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The Influence of Peer Institutions on Colleges' Decisions: Evidence from Fall 2020 Reopening Plans

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Abstract: We study how colleges and universities influence each other's behavior in the context of fall reopen- ing plans during the COVID-19 pandemic. By leveraging high-frequency data on colleges' reopening an- nouncements and using a fixed-effects model to control for unobserved factors at the college and state-day levels, we provide evidence that colleges respond strongly to prior decisions made by their peer institu- tions. A 10 percentage point (pp) increase in the share of one's peers who have announced an in-person plan increases the probability of doing so by 2.6pp, while a 10pp increase in the share of one's peers who have announced an online decision increases the probability of doing so by 4.1pp. These effects are large compared to colleges' responsiveness to the local severity of the pandemic, and are robust to a variety of definitions of peer institutions, indicating that peers played a large role in determining how colleges operated during the pandemic.

Keywords: Higher education, Peer institutions, COVID-19,

JEL Codes: I2, H4, L3

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1 Introduction

Understanding the strategic behavior of colleges and universities is a growing research agenda within economics. Increasingly, researchers recognize that colleges' decisions within the largely decentralized U.S. higher education system can have important consequences for both student and societal outcomes. While such research typically focuses on understanding decisions that take place on an annual basis in a predictable system, such as admissions and financial aid policies, the COVID-19 pandemic forced colleges to make decisions in an uncertain and unpredictable environment. Within this context, we provide new evidence that peer institutions can influence colleges' behavior.

Specifically, we study how colleges decided whether to open in-person, online, or in a hybrid model for the Fall 2020 semester and the extent to which these decisions were influenced by the prior decisions made by a college's peers. College and university leaders faced great uncertainty as they made these decisions during the summer of 2020. It was unclear at the time to what extent in-person instruction would lead to the spread of the novel coronavirus among students and in the broader local community and how students would respond to the announcement of different plans. While in-person instruction presented real, though uncertain, health risks, many institutions feared that the alternative of online instruction could limit student experiences and potentially reduce revenues both for the institution and for businesses in the local community.[1] The variation in choices reflects the difficulty of this decision; no alternative strictly dominated another for every college. Ultimately, 36% of four-year colleges opened primarily in-person, 27% chose a hybrid option, and 37% conducted the semester primarily online.

In this rapidly changing environment, many colleges and universities reported that they were looking to the decisions of their peers for ideas and guidance. In April of 2020, an article in *The Daily Northwestern* presented the reopening plans of many of Northwestern's peers, pointing out that Purdue and the University of Nebraska - Lincoln were planning to open in person, while Harvard and Michigan State University were planning a remote semester (Birenbaum 2020). By

[1] A recent working paper based on students at Arizona State University shows that students were willing to pay more for the in-person experience (Aucejo, French, and Zafar 2021).

May, many institutions' decision-making documents explicitly stated that they were monitoring the decisions of peer institutions as they contemplated reopening plans (*CU Boulder Planning Team* 2020). As the summer continued, colleges continued to emphasize that they would look to their peers for best practices. For example, a July 2020 article in *The Daily Texan*, the student newspaper at the University of Texas at Austin, quoted the university's media relations manager as saying "UT-Austin looks closely at what peer institutions are doing for good ideas but does not specifically follow the plans of one university" (Zhang 2020).

We know now that Fall 2020 reopening decisions had meaningful implications for the spread of COVID-19 in their communities (Andersen et al. 2020). Yet, there is no empirical evidence on the extent to which peer institutions influenced one another in this decision-making process. In this paper, we quantify the responsiveness of college and universities to their peers' decisions by leveraging two unique, rich datasets: (1) institution-by-day data on colleges' instruction mode decisions from the College Crisis Initiative at Davidson College, and (2) self-reported peer institutions from the National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS). These data, combined with publicly available county-by-day COVID-19 death counts, allow us to pursue a fixed-effects strategy in which we control for unobservable characteristics at both the state-by-day and institution level. This method rules out potential sources of bias caused by differences across states over time, such as differences in the timing and intensity of shutdown policies, or differences in COVID-19 reporting or data collection. It also controls for political and demographic differences across states and counties, as well as differences in resources across colleges.

Our results indicate that peer institutions were influential in determining whether colleges reopened in-person, online, or in a hybrid model. A 10 percentage point (pp) increase in the share of one's peers who have announced an in-person reopening plan increases the probability of doing the same by 2.6pp. An equivalent increase in the share of one's peers who have announced an online reopening plan increases the probability of announcing an online plan by 4.1pp. These effects are large compared to the effects of county-level COVID-19 deaths. On average, a 10% increase in the share of peers announcing in-person plans produces the same effect as a 30% decrease in county-

level COVID-19 deaths. Meanwhile, a 10% increase in the share of peers announcing online plans is equivalent to a 20% increase in COVID-19 deaths. These findings are robust to alternative definitions of peer institutions, but a placebo test with randomly selected peers generates no effects on colleges' choices. The results are further supported by an instrumental variables specification in which we instrument for peer institutions' decisions with the severity of the COVID-19 pandemic in their counties.

Our work relates to a growing literature on the market structure of U.S. higher education and the behavior of colleges, which primarily studies colleges' decisions that occur prior to when enrollment is realized for a given year (see, for example, Epple, Romano, and Sieg 2006; Fu 2014; Epple et al. 2019). For example, financial aid and admission policies affect admission and aid offers to students, which then affect student enrollment behavior. Our setting is different. In most cases, institutions required students to accept offers of admission and pay their enrollment deposits by June 1, 2020 (Dickler 2020). The vast majority of colleges waited until later in the summer to make a final announcement about instruction mode. Thus, four-year colleges generally were not competing for current-year enrollment by choice of instruction mode, as the enrollment deadline had passed.[2]

A large part of the uncertainty facing colleges surrounded the degree to which college-level decisions would affect community-level public health outcomes. In the months leading up to the fall semester, college leaders often cited concerns about COVID-19 spread in the local community and ensured constituents that they were "prioritizing metrics related to physical health and safety" (Turk and Ramos 2020). Research in the last year has confirmed these concerns. For example, Mangrum and Niekamp (2020) show that colleges that had early spring breaks saw higher growth of COVID-19 cases in their county, compared to colleges with later spring breaks. Directly relevant to the reopening decisions we study in this paper, Andersen et al. (2020) show that colleges that opened in-person increased local COVID-19 incidence by 0.024 cases per 1,000 residents, while colleges that opened online did not increase spread. Thus, understanding why some colleges opened in-person while others did not —even when they faced similar rates of COVID-19 in their

[2]However, students could still choose not to attend any institution in Fall 2020.

communities —remains a policy-relevant question.

Other researchers have contributed to this question by examining institution and community factors that predicted colleges' reopening decisions, with a particular focus on the political environments in which they operate. Collier et al. (2020) find that institutions in Republican-led states were more likely to postpone decisions and ultimately open in-person. Felson and Adamczyk (2021) similarly report that institutions located in cities and states with a high Republican vote share in 2016 were more likely to reopen in-person, while Collier et al. (2021) show that a variety of state and county sociopolitical measures influenced institutions' decisions more than the severity of the pandemic. Whatley and Castiello-Gutiérrez (2021) further find that private institutions with a high share of international students were more likely to reopen in-person. We build on this prior work by abstracting away from institution differences to shed light on why institutions located in similar communities or sharing similar characteristics may make markedly different decisions depending on the prior decisions made by their peers.

