

Supporting Information

Phan and Airoidi 10.1073/pnas.1404770112

SI Text

Data Collection. We selected the top 133 national universities as reported by *USNews* (colleges.usnews.rankingsandreviews.com/best-colleges/rankings). These universities are a mix of private and public schools spanning a wide spectrum in terms of size of the student population and number of degrees offered. Based on year of birth self-reported on Facebook, we selected students who were born between 1985 and 1990 inclusively and listed at least one of these universities in their network. These criteria returned a list of 1,461,111 students. We aggregated the number of private messages and wall posts that each of these students made on a weekly basis between September 3, 2007 and May 23, 2011. We focused on this time window, because this is the period when most of the students in our list would be expected to attend a university as undergraduates. In this time window, the students in our list posted 590,953,204 wall posts and wrote 629,645,683 private messages. We collected all friendship data among these students and recorded a connection whenever two friends both reported to belong to the same university network.

Details About PSM Analysis. We manually identified five universities that suffered severe damage from Hurricane Ike using Federal Emergence Management Agency claims. We then matched these 5 universities with 10 similar universities based on the number of students in attendance before the hurricane. We chose to match on the number of students, because the primary outcome variables (degree, transitivity, and betweenness centrality) are network-based and rely heavily on the number of nodes (i.e., students). Table 1 reports the number of students by university. Here, we conduct balance checks across a number of additional covariates to alleviate the concern that confounding factors ignored in the matching procedure might be affecting the conclusions in the text. We consider socioeconomic factors, regional differences, university factors, and students' characteristics.

Overall, the additional analyses below confirm that the universities that we selected as affected and unaffected by the hurricane are well-matched along a number of key aspects.

Additional Covariates. We collected and matched university-level information from the Institutional Data Archive on American

Higher Education produced by the Colleges & Universities 2000 Project (www.icpsr.umich.edu/icpsrweb/ICPSR/studies/34851). In Figs. S1 and S2, we analyzed the relationship between the primary outcome variables (degree, transitivity, and betweenness centrality) and network-level covariates (number of students before Hurricane Ike, number of friendship links, and number of entering undergraduate students), university-level covariates (*USNews* rank and public vs. private institutions), economic and regional factors (percentage of undergraduate students on financial aid and percentage of undergraduate students paying in-state tuitions in 2005), and student body characteristics (percentage of foreign students and percentage of students who graduate within 6 y) in 4 wk before and 4 wk after Hurricane Ike. Similarly, Figs. S3 and S4 show the relationships among the same variables using data for 12 wk before and 12 wk after Hurricane Ike.

Number of New Users. Our simple matching strategy relies on a time-varying covariate (i.e., the number of students registered) fixed at its value before the hurricane. One additional concern is that the student body itself might have changed as a consequence of the hurricane. Here, we analyze the number of new student users over time in the affected universities (treatment) and the unaffected universities (control) as well as all other nonmatched universities. Fig. S5 shows that the affected universities (red line and confidence band) recruit students at a pace similar to that of the unaffected universities (blue line and confidence band). Both affected and unaffected universities display yearly seasonality effects that are likely caused by the academic calendar.

Communication Levels. We also checked whether communication levels (quantified in terms of numbers of messages per week, numbers of posts per week, and numbers of recipients per week) in the affected universities adequately match those in the unaffected universities. Figs. S6–S8 show the time-varying activity levels in the affected universities (red lines) and unaffected universities (blue lines). Universities in both groups exhibit similar communication levels and similar seasonal effects that are likely caused by the academic calendar.

