit from the 568-group on attendance. The estimates of the ATT is the change in enrolled, Title IV eligible students in income group i relative to the overall population of students enrolled. Overall, these estimates surprisingly suggest that the 568-group had little impact on enrollment. The simple weighted ATTs are not significant for any income group with all estimates being relatively close to zero (Table 5). Over all years in the panel, exiting the 568-group appeared to have no impact on student enrollment. If we again tighten the event window to three years before and three years after treatment, our results are slightly different.

Attendance rates of lower, lower-middle, and middle-income students generally again did not significantly change post-treatment, but the proportion of upper-middle income students significantly decreased one year after treatment by about 2.5% ($p < .05$). Similarly, the percentage of students being upper-income significantly decreased at the year of treatment by about 3.6% ($p < .05$). Since these treatment effects are only significant at the 5% level, it is possible that we are only seeing these results by random chance. For these income groups, pretrend ATTs were insignificant both individually and across the pre-treatment window which suggests that parallel trends between the treated and control groups may be a reasonable assumption.

Overall, these changes in post-treatment enrollment give weak support to the collusive hypothesis. Prior to exit, wealthier students took up a larger portion of the student body than students from lower-income backgrounds. We may interpret these results as evidence the 568-group did not abide by the policy of being need-blind. Once a school exited, they then may have decided to actually be need-blind to promote fairness in their admission policies. Alternatively, the interpretation could be that exiting institutions gave more aid to lower-income students which allowed them to

enroll at a greater rate, decreasing the proportion of wealthy students in the student body, but our findings do not strongly support the assertion that low-income students paid lower net costs after exit.

Finally, we will look at the calendar aggregated ATTs which reveals how the impact of the 568-group may have changed over its existence. Table 8 (Appendix B) shows the ATTs of exit on the net costs of tuition by income group at different calendar years. For example, in 2021, overall net costs were about $1390 lower in treated institutions compared to the control schools. Unfortunately, these estimates do not contribute much to our understanding of the group. Treatment effects appear to randomly vary across different calendar years, but we can see that from 2008-2021, the average treated institution always charged Title IV eligible students lower net costs compared to control schools. With the exception of 2020, upper-income students also consistently paid lower average net costs once an institution left the 568-group. These results suggest that while the year-to-year magnitude of the ATTs appear to be somewhat stochastic, the effects of the 568-group on student net costs did not change significantly across time.

These findings appear to support the collusive hypothesis, but how confident can we be in the robustness of these results? The pretrend estimates of the ATT in the net cost and attendance regressions indicate the assumption of parallel trends is not unreasonable or at least does not bias our estimates of the ATT in a way that would make our results insignificant, as in the case of the ATT on overall net costs. In all regressions, N=406 observations as we measure the net costs of 29 institutions from the 2008-09 to 2021-2022 academic years. It is important to note that our control group only consists of institutions that were always in the 568 Presidents Group. Out of the 33 institutions ever in the 568-group, 15 institutions were always members from 2008-2021 while 3 institutions entered between 2009-2021 and never exited. These three institutions were then not

included in the control group, as we may bias our ATT estimates if we include institutions that are not in the 568-group. Similarly, we may be concerned about the potential for the treatment to "turn off" for two of the treated institutions. As discussed in section 7, an alternative specification would be to allow for an unbalanced DiD model where I drop the years after a treated unit rejoins the 568-group.

Using the unbalanced panel, we can see that the simple weighted ATTs on net costs are similar to those obtained using the balanced panel with the exception that exit no longer has a significant impact on upper-middle income student net costs (Table 9, Appendix B). Again, the simple aggregation method faces the same problems as discussed for tables 3 and 5. The event aggregated ATTs are also similar to the previous results. Title IV eligible student net costs of tuition still decrease after exit, albeit at a lower significance level ($p < .05$). Additionally, lower-middle income and upper-middle income students still experience lower average net costs after exit ($p < .10$). These results maintain that the 568-group widely increased net costs for students, regardless of income. Tables 11 and 12 (Appendix) show the simple and event weighted ATTs on enrollment and are also similar to the balanced panel. After omitting the years post-reentry, the simple ATTs are not significant for any income group while there is some evidence that institutions admitted less upper-income students after exit. In the limitations section, I will further discuss other potential issues that may be biasing these results.

Table 4: Event Aggregated ATTs of Exit on Overall Net Costs

	(1) Overall	(2) Low	(3) Lower-Middle	(4) Middle	(5) Upper-Middle	(6) Upper
Pre_avg	545.1*	-650.8	593.3	276.1	143.1	154.1
	(1.66)	(-0.90)	(1.17)	(0.55)	(0.37)	(0.65)
Post_avg	-1675.6***	-955.4	-1669.9*	-1211.3	-1862.7**	-1291.1
	(-2.72)	(-1.42)	(-1.91)	(-1.20)	(-2.03)	(-1.62)
Tm3	56.29	-2902.1**	-280.7	-1597.4	-821.9	-431.2
	(0.08)	(-2.19)	(-0.30)	(-1.53)	(-0.80)	(-0.66)
Tm2	273.1	589.1	1166.3*	1354.4**	-91.90	101.5
	(0.69)	(0.66)	(1.94)	(2.24)	(-0.18)	(0.16)
Tm1	1305.9**	360.7	894.3	1071.2	1343.1*	792.0
	(2.23)	(0.48)	(0.83)	(1.35)	(1.66)	(0.97)
Tp0	-1948.4***	-420.9	-1169.2	-822.3	-1075.1	-1237.7*
	(-2.84)	(-0.65)	(-1.58)	(-0.82)	(-1.23)	(-1.68)
Tp1	-1729.8**	-1179.2	-1947.0*	-1526.0	-2078.3*	-1241.9
	(-2.23)	(-1.27)	(-1.84)	(-1.01)	(-1.68)	(-1.35)
Tp2	-1730.9**	-530.8	-1691.0	-940.7	-1018.6	-1491.9
	(-2.13)	(-0.59)	(-1.15)	(-0.73)	(-0.81)	(-1.16)
Tp3	-1293.5	-1690.9*	-1872.2	-1555.9	-3278.8**	-1192.9
	(-1.10)	(-1.69)	(-1.56)	(-1.08)	(-2.22)	(-0.94)
N	406	406	406	406	406	406