2 Data

Our analysis combines daily data on college reopening decisions and county-level COVID-19 deaths. We also incorporate data on institution-level characteristics, enrollment patterns, and self-reported peers from IPEDS to support multiple definitions of peer institutions. This subsection describes the data and the empirical patterns that motivate our analysis.

2.1 College Reopening Decisions

The College Crisis Initiative (C2i) at Davidson College provided us with a detailed, institution-by-day dataset covering colleges' reopening plans (Marsicano et al. 2020). To build this dataset, a team of researchers at C2i continuously scraped colleges' reopening websites and announcements, and then categorized colleges' announced instruction modes based on the degree to which they indicated they would operate in-person or online. For our purposes, we focus on three categories

of reopening decisions: primarily in-person, primarily online, or hybrid.[3] We define a college's reopening decision as the decision that dictated how they began the fall semester and the decision date as the date on which this decision was first communicated on their website.[4] We limit our analysis to four-year public and private non-profit institutions, as community colleges and four-year for-profit institutions likely faced very different decision environments and incentives.[5]

Table 1 describes patterns of final reopening decisions of four-year institutions by institutional control, basic Carnegie classification, geographic region, terciles of selectivity based on average ACT scores, and terciles of endowment per student. Overall, 36% of four-year colleges opened primarily in-person, 27% chose a hybrid option, and 37% conducted the semester primarily online. Private institutions were more likely than public institutions to reopen in-person, as were those that focus on bachelor's-level education (as opposed to master's or doctoral institutions).[6] Institutions in the West and Northeast were less likely than institutions in the Midwest and South to reopen in person, which corresponds with the severity of COVID-19 by region in the early stages of the pandemic, as well as different political climates. Less selective institutions were more likely to reopen in person than institutions of a higher selectivity classification, while institutions at both the low and high ends of the endowment distribution were more likely to reopen in person than those in the middle.

These differences across institution type and location suggest that local COVID-19 severity and the centrality of the undergraduate residential experience at each institution factored into reopening decisions. While differences across institutions are interesting in their own right, we control for these fixed differences at the institution level when we quantify the role of peers and county-level COVID-19 severity on institutional reopening decisions. This fixed-effects analysis is only possible because the C2i data was collected daily, allowing for the comparison of decisions over time. In Figure 1 we show aggregate differences over time in the share of colleges that have made

[3] Our in-person definition includes institutions that reported they were operating fully or primarily in-person, while our online definition includes institutions operating online (regardless of whether any students were residing on-campus). Our hybrid definition includes all other reopening plans, including those that left instructional mode decisions to individual instructors or offered a variety of instructional modes.

[4] 91.5% of institutions in our sample only made one decision prior to the start of the Fall 2020 semester.

[5] Four-year for-profit institutions enroll only about 3% of recent high school graduates. Community colleges typically do not have on-campus housing, so they faced different trade-offs during the COVID-19 pandemic.

[6] The Carnegie classification system classifies colleges based on programs offered at different levels. We drop any institutions that do not fall into the bachelor's, master's, or doctoral definitions in the Carnegie classification system, such as art institutes.

Table 1: Descriptive Statistics on Colleges' Fall 2020 Reopening Decisions

	Obs.	Share In-Person	Share Hybrid	Share Online
All	1247	0.359	0.273	0.368
Control: Public	482	0.268	0.284	0.448
Control: Private	765	0.417	0.265	0.318
Carnegie: Bachelor's	464	0.425	0.282	0.293
Carnegie: Master's	535	0.355	0.254	0.391
Carnegie: Doctoral	248	0.246	0.294	0.460
Region: Northeast	324	0.256	0.343	0.401
Region: Midwest	319	0.470	0.248	0.282
Region: South	431	0.427	0.274	0.299
Region: West	173	0.179	0.185	0.636
Selectivity: Low	351	0.402	0.293	0.305
Selectivity: Middle	370	0.378	0.270	0.351
Selectivity: High	295	0.312	0.278	0.410
Missing Selectivity	231	0.325	0.238	0.437
Endowment: Low	404	0.307	0.267	0.426
Endowment: Middle	404	0.438	0.235	0.327
Endowment: High	404	0.354	0.285	0.361
Missing Endowment	35	0.114	0.629	0.257

Note: This table describes the final reopening decisions of four-year institutions in our sample. We define selectivity terciles based on institutions' average ACT scores in 2017, and endowment terciles based on their endowment per student in 2017.

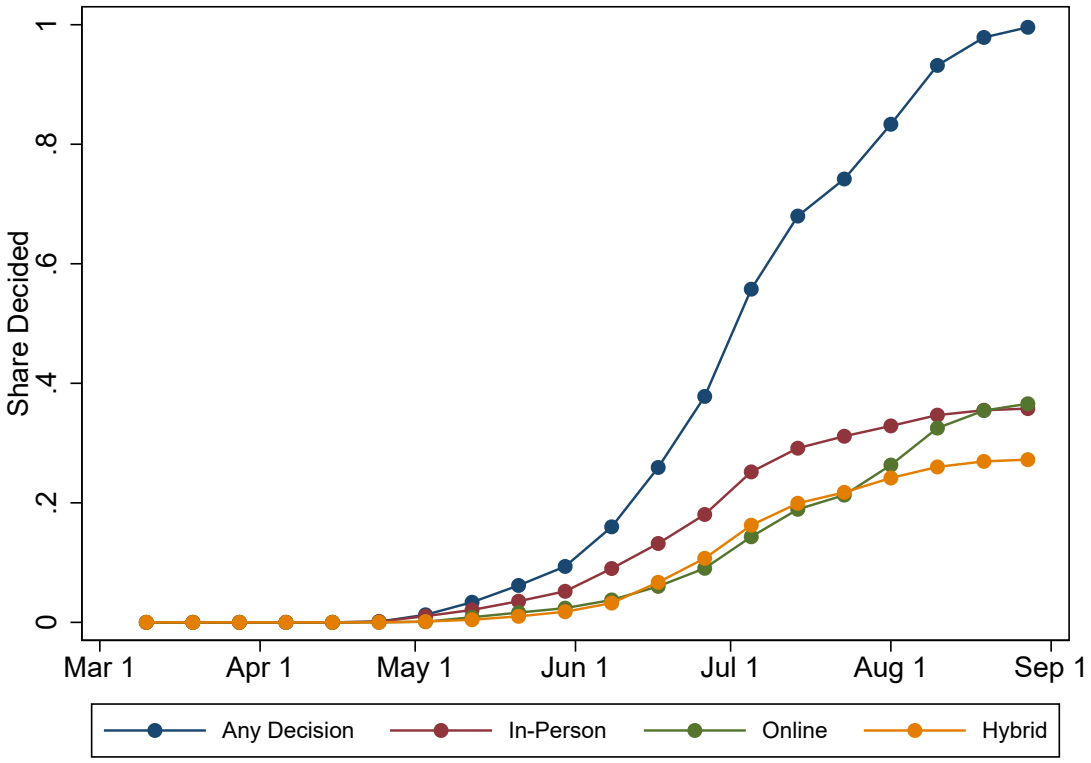
different decisions. By Fall 2020, all institutions had to make a decision, but many institutions delayed until late summer. By the beginning of July, only approximately 50% had made any announcement. Conditional on making an announcement, institutions that announced later were more likely to go online or hybrid, and less likely to open in person.