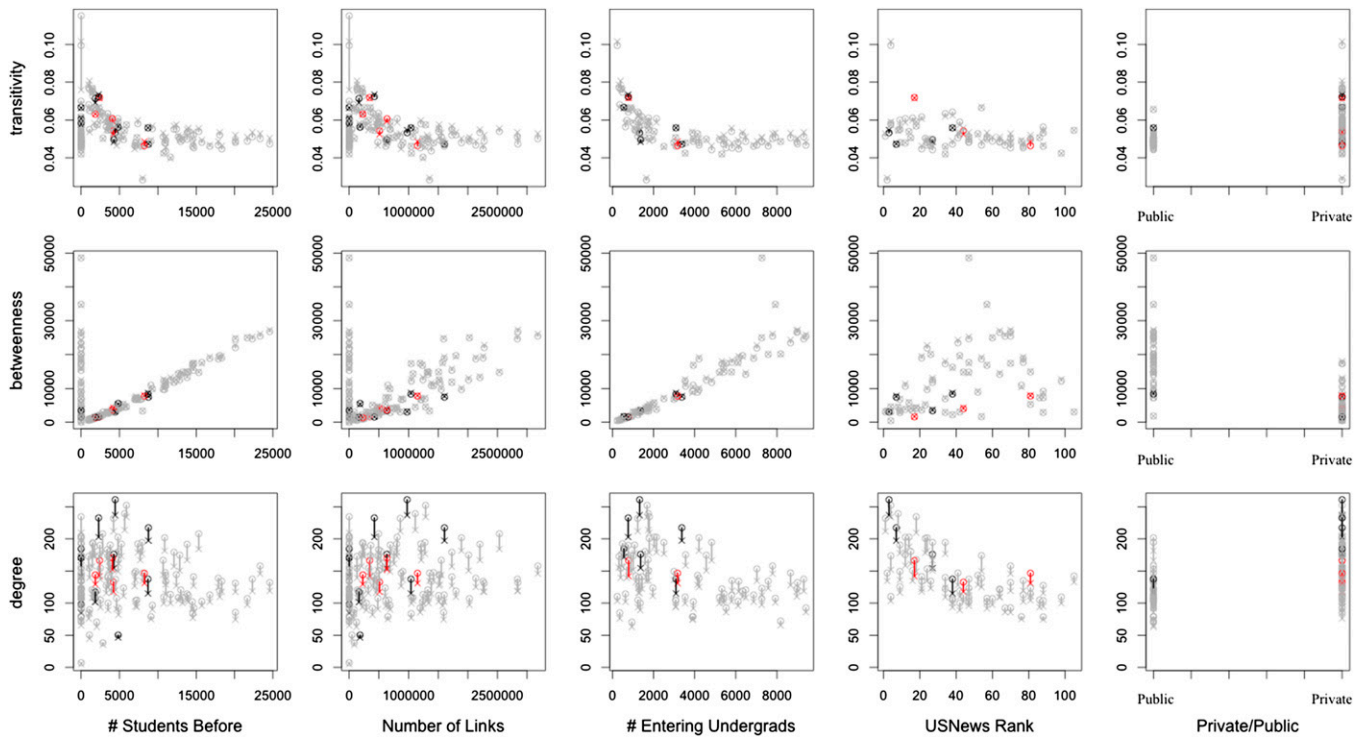


Fig. S1. The primary outcome variables plotted against five potential covariates. The X markers indicate values 4 wk before Hurricane Ike, whereas circles indicate values 4 wk after Hurricane Ike. Data points for the universities affected by the hurricane (treated) are in red, data points for the unaffected universities (control) are in black, and data points for the other universities (not matched in the main analysis) are in gray. Details are in *S1 Text*.