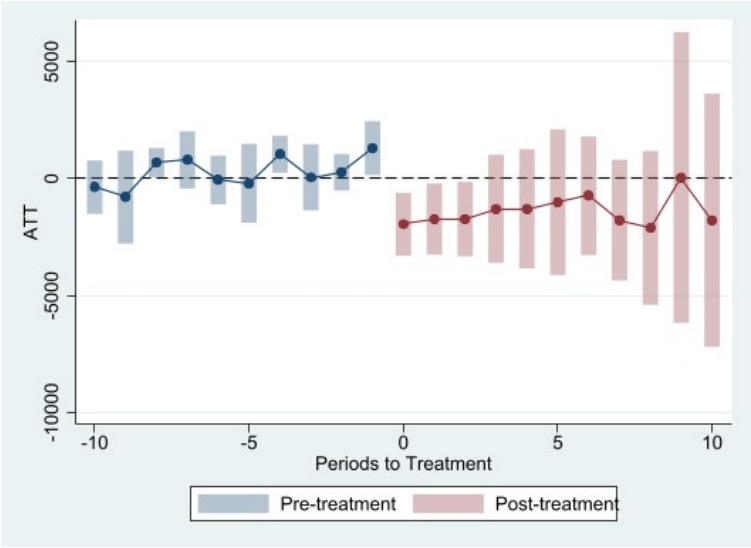
Notes: This table presents the event aggregated average treatment effects (Equation 5) of exit on the average net costs of tuition for Title-IV eligible students. Treatment effects are separated by household income groups. Post_avg represents the average treatment effect across the post-treatment time period (Equation 6). Pre_avg represents the average pretrend differences in net costs in the pre-treatment period. Sample includes a balanced panel of treated and control institutions over all periods from 2008-2021.t statistics in parentheses. Significance Levels: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 3: Simple Weighted ATTs of Exit on Net Costs

	(1) Overall	(2) Low	(3) Lower-Middle	(4) Middle	(5) Upper-Middle	(6) Upper
ATT	-1480.6	-977.6	-1758.4	-1268.9	-2235.9*	-1610.6
	(-1.52)	(-0.84)	(-1.18)	(-0.81)	(-1.70)	(-1.44)
N	406	406	406	406	406	406

Notes: This table presents the simple weighted average treatment effects (Equation 4) of exit on the average net costs of tuition for Title-IV eligible students. Treatment effects are separated by household income groups. Sample includes a balanced panel of treated and control institutions over all periods from 2008-2021.t statistics in parentheses. Significance Levels: * $p < .10$, ** $p < .05$, *** $p < .01$

Figure 9: Event Study of ATTs of Exit on Overall Net Costs



Notes: This figure illustrates the event aggregated average treatment effects (Equation 5) of exit on the average net costs of tuition for all Title-IV eligible students. The bands around each estimate represent 95% confidence intervals. Pre-treatment estimates (blue) represent the difference in trends between treated and control institutions. Post-treatment estimates (red) represent the observed ATT at e periods after the treatment.

Table 5: Simple Weighted ATTs of Exit on Student Enrollment

	(1)	(2)	(3)	(4)	(5)
	Low	Lower-Middle	Middle	Upper-Middle	Upper
ATT	0.882	-1.080	0.361	-0.333	0.170
	(0.64)	(-0.81)	(0.33)	(-0.47)	(0.08)
N	406	406	406	406	406

Notes: This table presents the simple weighted average treatment effects (Equation 4) of exit on enrollment for Title-IV eligible students. Treatment effects are separated by household income groups. Sample includes a balanced panel of treated and control institutions over all periods from 2008-2021. t statistics in parentheses. Significance Levels: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 6: Event Aggregated Treatment Effects of Exit on Percent Enrollment

	(1) Low	(2) Lower-Middle	(3) Middle	(4) Upper-Middle	(5) Upper
Pre_avg	0.0283	-0.00836	-0.576	0.0749	0.481
	(0.04)	(-0.02)	(-1.41)	(0.23)	(0.62)
Post_avg	0.697	-0.276	0.443	-0.403	-0.462
	(0.70)	(-0.26)	(0.59)	(-0.67)	(-0.32)
Tm3	0.111	0.737	-0.423	0.286	-0.711
	(0.07)	(0.85)	(-0.30)	(0.40)	(-0.43)
Tm2	-0.0382	-0.315	0.741	-0.408	0.0200
	(-0.04)	(-0.50)	(0.73)	(-0.44)	(0.01)
Tm1	0.0118	-0.448	-2.047*	0.347	2.135
	(0.01)	(-0.42)	(-1.65)	(0.50)	(1.26)
Tp0	0.913	1.234	1.204*	0.276	-3.627**
	(0.91)	(1.26)	(1.79)	(0.34)	(-2.43)
Tp1	0.575	0.430	1.052	-2.548**	0.490
	(0.50)	(0.29)	(1.06)	(-2.30)	(0.25)
Tp2	0.793	-0.344	0.183	0.208	-0.840
	(0.58)	(-0.25)	(0.19)	(0.24)	(-0.51)
Tp3	0.507	-2.424*	-0.665	0.451	2.131
	(0.28)	(-1.68)	(-0.68)	(0.45)	(0.92)
N	406	406	406	406	406

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Notes: This table presents the event aggregated average treatment effects (Equation 5) of exit on Title-IV eligible student enrollment. Treatment effects are separated by household income groups. Post_avg represents the average treatment effect across the post-treatment time period (Equation 6). Pre_avg represents the average pre-trend differences in attendance in the pre-treatment period. Sample includes a balanced panel of treated and control institutions over all periods from 2008-2021. *t* statistics in parentheses. Significance Levels: * $p < .10$, ** $p < .05$, *** $p < .01$

8 Discussion

The obtained estimates of the average treatment effects of exiting the 568 Presidents Group on net costs and student enrollment have given key insights into my competing hypotheses. The collusive hypothesis correctly predicted that overall net costs would rise while not significantly promoting low or middle-income student enrollment, but neither of the proposed hypotheses fully explain

these results.

Both hypotheses predict that students with the most financial need should pay less under the 568-group's regime of need-aid, but this does not appear to be the case. If 568-group members are fully meeting low-income students need, then why may net costs be lower for some needy students once members exit? One explanation is that exiting institutions use a methodology to calculate EFCs which tends to be more generous than CA methodology. That is that even though the 568-group may fully meet demonstrated student need, former members tend to adopt methodologies that set lower standards of need and create higher aid packages. Former members may also be awarding greater merit-aid which would bring down net costs for high-achieving, low-income students. These changes in net costs, however, do not seem to have resulted in significant changes in enrollment. We would then interpret this higher aid as generating greater consumer surplus, as some lower-income students would no longer be receiving aid up to their maximum willingness to pay.