2.2 Local COVID-19 Severity

One objective of this analysis is to explore the relative influence that peer institutions and local COVID-19 severity had on colleges' reopening decisions. To establish the effects of local COVID-19 severity, we obtain data on county-level deaths from the New York Times.[7] Our preferred

[7]In the New York Times COVID-19 data, several geographic areas were aggregated. We aggregated these areas in both our population and COVID-19 data consistently so that we could accurately calculate a per-capita COVID-19 death rate in each college's county. Specifically, New York, Kings, Queens, Bronx, and Richmond counties are treated as a single area. We also aggregated Cass, Clay, Jackson, and Platte counties in

Figure 1: Colleges' Reopening Decisions Between March and September 2020



Note: This figure depicts the proportion of institutions which had made a re-opening decision across time, indicating that most institutions waited until late in the summer to make a decision.

measure of local severity is the cumulative number of COVID-19 deaths per capita, which is less likely than other measures (such as hospitalizations or positive tests) to be affected by local policies surrounding testing or hospitalization rules, including increases in testing related to colleges' reopening decisions.[8]

Appendix Figure A.1 summarizes COVID-19 deaths per capita by day in the counties surrounding colleges in our sample. It shows the average per-capita deaths and the standard deviation of deaths, along with the proportion of counties with zero deaths over time. By the end of the summer, cumulative deaths approached 4 per 10,000 people on average in the counties that surround college campuses. Few counties had zero deaths, even at the start of the summer. By May 1, just over 20% of college counties had zero deaths.

Missouri, along with Kansas City into a single area. Also in Missouri, Joplin, Jasper, and Newton counties are also aggregated into a single area.

[8]We verify that, in our sample of college counties, the New York Times data are nearly identical to daily death data available from Johns Hopkins University and USAFacts.

3 Empirical Strategy

The first step in our analysis is to identify a college's peer institutions —the set of institutions each college is likely to look to for precedent. There is no one clear way to define peers, so we present several different measures. We discuss these measures in the subsection below, then we discuss the regression framework that we use for estimation.

3.1 Classification of Peer Institutions

There are many different classification systems and rankings that can be used to determine which institutions are most similar to each other, but perhaps none are as informative as who institutions state are their peers. We obtain self-reported peer information through C2i's partnership with The Chronicle of Higher Education. As part of the IPEDS reporting process (which all institutions that participate in federal financial aid programs must complete each year), institutions may select a set of peer institutions to use as comparisons in customized reports from the IPEDS system. This set of colleges is referred to as an institution's "peers" or "comparison group" in the reporting system and related documentation. If an institution does not select its own peers, the system automatically generates a list of peer institutions based on similarity of measures such as institution level and control, Carnegie classification, and enrollment. In 2012, the Chronicle obtained and analyzed these self-reported peer selections, and later provided the complete network of peers to C2i (Fuller and O'Leary 2012). Our preferred classification of peers is to use an institution's self-selected peers when available, and the IPEDS default comparison group otherwise.[9]

We also construct several other classifications of peers to test the robustness of our results. We do so by separating institutions into 24 subgroups based on their control (public vs. private), basic Carnegie classification, and region, and define all institutions within a group as one another's peers. This definition captures institutions that offer similar types of education in the same area of the country, such as private, bachelor's level institutions in the Northeast and public, doctoral institutions in the Midwest. We then narrow this definition in three ways. First, we use the U.S.

[9]Unfortunately, the 2012 automatically generated groups are not publicly available in IPEDS, so we use the 2013 automatically generated groups for institutions that did not self-report peer institutions in the 2012 data obtained from The Chronicle.

Census Bureau's "division" geographic definition (rather than region) to allow for a higher level of geographic granularity. For example, this definition separates institutions in the Northeast into those in New England and those in the Mid-Atlantic. Second, we divide the subgroups based on terciles of their selectivity to capture institutions in the same region, Carnegie classification, and control that enroll similar students. Finally, we divide the subgroups based on terciles of their endowment per student to restrict institutions' responses to other institutions with similar resources.[10]

3.2 Regression Framework

To understand the effects of both prior peer decisions and local COVID-19 severity on colleges' reopening decisions, we estimate regressions of the following form:

$$\text{Decision}_{icst} = \alpha + \beta \mathbf{PeerShare}_{ics,t-1} + \gamma \text{COVID}_{cst} + \delta \text{DaysLeft}_{icst} + \theta_i + \lambda_{st} + \varepsilon_{icst} \qquad (1)$$

where Decision_{icst} is a binary variable indicating whether college i, in county c and state s, has made a certain reopening decision by date t. Across our specifications, we consider four mutually exclusive outcomes: (1) a college has not yet announced a reopening decision, (2) a college has announced an in-person reopening decision, (3) a college has announced an online reopening decision, and (4) a college has announced a hybrid reopening decision. We consider how the probability of these outcomes is influenced by the share of one's peers who have made corresponding decisions by the prior day, which is expressed as the $\mathbf{PeerShare}_{ics,t-1}$ vector. We lag these measures by one day to avoid any simultaneous, unobserved shocks that may affect both a college and its peers on the same day (e.g., an athletic conference's decision regarding fall sports). Depending on the specification, we consider either the share of college i's peers that have made any decision, or separately, the share that have made in-person, online, and hybrid decisions.

COVID_{cst} is the cumulative number of COVID-19 deaths, per 10,000 residents, that have occurred in county c by date t. In additional specifications, we interact this measure with county-level

[10]For both the selectivity and endowment definitions, we drop institutions that do not report average ACT scores or endowment per student, respectively.

population density to observe the effect of COVID-19 deaths per square mile on institutions' decisions. DaysLeft_{icst} is the number of days prior to college i's semester start date. θ_i is an institution fixed effect that captures any characteristics of a college that do not vary over time, such as their size, selectivity, control (public vs. private), and local political environment. λ_{st} is a vector of state-by-day fixed effects that capture any characteristics of states that vary across the time frame of our data, including COVID-19 severity and state reopening policies. Throughout the analysis, we cluster standard errors at the institution level to account for correlation in the ε term within an institution, over time.

The state-by-day fixed effects are crucial to identifying how colleges responded to their peer institutions, as they will account for any state and national trends in other colleges' decisions over time. The β coefficients, therefore, will capture the effect of peers' decisions *above and beyond* any response to general trends in the higher education market. If colleges respond similarly to all other institutions' decisions, or only respond to the total number of colleges that have announced a particular decision, these coefficients will equal zero. Similarly, the γ coefficient identifies the effects of local COVID-19 severity *above and beyond* state and national trends in COVID-19 severity and will equal zero if colleges respond only to state or national trends regarding the pandemic, rather than the specific public health situation of their county.

In order for the β coefficient to represent the causal effect of peers decisions' on a college's decision, it must be the case that there are no unobserved, time-varying factors at either the college or peer group level that affect the decisions of both an institution and its peers. Given that peer institutions are likely to share a number of characteristics, this assumption could be threatened if public policies or the changing public health landscape throughout the summer altered the likelihood that certain types of institutions (e.g., public vs. private, small vs. large) decided to reopen in a particular way. As such, in Section 5, we present additional specifications that allow the day fixed effects to vary not only by state, but also by control, by Carnegie classification, and by size quartile. We also estimate specifications that interact linear time trends with peer group definitions. The results from these specifications are similar to our preferred main specification, bolstering our interpretation of the coefficients as the effects of peer institutions on colleges' reopening plans.