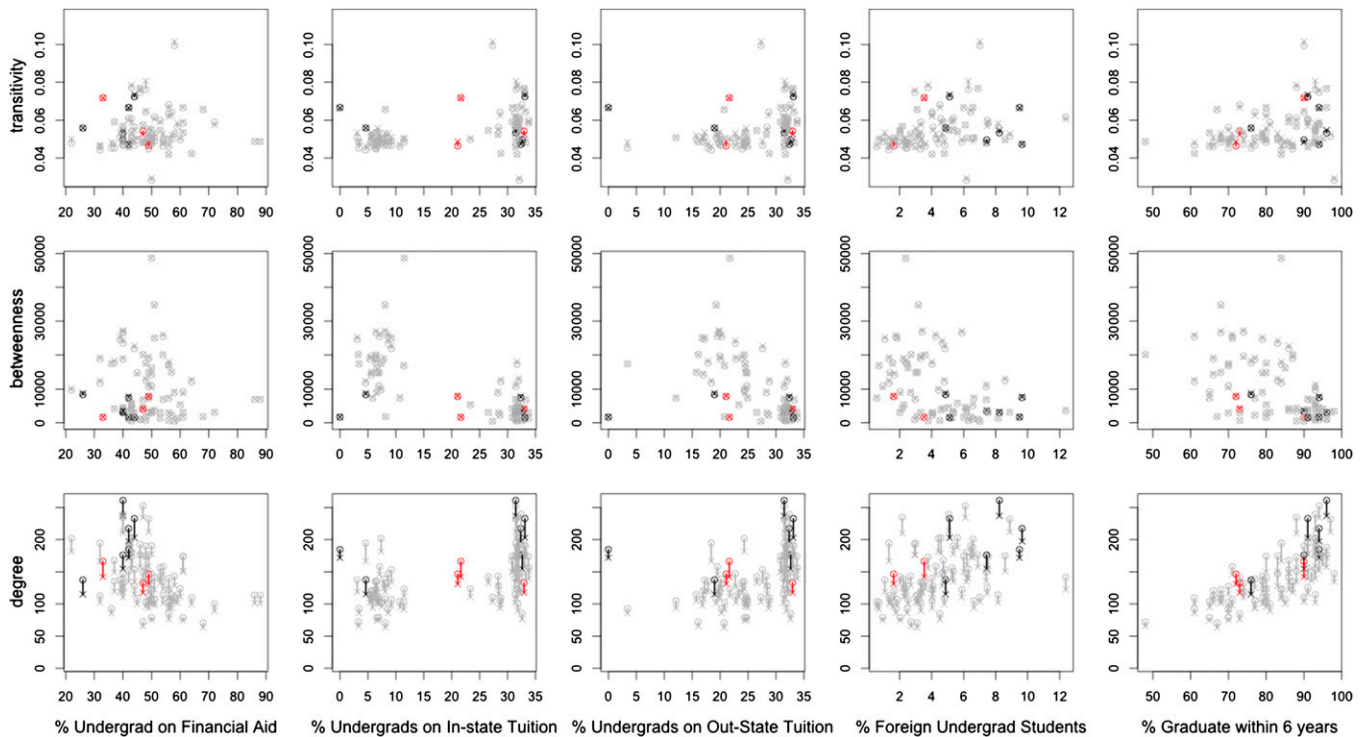


Fig. S2. The primary outcome variables plotted against five potential covariates. The X markers indicate values 4 wk before Hurricane Ike, whereas circles indicate values 4 wk after Hurricane Ike. Data points for the universities affected by the hurricane (treated) are in red, data points for the unaffected universities (control) are in black, and data points for the other universities (not matched in the main analysis) are in gray. Details are in *S1 Text*.