Another question that arises is why upper-middle income students appear to be given more aid than upper-income students after an institution exits. We predicted that when institutions leave the group, they will use merit-aid to attract high-income, high-achieving students who are otherwise offered little aid from 568-group members. This should result in upper-income students seeing significantly lower net costs, but this is not the case. It instead appears that upper-middle students with greater financial need are awarded greater aid. This further supports the argument that when an institution exits, they primarily become more generous by offering greater need-aid, not just by offering more aid on the basis of merit.

Lastly, there is some question as to why our empirical results seem to counter the results of previous studies of the Overlap and 568 Presidents Group which argue that the group sought to

lower tuition costs for disadvantaged students (Carlton et al., 1995; Hoxby, 2000; Karikari and Dezhbakhsh, 2019). The key difference is likely that we are studying the group in a completely different periods of time compared to previous studies. It could be that the group's coordination throughout the early 1990s and 2000s fundamentally changed the market for higher education.

My theory suggested that competing institutions would deviate from the group by offering greater merit-aid, and as Hoxby (2000) found, this may have once been the case in the early 1990s as schools in the Overlap group offered significantly greater need-aid than its competitors. In this study, I find that competitors did not attempt to offer more merit-aid to attract high-achieving students. Instead, elite schools continued to primarily award need-aid. By 2008, the 568-group then no longer offered more generous financial aid packages, which may have affected student welfare. Rather, it appears that the CA methodology held institutions back from being as generous as they could be when awarding financial aid.

9 Limitations and Future Work

One of the principle assumptions underlying DiD estimation is the Stable Unit Treatment Values Assumption (SUTVA) which assumes that for any unit $i's$ outcome, the outcome Y_i is not influenced by the treatment status of unit $j \neq i$. However, this assumption may be violated if we ignore potential market spillover effects that may occur when a unit exits the 568-group. In Appendix A, I discuss how the 568-group's cooperation relies on sufficiently many institutions agreeing to award students need-aid using the CA methodology. An institution exiting the group could then feasibly impact the market power of the group and limit members' ability to award aid on a needs basis. That is that some units in the control group would be impacted by the treatment, violating SUTVA. This would likely lessen the observed impact of the group and increase the possibility of

generating insignificant results.

These results are also limited by the treatment not being randomly assigned. As discussed in section 4, universities likely exited the group because they are no longer satisfied with cooperation. This desire to exit may coincide with other changes in administration, admission policies, or aid packages that could occur regardless of whether the university received the treatment. It is possible that the treatment is confounded by these changes. If so, we would then not be able to attribute the changes in outcomes among Title IV students to the effect of exiting the group. One extension of this paper would be to use sensitivity analysis to analyze how strong these violations would have to be to nullify these results. Given the highly significant, systematic decreases in net costs that we observe after exit, these unrelated changes in aid policies would need to strongly and consistently decrease net costs to nullify these results, which we may see as unlikely. Sensitivity analysis would allow us to better quantify and evaluate the likelihood of this occurring.

The IPEDS dataset of net costs and enrollment brings another limitation as this data only includes students receiving Title IV financial aid. All students included in this data then must be U.S. citizens and have some financial need. This limits the generalizability of our results for students from the wealthiest family backgrounds, international students, and undocumented domestic students who do not qualify for federal aid. After exiting, universities could theoretically be admitting more wealthy non-Title IV eligible students who receive no financial aid to offset the increased need-aid to Title IV eligible students. This would clearly be at the harm of needier students who are disadvantaged in the admissions process, but I find this outcome to be unlikely. If colleges became more need-aware in their admissions process, then we should observe some increase in the admission of Title IV eligible, upper-income students, not a decline. An extension of this paper would be to look at changes in the percent of students receiving financial aid or the change

in international student populations after 568-group exit.

Another data limitation is that since no official record of 568 membership exists, our data on exit and entry may be flawed. First, we are missing membership data from 2010 and I had to interpolate these values for all institutions. Second, the collected dates on the website may not necessarily be one-to-one with the dates schools actually start adopting the methodology. This could effectively break the assumption of no treatment anticipation. For example, if an institution exited the group in 2010, but I mistakenly record them as adopting the methodology in 2011, then the treated institution would "anticipate" their treatment by one year. This would generally lead to greater imprecision in our estimates and potentially alter some of our conclusions.

Future work should look at the expiration of the 568-group's antitrust exemption in 2022 and analyze its impact on the market for higher education. Long term, it would be interesting to see if members become more generous when awarding financial aid as they are no longer bound by the CA methodology. Alternatively, it could be that some schools revert to using merit-aid policies without any clear method of coordination. Studying the aftermath of this event within the market for higher education could complete our understanding of the group and its impact on students' costs of education.

10 Conclusion

This study finds that the 2022 lawsuit alleging the 568 Presidents Group conspired to fix the net prices of college tuition has substantial merit. From our staggered difference-in-differences analysis, there is strong evidence suggesting that from 2008-2021, members of the 568-group cooperated to restrict financial aid offers to students in order to raise university revenues.

In contrast to claims of group members, I find that the 568 Presidents Group also did not

significantly support low and middle-income students ability to enroll in member institutions and gain greater access to a prestigious education. However, I also find little evidence suggesting that the agreement itself systematically favored the wealthy in the admissions process. Top-tier institutions may favor wealthy students through certain admission mechanisms, such as legacy admissions, but these are not unique to institutions in the 568 Presidents Group.

Overall, the expiration of the 568 Presidents Group's antitrust exemption likely benefited many students regardless of their family income. Nevertheless, I do not claim that the group's cooperation was always harmful to students. It is possible that the policy created a framework that allowed schools to shift from primarily awarding merit-aid to primarily awarding need-aid which allowed a more diverse pool of students to access the top-tier of higher education. By 2008, the group's cooperation shifted into a mechanism that solely benefits the institutions themselves. Optimistically, the cessation of the group's consensus approach methodology may allow elite universities to be more generous in offering financial aid. If universities are truly motivated to benefit student access to higher education, then abandoning the group is a great first step.

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Appendix A

The Market for Higher Education

Prior economic studies of the market for higher education often attempt to view education from two viewpoints. One end attempts to apply a rigorous mathematical model of higher education under a given set of assumptions and limitations, such as pursued by Rothschild and White (1995). Rather than trying to apply a rigorous model, this paper will try to acknowledge the complexities of the market for higher education to shed insight on the implications of collusive behavior on net prices and student enrollment.