4 Results

The results from the regression framework described above are broadly consistent with two findings. First, colleges responded to local COVID-19 intensity when they made their reopening decisions. When colleges faced higher COVID-19 death rates in their county, they delayed announcing reopening decisions. But conditional on making a decision, higher local death rates increased the likelihood that the institution would reopen online. Second, colleges followed their peers when making reopening decisions. The share of peers making any decision as of yesterday increased the likelihood an institution would make a decision today. Conditional on making a decision, an increase in the share of peers going online increased the likelihood that an institution would go online, and similarly for in-person decisions. The subsections below describe our main results and robustness checks in detail.

4.1 Main Effects

Table 2 presents our main estimates of equation (1). In Panel A, we separately regress the four binary, mutually exclusive outcomes of interest on the share of one's peers that have made any reopening decision by the prior day and county-level COVID-19 deaths per capita, along with the fixed effects outlined in equation (1).[11] Column (1) shows that a 10pp increase in the share of one's peers who have announced a reopening decision decreases the likelihood that an institution has not yet made a reopening decision by 2.1pp. That is, as more peers make a decision, an institution is more likely to do so as well. Moving across the columns, we see that this effect is predominantly driven by an increase in institutions making an online reopening decision: a 10pp increase in the share of one's peers who have made a decision increases the probability of announcing an online decision by 1.5pp and the effect is statistically significant at the 1% level. The effects on in-person and hybrid decisions are 0.47pp and 0.1pp, respectively, and neither is statistically significant at conventional levels.

The coefficients on our COVID-19 death rate measure in the second row of Panel A indicate that

[11] We further control for the number of days until an institution begins their fall semester, but in all specifications, the estimated coefficient on this variable is close to zero and statistically insignificant.

Table 2: Effects of Prior Peer Decisions on Colleges' Reopening Decisions

	Not Yet Decided (1)	Decided In-Person (2)	Decided Online (3)	Decided Hybrid (4)
Panel A. Share of peers who have made any decision				
Share decided, t-1	-0.212***	0.047	0.154***	0.010
	(0.051)	(0.043)	(0.039)	(0.039)
County deaths per 10,000	0.005***	-0.005**	0.008***	-0.008***
	(0.002)	(0.002)	(0.002)	(0.002)
Observations	221,966	221,966	221,966	221,966
Panel B. Share of peers who have made each decision				
Share decided in-person, t-1	-0.218***	0.263***	0.017	-0.062
	(0.058)	(0.065)	(0.054)	(0.058)
Share decided online, t-1	-0.214***	-0.227***	0.412***	0.028
	(0.059)	(0.055)	(0.058)	(0.055)
Share decided hybrid, t-1	-0.193***	0.019	0.105	0.069
	(0.062)	(0.076)	(0.070)	(0.077)
County deaths per 10,000	0.005***	-0.004*	0.007***	-0.008***
	(0.002)	(0.002)	(0.002)	(0.002)
Observations	221,966	221,966	221,966	221,966

Note: This table presents the main estimates of equation (1): the effect of peers' announced decisions and county-level COVID-19 deaths on individual institutions' decisions. Panel A describes the effect of peers making any decision and Panel B describes the effect of each type of decision. Column 1 describes the effects on the likelihood of a school having not yet made an announcement. Columns 2 - 4 describe the effects on the likelihood of a school announcing each of the three types of reopening styles. In all specifications, we control for institution and state-by-day fixed effects, as well as the days remaining before an institution's semester start date. We cluster all standard errors at the institution level.$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

increases in local COVID-19 severity delay institutions' reopening decisions. An additional death per 10,000 county residents reduces the likelihood that an institution has announced a reopening decision by 0.5pp. However, this aggregate effect masks heterogeneity in the type of decisions institutions make. When exposed to an additional death per 10,000 residents, institutions are less likely to announce in-person (0.5pp) or hybrid (0.8pp) decisions, but more likely to announce online decisions (0.8pp). The fact that the sum of the in-person and hybrid responses is larger than the online response explains why institutions are overall less likely to announce a decision when the pandemic worsens in their county.

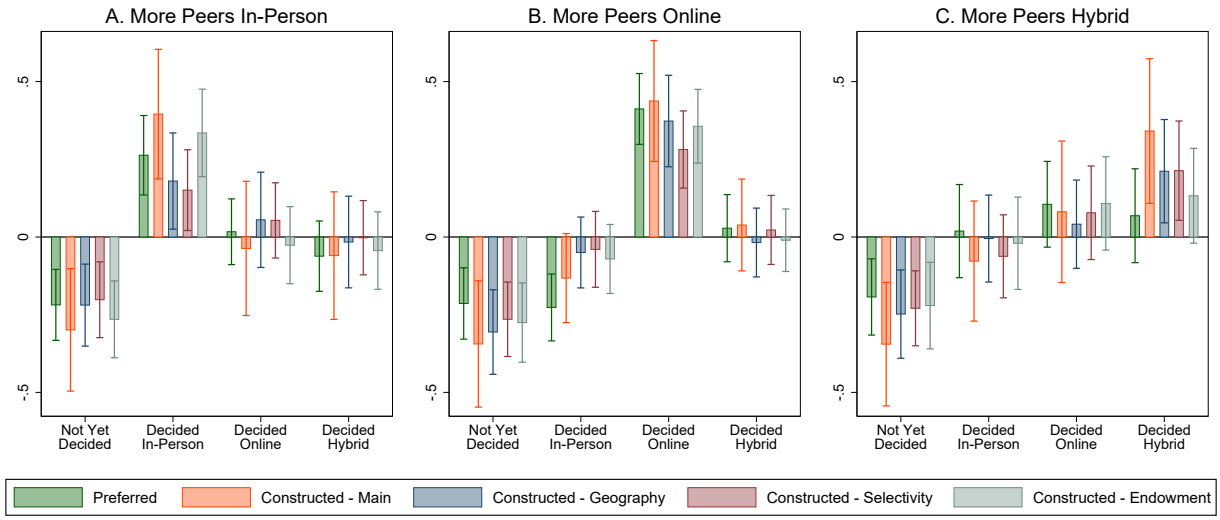
In Panel B, we disaggregate our peer measure by the the types of decisions one's peers have made. Column (1) shows that an increase in the share of one's peers making in-person, online, or hybrid decisions increases the likelihood that an institution has made a decision by similar amounts. A 10pp increase in the share of one's peers making any one of these decisions increases the probability of making a decision by 1.9-2.2pp. The types of decisions institutions make, however, are highly dependent on what decisions their peers have made. A 10pp increase in the share of peers who have made an in-person decision increases the probability of doing so by 2.6pp, with little detectable effect on the likelihood of announcing an online or hybrid decision. Meanwhile, a 10pp increase in the share of one's peers who have announced an online decision reduces the probability of announcing an in-person decision by 2.3pp and increases the probability of announcing an online decision by 4.1pp. The effect of an increase in peers announcing hybrid decisions is distributed across the different reopening plans and none are statistically significant. This finding is not surprising since hybrid plans can vary substantially and may not provide useful information to peer institutions still planning for the Fall 2020 semester.