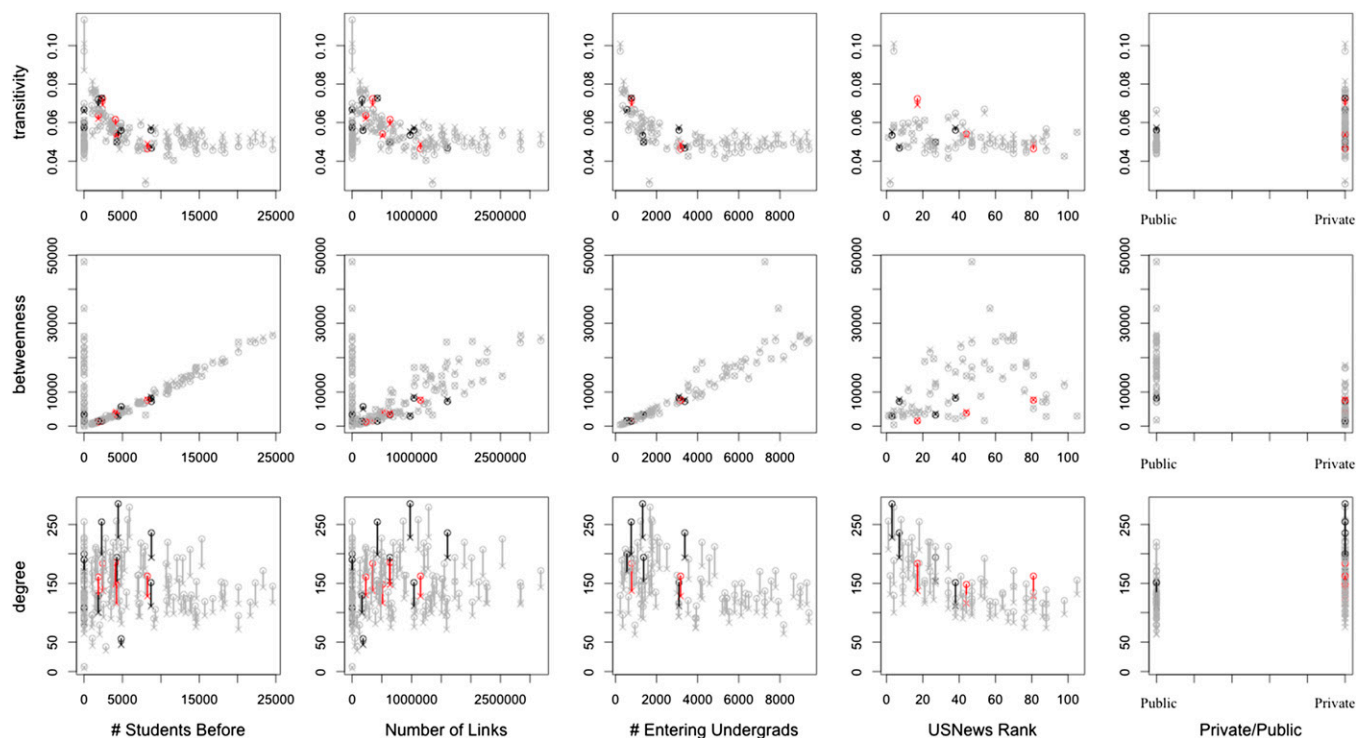


Fig. S3. Similar to Fig. S1 but evaluating the outcome variables 12 wk before and 12 wk after Hurricane Ike.