Within the market of higher education, the sellers are the universities. These schools vary in ownership (public vs. private), prestige, location, etc., and consequently offer the product higher education with varying quality. For this analysis, we will define this education as a 4-year undergraduate degree. Consumers are defined as the prospective students vying for admittance to each school. As these students come from various income backgrounds, these students have a heterogeneous ability to pay for a degree. Students then have their own willingness to pay (WTP) and, combined, form a demand curve for this education. Additionally, these buyers' WTP would not be the same for every institution. Institutions instead show clear horizontal product differentiation; prospective students have preferences for certain characteristics of an institution. Some students may prefer schools that are located in urban areas to a more rural school. Some may prefer a school that prioritizes athletics compared to one that prioritizes academics. These preferences are unrelated to price or an objective quality of an institution, and all else equal, a student may be willing to pay more to attend an institution that closely matches their preferences.

Another important characteristic of these buyers is that they are themselves an input in each

university's production of education. There are two main mechanisms creating this feedback. First, students benefit from being surrounded by motivated, well-accomplished students. These benefits may transcend to better grades, educational attainment, and generally improves the quality of education a student receives, often referred to as "peer effects."[28] Students are then inputs in higher education by promoting educational attainment along with faculty, tutors, or any other academic support services.[29]

Second, college reputations are highly dependent on student outcomes like graduation rates, employment after graduation, or future incomes. For instance, the *U.S. News and World Report* (USNWR) National University rankings play a significant role in prospective students' application process. Bowman and Bastedo (2009) find that entering into one of the USNWR's top 50 ranked institutions significantly increases the number of student applications and leads to lower acceptance rates. This response creates something of a feedback loop, as increases in rankings lead to an increase in admitted student SAT scores. In other words, colleges with high reputations attract high achieving students. Institutions then do not simply sell their product to the highest bidder; they also want to admit students with high merit as demonstrated through test scores, high-school GPAs, leadership experience, etc. since these are predictive of future outcomes. Schools then view prospective buyers in 2-dimensions: on the basis of merit and their willingness to pay. These dimensions of buyers introduce the major wrinkle of the market for higher education and have a large impact on university admissions and tuition prices.

Financial aid is a particularly unique aspect of the market for higher education, and it is

[28]There is a vast and controversial literature on the topic of peer effects in higher education. Some authors examining elite universities see very small or mixed peer effects; however, when taking a larger sample of peer effects within universities of varying quality, Humlum and Thorsager (2021) found that an increase of one standard deviation in peer GPAs significantly decreased student dropout rates.

[29]We can similarly extend this logic to student athletes, as they contribute their athletic ability to promote the success of a university's sports teams.

important to consider what it is and is not. Student aid is not a form charity. It is instead a tool colleges use to maximize both revenues and the quality of admitted students. Hoxby (2000) likens financial aid to a wage that compensates students for the value they bring to the school as a production input. That is that schools are willing to pay a "wage" in order to attract students of high merit who otherwise may not attend the university. Within the context of higher education, these wages would come in the form of scholarships, grants, or low-interest loans. In contrast to more standard economic models of competitive markets, the cost of attendance is not the same for all students. This reflects something closer to first-degree price discrimination, as institutions look at students' individual applications and determine how much aid to award to create a specific price tailored to around each student. Although, the decision of how much aid to award is not always based on a student's merit. Administrators may instead prefer to award aid based on the financial need of the student, such as done in the 568 Presidents Group. One question that arises then is why do some universities award merit-aid while others award need-aid? Analyzing the role of financial aid as means of competition may reveal the answer.

University Competition within Hierarchies

Conventional literature in industrial organization often categorizes markets as reflecting a quantity competition or a price competition. The market for higher education is then a clear example of competition through price, particularly through the mechanism of financial aid. The institution for this is that colleges are in competition to acquire students of high quality. In optimum, we may assume a university's objective function is to maximize the revenue they take in from students

paying tuition costs while simultaneously attracting students with high merit.[30] In a simplified model of this market, Rothschild and White (1995) analyze the competitive outcomes of universities offering financial aid on the basis of merit.

Rothschild and White aimed to develop a matching model of perfectly competitive, profit maximizing firms selling a product and consumers who themselves contribute to the production of the product in varying degrees. An interesting outcome of this model is that, in equilibrium, colleges will set each student's net costs below the marginal cost of producing the student's education. Institutions, however, are still effectively charging zero-profit prices. This is because students contribute to the college as the production inputs, and colleges will reward students with varying levels of aid depending on who is the most productive. We can compare the market to the story of Bertrand price competition (named after Joseph Bertrand, 1883). In this classical model, we assume that at least two firms are competing in a market by changing prices to attract consumers. Under the assumption that the firms have identical products, consumers have perfect information, and firms are not capacity constrained, the outcome of the model is that if the market is at least a duopoly, then prices will be set to marginal costs. This is because assuming identical products indicates that consumers have no preference between goods other than through price. Consider the case of two firms charging prices at marginal costs. If firm 1 deviates by charging prices above marginal costs, consumers will strongly prefer firm 2's products as they are being charged at a lower price. Assuming that firm 2 is not capacity constrained, they would then capture the entirety of the market. Additionally, if firm 1 charged prices below marginal costs, consumers may prefer their product, but they would lose money with every purchase, generating negative profits. This

[30] In reality, in may be difficult to define a university's objective function as a non-profit entity. Winston (1996) offers a discussion of how managers may have "ideological" motivations such as supporting academic excellence or generally benefiting society. To be able to apply economic models of the market, we simplify these motivations to be mainly financial or related to promoting university prestige.

creates an equilibrium of zero-profit pricing.

The same logic of the Bertrand price competition model applies to Rothschild and White's model of higher education, but instead of competing to set a market-wide price level, institutions engage in price competition at the student level. Assuming students have no preference between universities and marginal costs are identical, then they will go to the university who offers them the most financial aid. Similar to the Bertrand equilibrium, universities will then set prices at zero-profits. If a university deviates by decreasing aid, they will then lose the student to another institution. If a university increases aid, they will get the student but end up being worse off as they are generating negative profits. The issue with Rothschild and White is that the assumptions underlying this model are not very reasonable in the context of higher education.

As I previously established, university educations are not identical. There is significant vertical and horizontal differentiation in the educations across all institutions in the market. Under Rothschild and White, we would assume that a student is indifferent to receiving an education from Harvard University to receiving an education from the University of Alabama. In reality, as I previously addressed, some educations are objectively better in quality than others and provide greater human capital to students (vertical differentiation). Students also may have subjective preferences for certain characteristics of an institution (horizontal differentiation). Additionally, colleges are highly stratified in the amount of donative wealth they possess, as reflected in their endowments. Some colleges are then able to award much more financial aid than others and possess a clear competitive advantage in pursuing high merit students.