The final row of Table 2 again shows how increases in local COVID-19 deaths per capita affect colleges' reopening decisions. We use these estimates to compare the relative response of institutions' to their peers and to the severity of COVID-19 in their county. For example, at the mean rates of institutions' decisions and COVID-19 deaths during our sample period, a 10% increase in the share of one's peers announcing an in-person decision increases the probability of doing so by 2.5%, while a 10% increase in local COVID-19 deaths per capita decreases the probability of doing so by 0.8%. Thus, a county would need to have 30% lower COVID-19 deaths per capita to induce the same effect as a 10% increase in peers deciding to reopen in-person. Similarly, we find that a 10% increase in the share of one's peers deciding to reopen online has the same effect as a 20% increase in local COVID-19 deaths per capita. We interpret these results as evidence that institutions were more responsive to the decisions of their peers than they were to the severity of their pandemic in their counties, which aligns with other work showing that colleges responded to pressures beyond public health when making reopening decisions (Felson and Adamczyk 2021; Collier et al. 2020; Collier et al. 2021; Whatley and Castiello-Gutiérrez 2021).

4.2 Alternative Peer Definitions & Heterogeneous Effects

We next explore whether are our results vary across definitions of peer institutions and whether different types of institutions vary in their responsiveness to prior peer decisions. First, in Figure 2, we show the estimated coefficients and confidence intervals for the peer definitions discussed in subsection 3.1. Panel A presents the effect of more peers announcing in-person decisions, while Panel B and C show effects for increases in online and hybrid decisions, respectively. In general, our estimated effects are quite similar across peer definitions. As more peers announce in-person decisions, institutions are induced to make in-person decisions. As more announce online decisions, institutions are more likely to announce online decisions and somewhat less likely to announce in-person decisions. The hybrid results remain noisy, although there is a statistically significant increase in the probability of announcing a hybrid decision when using our constructed peer measure based on region, Carnegie classification, and control, and when narrowing it by geography and selectivity.

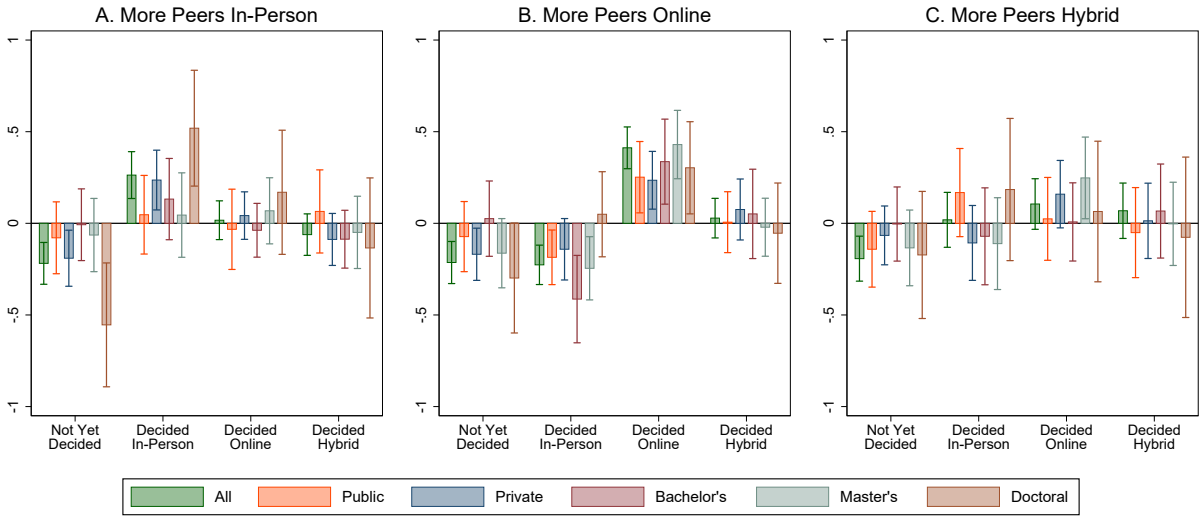
Figure 2: Effects of Prior Peer Decisions Across Peer Definitions



Note: This figure shows how estimated effects of peers on re-opening decisions vary across peer definitions, as described in Section 3.1. Panel A shows the estimated coefficient on the share of peers that have announced in-person re-openings, where the dependent variable is an indicator for each decision type as shown on the X-axis. Panels B and C show the estimated effects for the share of peers that have announced an online or hybrid re-opening.

Figure 3 then repeats our main analysis using sub-samples of the data to show how the estimated effects vary across institutional control and Carnegie classification. Because we estimate these effects by stratifying our main sample, these specifications also implicitly capture any state-by-day trends that uniquely affected colleges within a particular sector or Carnegie classification. In Panel A we show the estimated effect of more peers announcing in-person reopening decisions. We find that private institutions are somewhat more likely than public institutions to respond to peers' decisions to re-open in person and that doctoral institutions are much more responsive than other Carnegie classifications. The large effect from these institutions could be due to them having more resources to accommodate in-person activities (e.g., testing and medical infrastructure), or more pressure to "keep up" with their peer institutions.

Figure 3: Heterogeneous Effects of Prior Peer Decisions



Note: This figure describes how the effect of peer decisions differs across institutional control (public vs. private) and Carnegie classification. Panel A shows the estimated coefficient on the share of peers that have announced in-person re-openings, where the dependent variable is an indicator for each decision type as shown on the X-axis. Panels B and C show the estimated effects for the share of peers that have announced an online or hybrid re-opening.

Panel B then shows the effect of peers' online re-opening announcements on decisions made by institutions of different types. Bachelor's-focused institutions see an especially large drop in in-person reopening announcements when peers announce that they will be re-opening online, but all types of institutions are similarly more likely. Similar to our main results, the heterogeneity

analysis for an increase in hybrid re-opening decisions (Panel C) is very noisy and nearly all of the estimate coefficients are statistically insignificant. We continue to interpret this effect as evidence that hybrid decisions provide little information or guidance to peer institutions still deciding their fall instructional mode.

5 Robustness

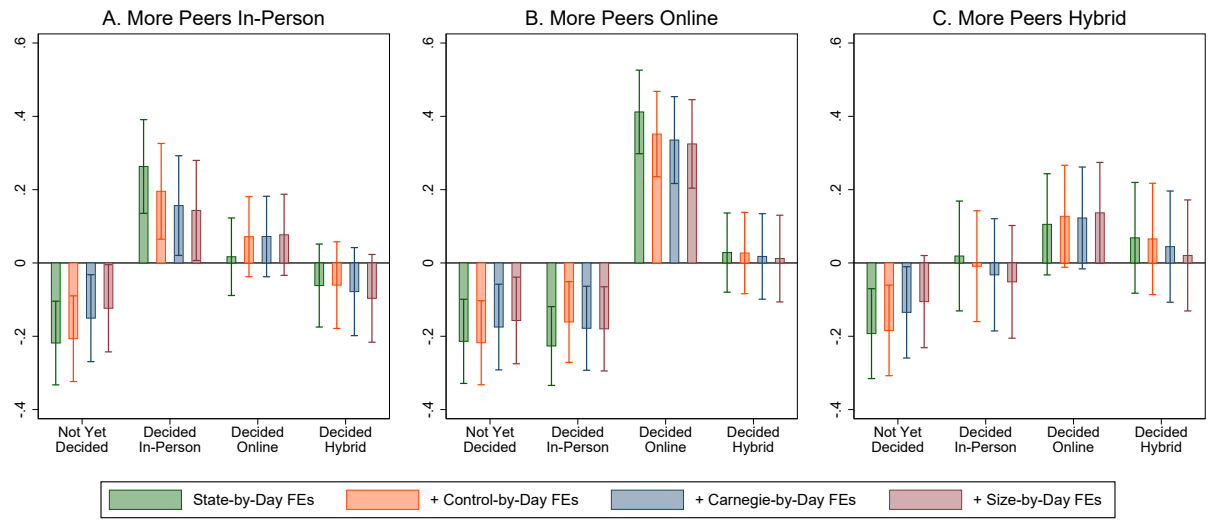
Our empirical approach relies on the assumption that, after accounting for unobservable factors at the institution and state-by-day levels, the decisions of peers are uncorrelated with unobserved determinants of a college's own decision. This assumption may be violated if peer institutions, which tend to share certain characteristics, are responding to common shocks throughout the summer. In the following sections, we test the validity of this assumption by accounting for potential correlated shocks and by implementing an instrumental variables strategy. We also demonstrate that the results are not driven by secular trends through a placebo test with randomly assigned peers.