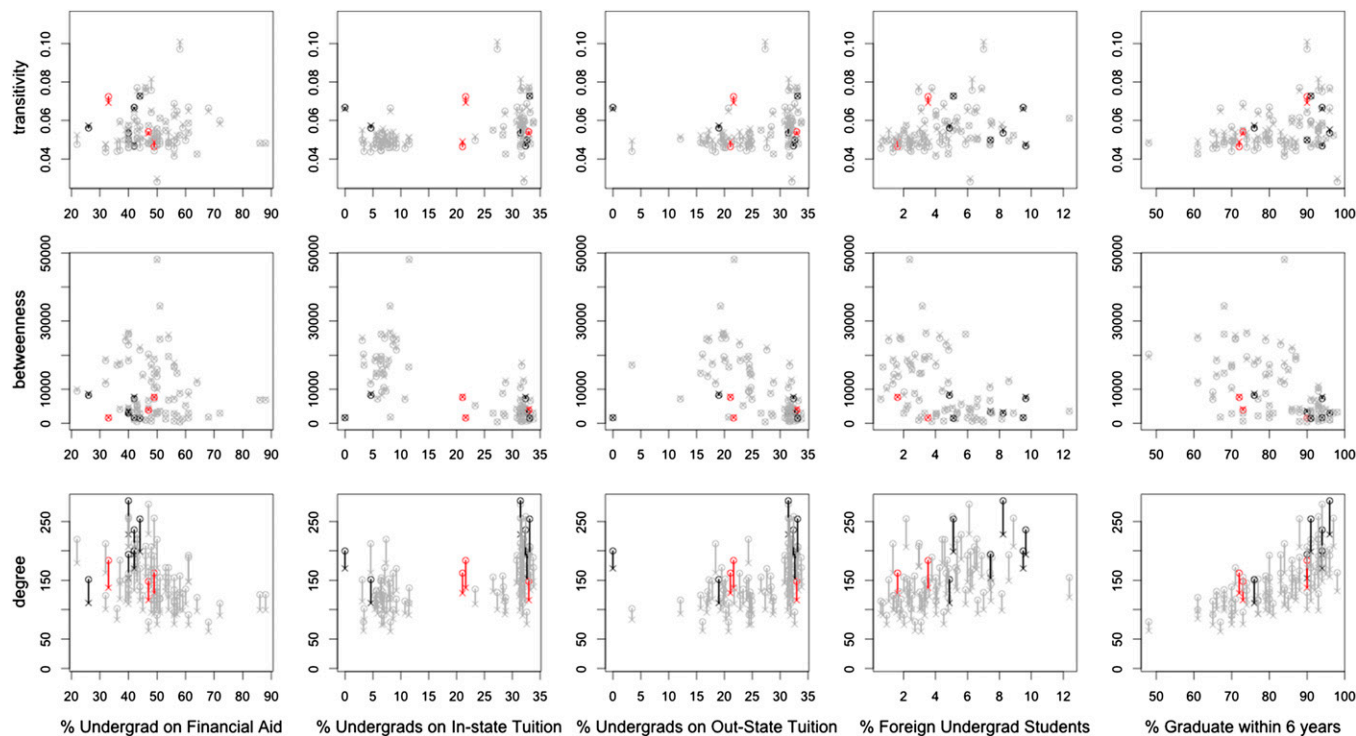


Fig. S4. Similar to Fig. S2 but evaluating the outcome variables 12 wk before and 12 wk after Hurricane Ike.

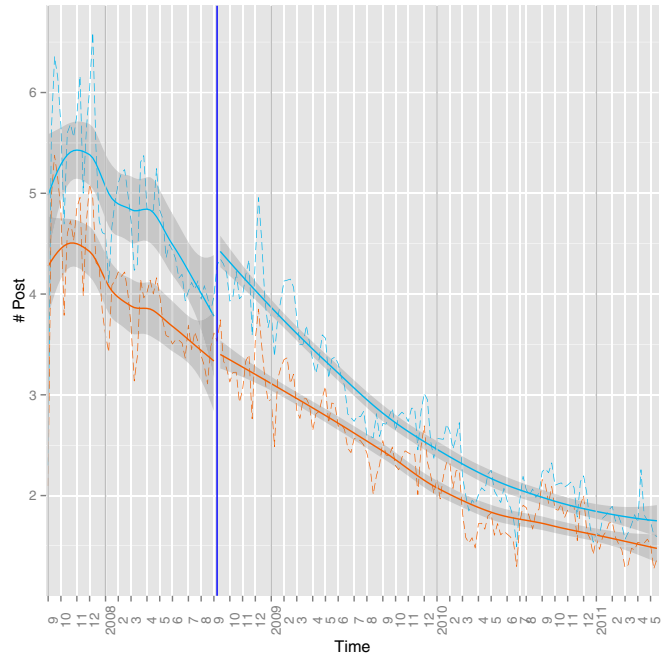


Fig. S7. The average number of posts per week in the treatment group (red) and control group (blue).

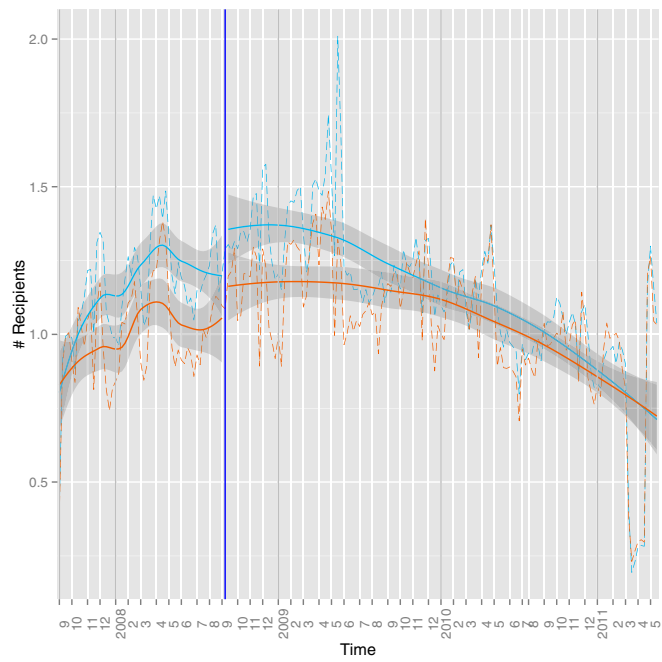


Fig. S8. The average number of recipients per week in the treatment group (red) and control group (blue).