Lastly, even if universities were identical in products and wealth, they are significantly capacity constrained. It is not easy for colleges to increase the amount of seats they can offer at their university without constructing new academic buildings, new housing, hiring new faculty, etc. In

the two firm situation, one university may fill to capacity if they set prices at marginal cost, but the second university can easily still fill to capacity if they offer a higher price. This would likely come at the cost of losing students with the highest-merit, but this reveals a trade off between offering low net costs to attract the highest-merit students versus setting high net costs to maximize revenue. Educational quality and wealth vary widely across institutions, as Winston (1999) argues, these differences have significant implications on the nature of competition in the market.

Donative wealth and the quality of an institution are likely the most important factors in its ability to compete with other schools. As Winston (1999) and Epple et al. (2006) explain, these qualities serve to create a hierarchy where competition occurs in "bands" of similar institutions. A large reason for this hierarchy is the existence of feedback between educational quality, donative wealth, and student selectivity. For example, institutions with greater funding are both likely able to spend more on education technology and financial aid. This means they not only are they able to attract meritorious students by offering high quality education, but they are also able to offer better aid packages then lower-funded, worse quality institutions. Being able to attract the best students then feeds back into the production process. Through better student outcomes and peer effects, the observed quality of the institution becomes even greater and attracts more donative wealth. This leads to students seeing the school as even more valuable, and so on. It is highly difficult then for institutions with less funding and lower prestige to compete with the most elite schools.

This feedback creates a sharp hierarchy between institutions. Winston (1996) defines the top of the hierarchy as schools that are well endowed and offer expensive, high quality education at highly subsidized prices. Given the capacity constraints of these institutions and the demand for their high quality education, this creates an effective market shortage. The extent of this shortage

is reflected in university acceptance rates. Schools at the top of the hierarchy, such as Princeton and MIT, had acceptance rates as low as 4% in 2021 (NCES). This selectivity means that schools at the top of the hierarchy are competing for the very best students and have extensive choice over admitted student quality. As we move down the hierarchy, schools are less able to compete for high quality students which in turn leads to less of excess demand. Schools towards the middle of the hierarchy then may achieve near market-clearing demand while schools at the bottom have excess supply, relying on different strategies like relying on distance learning, older students, or vocational curricula. We see this hierarchy reflected in reality. As evidenced through the USNWR university rankings, for example, their appears to be a clear hierarchy within schools in the top 10, 50, 100, or beyond. As shown by Bowman and Bastedo (2009), an institution moving in ranking to the top 50 from the top 100 has a significant effect on acceptance rates and admitted student SAT scores, suggesting that being seen as part of a more elite cohort of schools increases excess demand and student quality.

The hierarchical nature of the market for higher education means that schools with different student quality and endowment sizes will have widely varying competitive strategies of admission and awarding financial aid. Epple et al. (2006) develop a more robust model of higher education reflecting the hierarchical nature of universities finding that universities with the most wealth will tend to charge high tuition prices with high financial aid to attract the most valuable students. Universities lower on the hierarchy then compete for students with less observed merit by offering cheaper tuition costs but less financial aid. Within the context of the 568 Presidents Group, these schools clearly operate within the upper band of the hierarchy. This is reflected in both their lower acceptance rates compared to many institutions outside of the group (Table 1) and their method of producing expensive, but highly subsidized tuition prices (Figure 8). Given the fact that these

universities operate within the same tier of the hierarchy, members would otherwise be in direct competition to attract the same pool of high achieving students. Using this theory of institutions, we can explain how competition among elite institutions motivates cooperation towards a system of need-based aid.

Competitive Strategies among Elite Institutions

In the previously mentioned theories of higher education, all authors find that institutions are most likely to use merit as the major factor for awarding aid. This is due to the fact that colleges have only a small degree of market power in equilibrium.[31] In Rothschild and White (1995), firms have no market power and must set prices at marginal cost, making an equilibrium of institutions applying need-based aid unlikely. In the duopoly example, if one firm unilaterally decided to deviate from merit-based aid to need-based aid, then students from upper-income backgrounds would be awarded little to no financial aid regardless of their merit. Simultaneously, low-income students would be rewarded substantial aid without consideration of merit. Assuming students only care about net costs, the outcome is clear: the need-aid institution would attract low-income students with low merit but split low-income, high-achieving students and high-income, low-achieving students with the merit-aid institution. High-income, high-achieving students would then enroll in the merit-aid institution if they are offered any meaningful aid. The need-aid institution would then lose out on the buyers they value most: those who bring in the most revenue and who possess the most merit.

Even if we expand our model to include more institutions and relax the assumption of identical products, equilibrium financial aid strategies are unlikely to be needs-based. Winston (1996) argues that it is rarely optimal for schools to deviate from primarily awarding merit-aid. If schools use

[31] Epple et al. (2006) defines university market power using a version of the Lerner index equal the ratio of tuition revenue of each college to the revenue that each would obtain if price were set equal to effect marginal cost.

financial aid as a means to attract high-achieving students, then schools only using needs-blind admissions with full-need aid makes this policy much less effective. A school applying a needs-based aid system then is serving more egalitarian or charitable motivations rather than strategic goals. The model proposed by Epple et al. (2006) furthers this. Universities at the top of the hierarchy possess some market power to charge net costs above marginal cost, but they find that this power is not sufficient for need-based aid to be optimal. The only exception is if students have strong preferences on the income levels of their peers. For instance, students may value going to school with students from wider income backgrounds and being part of a diverse student body. Only in this case is need-aid effective, as this would promote low-income students enrolling in an institution and promote diversity within the student body. This analysis shows that any elite university wishing to unilaterally deviate from awarding merit-aid to need-aid would be at a significant competitive disadvantage as they would lose many high-income, high-achieving students to their competitors.

An administrator wishing to promote equity and inclusion at an elite institution is likely unsatisfied with the outcomes of primarily awarding merit-aid. As described in the above models, some admitted students with low-incomes will have sufficiently low levels of merit to where the merit aid they are awarded is not enough to meet their maximum willingness to pay. These income constraints result in low-income students dropping out of the market for educations at the top of the hierarchy in favor of a lower-tier, cheaper institution, such as public schools offering in-state tuition or a community college. Meanwhile, students from wealthier families do not face the same income constraints. Regardless of how much merit aid they are awarded, some students will always have a higher willingness to pay than the price of college tuition. The competitive outcomes of using merit aid, however, will award meritorious, high-income students with more aid than they

need to attend. A clear imbalance then emerges; students from lower income families will effectively be denied entry more often than students from wealthy backgrounds.