5.1 Accounting for Correlated Shocks

To account for the presence of correlated shocks across institutions with similar characteristics, we first estimate several alternative specifications of equation (1) with additional day fixed effects included. Specifically, we sequentially add interactions of day fixed effects with dummy variables for an institution's control, Carnegie classification, and size quartile. Figure 4 presents these results. Panel A shows how the additional fixed effects change the effects of more peers announcing in-person decisions, Panel B shows effects of more peers announcing online decisions, and Panel C shows effects of more peers announcing hybrid decisions. Across the different outcomes, our results only change slightly when allowing the day fixed effects to vary by institutional characteristics. Further, none of the most saturated regressions (with state-by-day, Carnegie-by-day, control-by-day, and size-by-day fixed effects) produce statistically different effects than our preferred main specification that only allows the day fixed effects to vary at the state level. We

interpret these results as evidence that institutions are indeed responding to the decisions of their peers, as opposed to changes in other unobserved factors unique to their institution type.

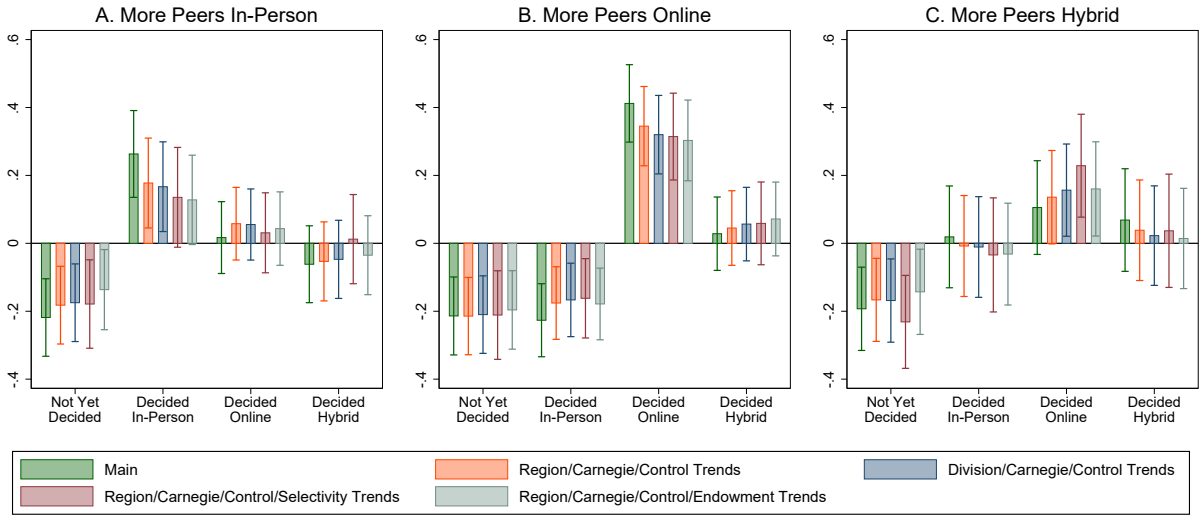
Figure 4: Specifications with Additional Day Fixed Effects



Note: This figure shows how estimated effects of peers on re-opening decisions vary when including additional interactions with the day fixed effects. Panel A shows the estimated coefficient on the share of peers that have announced in-person re-openings, where the dependent variable is an indicator for each decision type as shown on the X-axis. Panels B and C show the estimated effects for the share of peers that have announced an online or hybrid re-opening.

We then estimate specifications that include linear time trends for even narrower groups of institutions. Specifically, we interact linear time trends with indicators for the region/Carnegie/control groups we use as an alternative peer definition in Section 4.2, as well as the groups that narrow the geography, selectivity, and endowment of institutions. These trends will pick up any unobserved factors that were changing linearly over time and differentially affecting different groups of institutions. Figure 5 presents these results. Panel A shows how the inclusion of trends alters the estimated effect of more peers announcing in-person decisions, Panel B shows effects of more peers announcing online decisions, and Panel C shows effects of more peers announcing hybrid decisions. Once again, across the different outcomes, our results only attenuate slightly when including linear time trends. As in Figure 4, we do not detect statistically significant differences between any of our estimates, again indicating that colleges were responding to their peers' decisions and not other factors that were changing over time.

Figure 5: Specifications with Group-Specific Linear Time Trends



Note: This figure shows how estimated effects of peers on re-opening decisions vary when including group-specific linear time trends. Panel A shows the estimated coefficient on the share of peers that have announced in-person re-openings, where the dependent variable is an indicator for each decision type as shown on the X-axis. Panels B and C show the estimated effects for the share of peers that have announced an online or hybrid re-opening.

5.2 Instrumental Variables Approach

Even with additional day fixed effects and linear time trends, we cannot completely rule out the possibility that an institution and its peers are responding to group-specific shocks. We thus implement an instrumental variables (IV) approach that relies on the assumption that COVID-19 severity in peers' counties affect an institution's decision only through its peers' decisions. The median distance between peer institution pairs is 378 miles, so COVID-19 prevalence in a peer institution's county is unlikely to be a direct factor in an institution's decision-making process. The first stage equation is:

$$\text{PeerShare}_{ics,t-1} = \alpha + \beta \text{PeerCOVID}_{ics,t-1} + \gamma \text{COVID}_{cst} + \delta \text{DaysLeft}_{icst} + \theta_i + \lambda_{st} + \varepsilon_{icst} \quad (2)$$

and the second stage equation is:

$$\text{Decision}_{icst} = \alpha + \beta \widehat{\text{PeerShare}}_{ics,t-1} + \gamma \text{COVID}_{cst} + \delta \text{DaysLeft}_{icst} + \theta_i + \lambda_{st} + \varepsilon_{icst} \quad (3)$$

where $\widehat{\text{PeerShare}}_{ics,t-1}$ is predicted from the first stage. The instrument is $\text{PeerCOVID}_{ics,t-1}$, which we define as the average number of COVID-19 deaths per 10,000 residents that have occurred by day $t-1$ in the counties where institution i's peers are located. We also estimate specifications where we define this variable as the average number of COVID-19 deaths per square mile in the peers' counties to account for differences in institutions' responsiveness to COVID-19 deaths in low-density and high-density areas.[12]

Appendix Table A.2 presents the first stage estimates using these instruments on three different peer measures of interest: the share of peers who have made any decision, the share who have made in-person decisions, and the share who have made online decisions. For each measure, we estimate the specification using both the COVID-19 deaths per capita and COVID-19 deaths per square mile measures. Columns (1) and (2) show that, as peers are exposed to more COVID-19 deaths, they are less likely to announce a decision. Columns (3) and (4) show that this effect is even larger in magnitude for in-person decisions, while columns (5) and (6) show that peers are more likely to make online decisions when exposed to higher levels of COVID-19 deaths in their counties. Across both instruments, the partial F-statistics are larger when considering the overall decision and in-person decision results, suggesting that the online results should be interpreted with caution.