These motivations underlie why members of the Overlap and 568 Presidents Groups argued that elite universities needed to coordinate a common system of awarding financial aid based on need. Cooperative actions of these groups sought to strengthen the market power of institutions and allow them to charge certain students prices above marginal costs while charging others below cost. Hoxby's study of the Overlap Group (2000), found that members were able to coordinate a regime of a need-based aid as Overlap college grants were more generous for the neediest and elastic with respect to parents income than elite colleges outside of the group. Crucially, the implication of this study is that the Overlap Group were able to have much greater flexibility in pricing strategies without requiring all elite colleges to cooperate.[32] The model of Bertrand price competition predicts that anything short of a monopoly will result in prices set at marginal costs, but this is clearly not the case within the market for the most lauded educations.

[32]In 2005, when the group recorded its highest membership, 16 out of the 25 top ranked schools in the USNWR national university rankings were members of the group. This suggests that they had captured the majority of the market for educations at from the top of the university hierarchy.

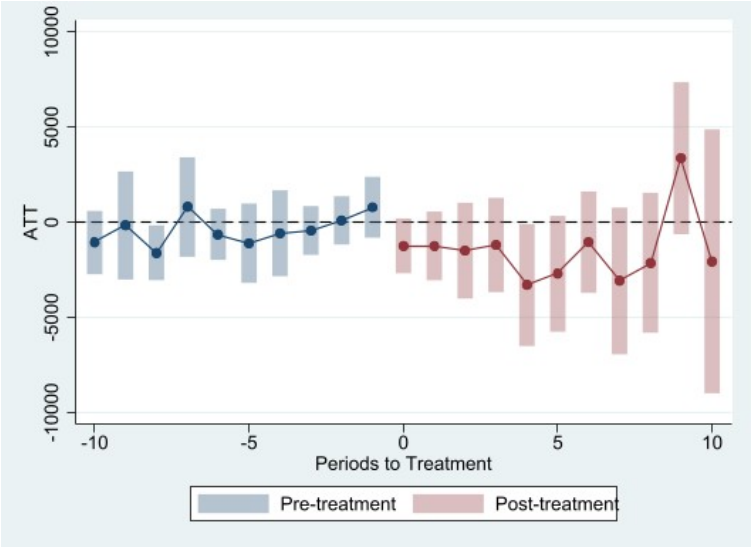
Appendix B

Table 7: Composition of Treated and Control Institutions

Treated	**Control**
Brown University	Amherst College
College of the Holy Cross	Boston College
Duke University	Claremont McKenna College
Emory University	Columbia University
Haverford College	Cornell University
Middlebury College	Dartmouth College
Rice University	Davidson College
St. John's College	Georgetown University
University of Chicago	Massachusetts Institute of Technology
University of Pennsylvania	Northwestern University
University of Rochester	Pomona College
Vanderbilt University	Swarthmore College
Wake Forest University	University of Notre Dame
Wesleyan University	Wellesley College
	Williams College

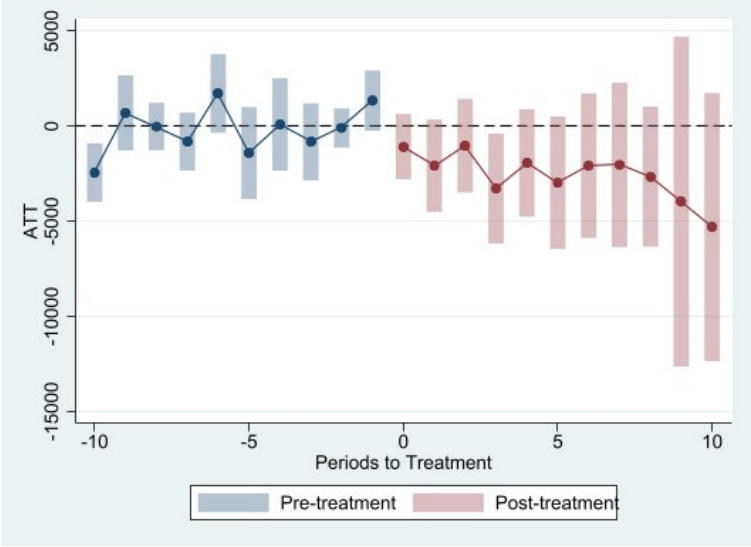
Notes: This table displays the institutions in this paper's treated and control groups. Control institutions include universities that were in the 568 Presidents Group from 2008-2021 and never exited. Treated institutions include universities that were in the group in 2008 but exited before 2021.

Figure 10: Event Study of ATTs of Exit on Upper-income Student Net Costs



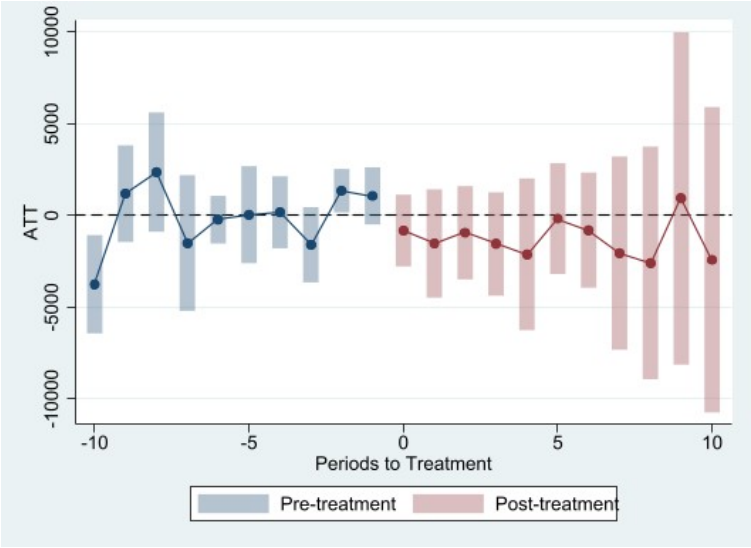
Notes: This figure illustrates the event aggregated average treatment effects (Equation 5) of exit on the average net costs of tuition for upper-income Title-IV eligible students. Bands around each ATT estimate represent 95% confidence intervals. Pre-treatment estimates (blue) represent the difference in trends between treated and control institutions. Post-treatment estimates (red) represent the observed ATT at e periods after the treatment

Figure 11: Event Study of ATTs of Exit on Upper-middle income Student Net Costs



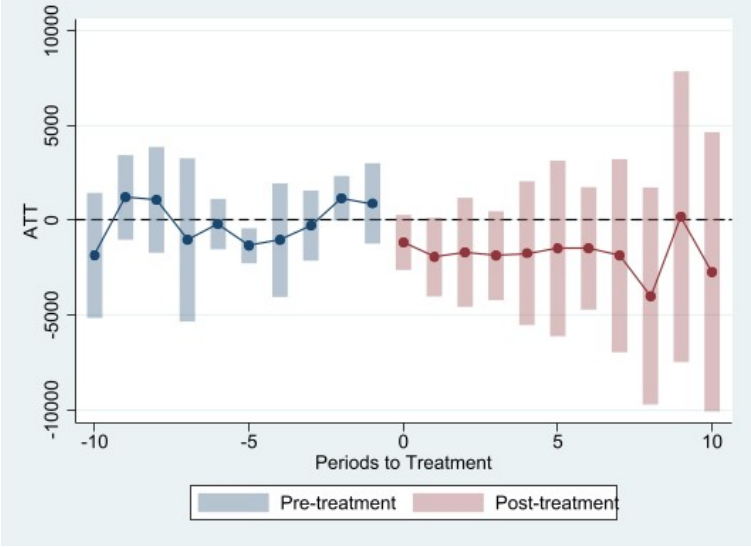
Notes: This figure illustrates the event aggregated average treatment effects (Equation 5) of exit on the average net costs of tuition for upper-middle income Title-IV eligible students. Bands around each ATT estimate represent 95% confidence intervals. Pre-treatment estimates (blue) represent the difference in trends between treated and control institutions. Post-treatment estimates (red) represent the observed ATT at e periods after the treatment

Figure 12: Event Study of ATTs of Exit on Middle-income Student Net Costs



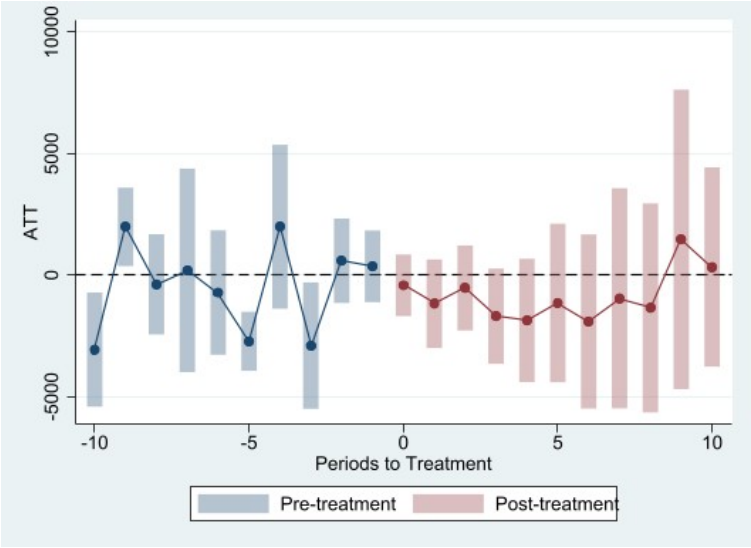
Notes: This figure illustrates the event aggregated average treatment effects (Equation 5) of exit on the average net costs of tuition for middle-income Title-IV eligible students. Bands around each ATT estimate represent 95% confidence intervals. Pre-treatment estimates (blue) represent the difference in trends between treated and control institutions. Post-treatment estimates (red) represent the observed ATT at e periods after the treatment

Figure 13: Event Study of ATTs of Exit on Lower-Middle income Student Net Costs



Notes: This figure illustrates the event aggregated average treatment effects (Equation 5) of exit on the average net costs of tuition for lower-middle income Title-IV eligible students. Bands around each ATT estimate represent 95% confidence intervals. Pre-treatment estimates (blue) represent the difference in trends between treated and control institutions. Post-treatment estimates (red) represent the observed ATT at e periods after the treatment

Figure 14: Event Study of ATTs of Exit on Lower-Income Student Net Costs



Notes: This figure illustrates the event aggregated average treatment effects (Equation 5) of exit on the average net costs of tuition for low income Title-IV eligible students. Bands around each ATT estimate represent 95% confidence intervals. Pre-treatment estimates (blue) represent the difference in trends between treated and control institutions. Post-treatment estimates (red) represent the observed ATT at e periods after the treatment

	(1) Overall	(2) Low	(3) Lower-Middle	(4) Middle	(5) Upper-Middle	(6) Upper
T2011	-165.0	-483.4	-496.7	43.52	-2404.8**	-919.8
	(-0.37)	(-0.66)	(-0.50)	(0.05)	(-2.02)	(-0.64)
T2012	-2497.2*	-1522.5	-3098.9	-2515.0	-5892.6***	-2195.1
	(-1.92)	(-0.80)	(-1.63)	(-1.40)	(-4.36)	(-1.51)
T2013	-1923.0*	-1642.7	-2807.0	-1886.7	-2188.2	-638.0
	(-1.66)	(-1.47)	(-1.46)	(-1.01)	(-1.40)	(-0.32)
T2014	-2369.5*	-2151.8*	-2873.4**	-2722.6*	-3449.8**	-571.2
	(-1.84)	(-1.70)	(-2.25)	(-1.74)	(-2.13)	(-0.40)
T2015	-2766.5**	-1358.5	-2263.1	-2317.3	-2903.1*	-2700.1**
	(-2.06)	(-0.98)	(-1.09)	(-1.13)	(-1.81)	(-2.11)
T2016	-985.0	-854.4	-2477.2	-1231.9	-3061.7*	-1736.5
	(-0.65)	(-0.48)	(-1.11)	(-0.76)	(-1.90)	(-1.10)
T2017	-310.5	-1029.6	-502.7	-737.4	-494.1	-1297.9
	(-0.28)	(-0.59)	(-0.30)	(-0.45)	(-0.26)	(-0.94)
T2018	-1189.1	-2400.2	-1618.7	-1966.1	-1551	-2671.5
	(-1.00)	(-1.35)	(-0.77)	(-0.93)	(-0.93)	(-1.63)
T2019	-2044.3	-592.8	-1152.5	294.9	-1364.3	-1247.3
	(-1.56)	(-0.44)	(-0.61)	(0.14)	(-0.84)	(-0.97)
T2020	-999.8	686.5	-707.0	1191.3	-1840.3	64.49
	(-0.59)	(0.40)	(-0.36)	(0.51)	(-0.70)	(0.04)
T2021	-1389.2	-724.5	-2304.1	-2949.0*	-2287.4	-3123.3*
	(-1.03)	(-0.61)	(-1.42)	(-1.68)	(-1.41)	(-1.93)
N	406	406	406	406	406	406