Figure 6 then presents comparisons of the OLS and IV estimates for three different estimated effects: (1) the effect of more peers making decisions on the probability of a college making a decision, (2) the effect of more peers making in-person decisions on the probability of a college making an in-person decision, and (3). We note that one limitation of the IV approach is that we are unable to include multiple measures of peers' decisions in the latter two specifications, since we only have one instrument. As such, we compare our OLS results from the specifications in Table 2 to specifications that only include the single peer decision variable. The first two columns in each panel show that the estimated effects are very similar across the two types of specifications.[13]

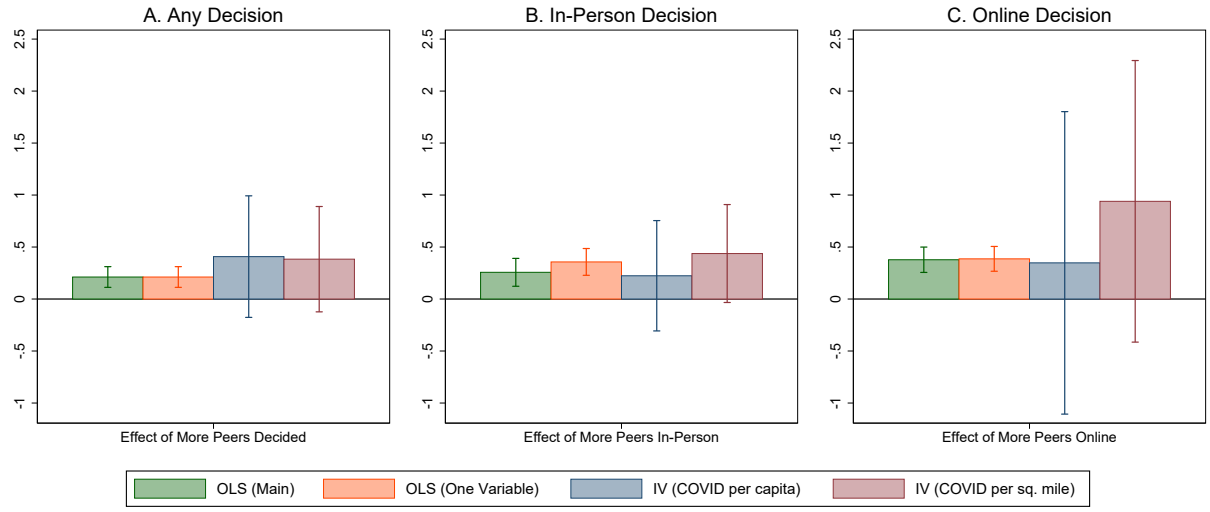
The third and fourth columns in Figure 6 show that our IV specifications produce qualitatively

[12] Appendix Table A.1 presents our main results using COVID-19 deaths per square mile as our measure of local COVID-19 severity. The estimated effects of peers decisions' on colleges' decisions are nearly identical to those in Table 2.

[13] Note that the estimates are the same for the first estimated effect, since each approach only includes a variable for the share of peers that have made any decision.

similar, although noisier, results compared to our OLS specifications. In Panel A, we show that the IV estimates produce slightly larger effects of the influence of peers decisions' on a college's own likelihood of making a decision. In Panels B and C, we find that the IV specifications with COVID-19 deaths per capita are slightly smaller, and the IV specifications with COVID-19 deaths per square mile are slightly larger than our OLS specifications for in-person and online decisions. Taken together, we interpret these results as providing evidence that endogenous peer decisions are not driving our main findings.

Figure 6: Instrumental Variables Specifications



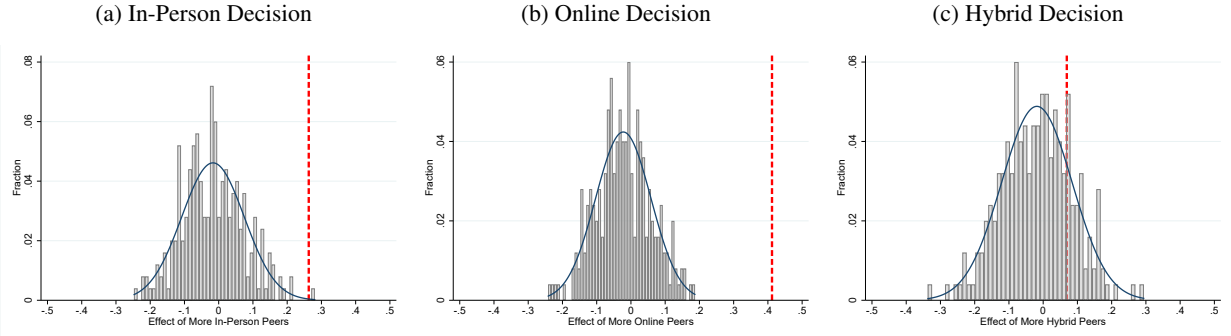
Note: This figure compares our OLS and IV approaches. Panel A shows the estimated effects for how the share of peers who have made any decision affect a college's likelihood of making a decision. Panel B shows the estimated effects for how the share of peers who have made an in-person decision affects the college's likelihood of making an in-person decision. Panel C shows the estimated effects for how the share of peers who have made an online decision affects the college's likelihood of making an online decision.

5.3 Placebo Test

Finally, we assess the validity of our approach by conducting a placebo test as follows. We randomly assign 25 peer institutions to each college in our data. Then we reconstruct the measures of prior decisions using the randomly assigned peers and re-run our main specification. We repeat this process 250 times, saving the estimated effects each time. Figure 7 shows the distribution of the estimated effects from the randomly assigned peers, with a vertical red dashed bar showing

our estimated effects from the preferred peer definition. The estimated effects from the random peers are centered around zero, as expected. The estimated effect from our main peer definition is in the very far-right tail of the distribution for each outcome, except for the hybrid decision. The estimated effects for hybrid were noisy to begin with, so we do not find this result concerning. We further interpret the results for in-person and online decisions as evidence that colleges were truly responding to their peer institutions, and not to the higher education market as a whole.

Figure 7: Placebo Tests with Randomly Selected Peers



Note: This figure depicts the results of a placebo test in which we assign to schools random peers. Each panel describes the distribution of the estimated effect of the random peers' decision to open online, hybrid, or in person on the institutions to open in the same way. The vertical line represents this estimated effect in our preferred specification using an institution's peers as reported in IPEDS.

6 Conclusion

Within the U.S. higher education market, colleges make strategic decisions about advertising, recruitment, financial aid, tuition, admissions, and a host of other factors on a routine basis, all centered around the academic calendar. Given the decentralized and autonomous nature of higher education within the U.S., colleges may look to their peer institutions for ideas and guidance when making decisions in uncertain environments. We study this influence of peer institutions on colleges' decisions in the context of colleges' reopening plans during the COVID-19 pandemic, where colleges faced substantial uncertainty and generally were not competing with one another for current-year enrollment.

By leveraging unique, high-frequency data on colleges' decisions leading up to the Fall 2020

semester, we find evidence that institutions responded strongly to prior decisions made by their peers. As more of an institution's peers announced they would be reopening in-person or online, they were more likely to do the same. This effect holds across a variety of definitions of peer institutions and robust to a variety of specifications with additional trends and fixed effects. The effect of peers' decisions holds even after controlling for local COVID-19 severity and state-day trends, indicating that colleges' re-opening decisions were not driven solely by contemporaneous local or statewide COVID-19 conditions.

As colleges continue to adapt to the challenges of the pandemic and ensuing economic recovery, we expect them to continue looking to their peers for ideas and guidance. Thus, peers may also have an influence on colleges decisions' about instructional modes and public health practices in Fall 2021, policies regarding tenure extensions for junior faculty members, and the continuation of pandemic-induced operations like test-optional admissions. Future research on these decisions would be a valuable contribution to understanding how colleges respond to one another and operate, particularly during times of uncertainty.

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We are grateful to Chris Marsicano and the team at the College Crisis Initiative (C2i) at Davidson College for their assistance in getting this project started and providing data and technical support. We would also like to thank Doug Harris, Peter Nencka, and Austin Smith for their helpful comments, as well as our research assistant at St. Olaf College, Grace Lindmark, for her work on this project.

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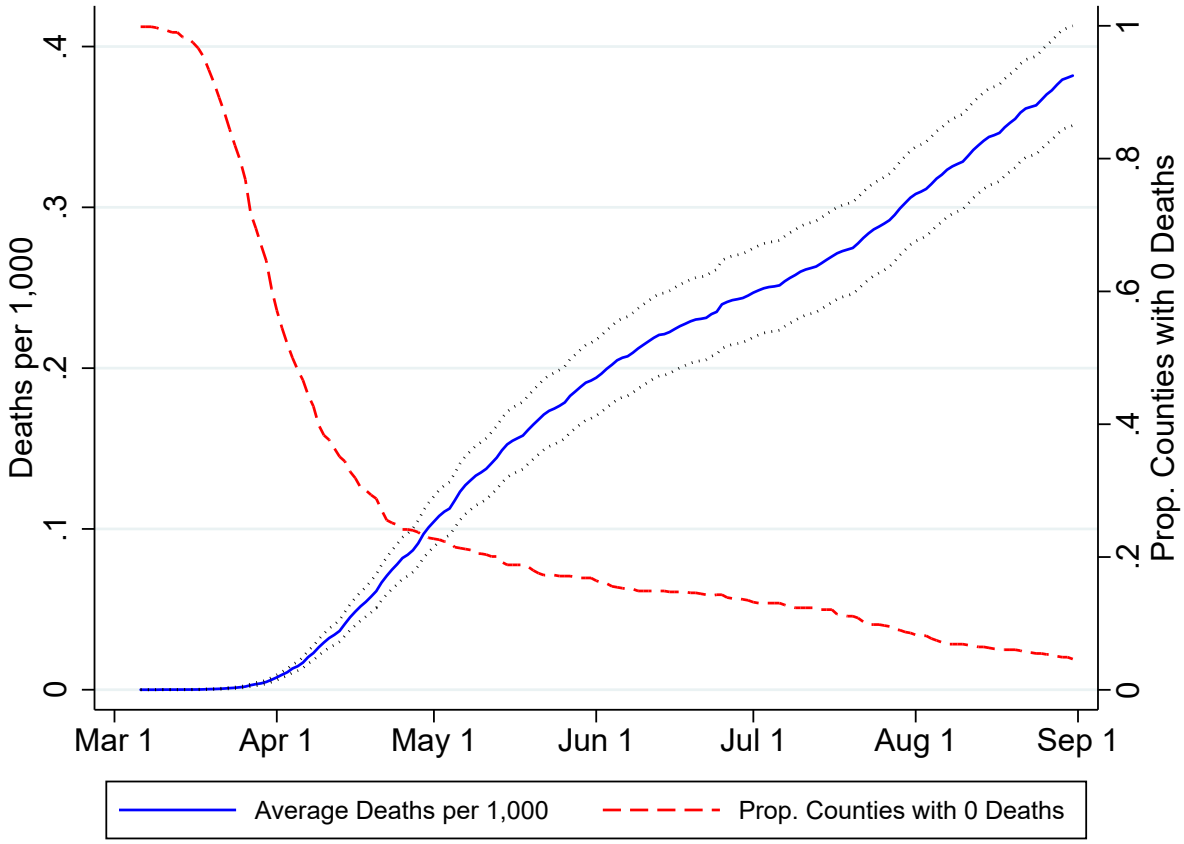
Online Appendix

A Additional Figures & Tables

Figure A.1: COVID-19 Deaths per Capita in College Counties



Note: This figure depicts COVID-19 deaths per-capita in the counties surrounding the institutions in our sample. The solid line describes average deaths per 1,000 people over time. The dashed line describes the proportion of counties with 0 deaths over time. Only a small proportion of counties had no deaths, even at the beginning of the summer.

Table A.1: Main Effects with COVID-19 Deaths per Square Mile

	Not Yet Decided (1)	**Decided In-Person (2)**	**Decided Online (3)**	**Decided Hybrid (4)**
Panel A. Share of peers who have made any decision				
Share decided, t-1	-0.212***	0.048	0.150***	0.014
	(0.051)	(0.043)	(0.039)	(0.039)
County deaths per square mile	0.005***	-0.005**	0.008***	-0.008***
	(0.002)	(0.002)	(0.002)	(0.002)
Observations	221,966	221,966	221,966	221,966
Panel B. Share of peers who have made each decision				
Share decided in-person, t-1	-0.219***	0.264***	0.013	-0.058
	(0.058)	(0.065)	(0.054)	(0.058)
Share decided online, t-1	-0.217***	-0.224***	0.412***	0.030
	(0.058)	(0.055)	(0.058)	(0.055)
Share decided hybrid, t-1	-0.190***	0.018	0.100	0.073
	(0.062)	(0.077)	(0.070)	(0.077)
County deaths per 10,000	0.003***	-0.002***	0.001	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	221,966	221,966	221,966	221,966

Note: This table presents the main estimates of equation (1): the effect of peers' announced decisions and county-level COVID-19 deaths on individual institutions' decisions, using COVID-19 deaths per square mile as our measure of local COVID-19 severity. Panel A describes the effect of peers making any decision and Panel B describes the effect of each type of decision. Column 1 describes the effects on the likelihood of a school having not yet made an announcement. Columns 2 - 4 describe the effects on the likelihood of a school announcing each of the three types of reopening styles. In all specifications, we control for institution and state-by-day fixed effects, as well as the days remaining before an institution's semester start date. We cluster all standard errors at the institution level.$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table A.2: First Stage Estimates for IV Approach

	Peers Decided		**Peers Decided In-Person**		**Peers Decided Online**	
Variable:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**6)**
Peers' COVID-19 deaths per 10,000 residents	-0.011***		-0.014***		0.005***	
	(0.001)		(0.002)		(0.001)	
Peers' COVID-19 deaths per square mile		-0.005***		-0.007***		0.003***
		(0.001)		(0.001)		(0.001)
Partial F-Statistic	69.97	37.48	82.12	39.21	13.09	9.640
Observations	221,966	221,966	221,966	221,966	221,966	221,966

Note: This table presents estimates of equation (2): the effect of peers' COVID-19 exposure on their decisions. In all specifications, we control for institution and state-by-day fixed effects, as well as the institution's COVID-19 severity at the county level and days remaining before an institution's semester start date. We cluster all standard errors at the institution level.$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$