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Notes: This table presents the calendar aggregated average treatment effects (Equation 7) of exit on Title-IV eligible student net costs of tuition. Treatment effects are separated by household income groups. Sample includes a balanced panel of treated and control institutions over all periods from 2008-2021. Estimates start at 2011 as this is the first post-treatment time period in the panel. t statistics in parentheses. Significance Levels: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 8: Calendar Aggregated ATTs of Exit on Net Costs

	(1) Overall	(2) Low	(3) Lower-Middle	(4) Middle	(5) Upper-Middle	(6) Upper
ATT	-1328.0	-1325.9	-2202.5	-1544.5	-1949.3	-1049.0
	(-1.18)	(-1.07)	(-1.35)	(-0.89)	(-1.43)	(-1.06)
N	388	388	388	388	388	388

Notes: This table presents the simple weighted average treatment effects (Equation 4) of exit on the average net costs of tuition for Title-IV eligible students. Treatment effects are separated by household income groups. Sample includes an unbalanced panel excluding time periods after institutions reenter the group.t statistics in parentheses. Significance Levels: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 9: Simple Weighted ATTs of Exit on Net Costs, Unbalanced

	(1) Overall	(2) Low	(3) Lower-Middle	(4) Middle	(5) Upper-Middle	(6) Upper
Pre_avg	545.1*	-650.8	593.3	276.1	143.1	154.1
	(1.66)	(-0.90)	(1.17)	(0.55)	(0.37)	(0.65)
Post_avg	-1505.8**	-887.8	-1635.4*	-1190.7	-1612.0*	-1007.3
	(-2.34)	(-1.24)	(-1.75)	(-1.13)	(-1.85)	(-1.36)
Tm3	56.29	-2902.1**	-280.7	-1597.4	-821.9	-431.2
	(0.08)	(-2.19)	(-0.30)	(-1.53)	(-0.80)	(-0.66)
Tm2	273.1	589.1	1166.3*	1354.4**	-91.90	101.5
	(0.69)	(0.66)	(1.94)	(2.24)	(-0.18)	(0.16)
Tm1	1305.9**	360.7	894.3	1071.2	1343.1*	792.0
	(2.23)	(0.48)	(0.83)	(1.35)	(1.66)	(0.97)
Tp0	-1948.4***	-420.9	-1169.2	-822.3	-1075.1	-1237.7*
	(-2.84)	(-0.65)	(-1.58)	(-0.82)	(-1.23)	(-1.68)
Tp1	-1729.8**	-1179.2	-1947.0*	-1526.0	-2078.3*	-1241.9
	(-2.23)	(-1.27)	(-1.84)	(-1.01)	(-1.68)	(-1.35)
Tp2	-1521.6*	-446.2	-1676.9	-842.0	-355.4	-942.4
	(-1.76)	(-0.47)	(-1.05)	(-0.61)	(-0.31)	(-0.74)
Tp3	-823.4	-1504.7	-1748.5	-1572.4	-2939.0*	-607.1
	(-0.67)	(-1.40)	(-1.34)	(-1.01)	(-1.91)	(-0.49)
N	388	388	388	388	388	388

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Notes: This table presents the event aggregated average treatment effects (Equation 5) of exit on the average net costs of tuition for Title-IV eligible students. Treatment effects are separated by household income groups. Post_avg represents the average treatment effect across the post-treatment time period (Equation 6). Pre_avg represents the average pretrend differences in net costs in the pre-treatment period. Sample includes an unbalanced panel excluding time periods after institutions reenter the group. t statistics in parentheses. Significance Levels: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 10: Event Aggregated ATTs of Exit on Overall Net Costs, Unbalanced

	(1) Low	(2) Lower-Middle	(3) Middle	(4) Upper-Middle	(5) Upper
ATT	0.566	-1.267	-0.193	-0.130	1.023
	(0.44)	(-0.85)	(-0.21)	(-0.17)	(0.46)
N	388	388	388	388	388

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Notes: This table presents the simple weighted average treatment effects (Equation 4) of exit on Title-IV eligible student enrollment. Treatment effects are separated by household income groups. Sample includes an unbalanced panel excluding time periods after institutions reenter the group.t statistics in parentheses. Significance Levels: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 11: Simple Weighted ATTs of Exit on Percent Enrollment, Unbalanced

	(1) Low	(2) Lower-Middle	(3) Middle	(4) Upper-Middle	(5) Upper
Pre_avg	0.0283	-0.00836	-0.576	0.0749	0.481
	(0.04)	(-0.02)	(-1.41)	(0.23)	(0.62)
Post_avg	0.476	-0.326	0.360	-0.394	-0.116
	(0.50)	(-0.30)	(0.48)	(-0.64)	(-0.08)
Tm3	0.111	0.737	-0.423	0.286	-0.711
	(0.07)	(0.85)	(-0.30)	(0.40)	(-0.43)
Tm2	-0.0382	-0.315	0.741	-0.408	0.0200
	(-0.04)	(-0.50)	(0.73)	(-0.44)	(0.01)
Tm1	0.0118	-0.448	-2.047*	0.347	2.135
	(0.01)	(-0.42)	(-1.65)	(0.50)	(1.26)
Tp0	0.913	1.234	1.204*	0.276	-3.627**
	(0.91)	(1.26)	(1.79)	(0.34)	(-2.43)
Tp1	0.575	0.430	1.052	-2.548**	0.490
	(0.50)	(0.29)	(1.06)	(-2.30)	(0.25)
Tp2	0.327	-0.0598	-0.262	0.656	-0.661
	(0.25)	(-0.04)	(-0.28)	(0.82)	(-0.37)
Tp3	0.0873	-2.909*	-0.552	0.0390	3.335
	(0.05)	(-1.92)	(-0.54)	(0.04)	(1.56)
N	388	388	388	388	388

t statistics in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Notes: This table presents the event aggregated average treatment effects (Equation 5) of exit on Title-IV eligible student enrollment. Treatment effects are separated by household income groups. Post_avg represents the average treatment effect across the post-treatment time period (Equation 6). Pre_avg represents the average pretrend differences in attendance in the pre-treatment period. Sample includes an unbalanced panel excluding time periods after institutions reenter the group.t statistics in parentheses. Significance Levels: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 12: Event Aggregated Treatment Effects of Exit on Percent Enrollment, Unbalanced