

The Impact of International Virtual Exchange on Participation in Education Abroad

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Abstract:

International Virtual Exchange is gaining popularity as an innovative approach to providing international experiences to students, particularly in light of the COVID-19 pandemic. However, little research has been conducted on this unique teaching approach or how it fits into university comprehensive internationalization plans. In this paper we develop a simple theoretical model to explain the impact of International Virtual Exchange classes on student mobility. We use a linear probability model with a panel of 39,381 students to estimate the impact of International Virtual Exchange and foreign language courses on the probability of subsequent study abroad. Based on our preferred matching model, which accounts for observable differences in student characteristics, we find the likelihood a student will subsequently study abroad approximately doubles if they take International Virtual Exchange courses. While point estimates indicate a weaker impact among students of color and students of limited economic means, the results were not statistically significant.

Keywords: comprehensive internationalization, international virtual exchange, study abroad, higher education

Declarations:

No funding was received for conducting this study. The authors declare they have not conflict or competing interests. The dataset generated and analyzed during the current study are not publicly available due to concerns of student privacy. The coding use for analysis is available from the authors upon request.

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Introduction

Comprehensive internationalization is a strategic coordinated process that seeks to align and integrate policies, programs, and initiatives to position colleges and universities as more globally oriented and internationally connected institutions (ACE, 2019A). Hudzik (2011) defines comprehensive internationalization as a commitment, confirmed through action, to infuse international and comparative perspectives throughout the teaching, research and service missions of higher education. According to the internationalization case statement of the American Council on Education (2019B): “In order for the United States to have a truly world-class higher education system, colleges and universities must be globally engaged and prepare students to be citizens of a multicultural community both at home and in a globalized world. Institutions accomplish this by having a multi-dimensional, comprehensive strategy that includes internationalization at home and engagement with global issues and partners.”

Student mobility, both short-term faculty-led programs and more immersive semester- or year-long student exchange are often the most visible aspects of a university’s comprehensive internationalization strategy. However, other aspects of the plan can also be particularly impactful for students. International general education requirements, language studies, international courses within the disciplines, and co-curricular activities such as international research, internships or service-learning programs can also impart many of the same global competencies. In many cases these activities reinforce one another. For instance, Kato and Suzuki (2019) find that for Japanese students completing a short-term summer program encourages them to participate in longer-term exchange programs. This is widely consistent with observed anecdotal evidence across a range of universities in the United States (Scovel, 2015).

In the wake of COVID-19, internationalization at home strategies that are intentionally designed to that provide students with the opportunity to engage internationally while staying either on their local campus or at home are increasingly relevant and necessary to meet internationalization goals. In this paper we focus on the use of technology as a strategy for comprehensive internationalization. In particular, we are interested in how participation in International Virtual Exchange programming (IVE) affects students’ choices to subsequently participate in more immersive experiences abroad.

International Virtual Exchange

International Virtual Exchange (IVE), also known as Collaborative Online International Learning (COIL), Globally Networked Learning (GNL), and telecollaboration among other names, is a technology based international education approach that allows students around the world to have meaningful international exchange directly from their home campus. While there are various models of virtual exchange, within the virtual exchange community there is general

consensus surrounding basic features associated with IVE.⁵ First, it leverages technology to connect people from diverse cultural backgrounds. These connections may be conducted synchronously and/or asynchronously typically with one group in one country connecting with a second group in another country. Second, IVE focuses on collaborative interaction in the form of discussion and project-based learning where the students from each location must have significant interaction with each other to meet project or course goals. Simply having students from multiple locations simultaneously attending a lecture style course does not rise to the standard of being IVE. Third, while the actual topic of interaction may be anything and cultural competency may not be the content focus, IVE projects have the explicit objective of improving global competencies. Finally, IVE connections are sustained over time allowing participants to build rapport and understanding and employ the burgeoning intercultural skills that are developing from the continued interaction. IVE activities may be an entire collaborative course, modules embedded in a course, or extracurricular activities.

Theoretical background

While there is growing recognition of the value of IVE within comprehensive internationalization strategies (de Wit, 2016), research on the impacts of International Virtual Exchange is sparse, and investigations into how these types of programs may impact other international activities at the student level do not exist to our knowledge. Theoretically, there are two pathways through which IVE could impact student mobility, in particular. The first impact we call the *exposure effect*. Exposure to other cultures through IVE programming could act to increase students' interest in, and demand for, mobility programs. As an example of what we mean by the exposure effect, Goldstein and Kim (2006) show that students' interest in second language acquisition and degree of ethnocentrism contributes to their intent to study abroad. Similarly, Stroud (2010) reports that exposure to and interest in increasing understanding of other cultures contributes to study abroad participation among American college students. Finally, Salisbury, Paulsen and Pascarella (2011) show that an increase in diverse experiences increase survey respondents' intent to study abroad. In these seminal articles, more exposure to other cultures or cultural diversity expands interest in study abroad. Learning more about a culture from fellow students in another country via IVE could also reduce the anxiety associated with navigating another culture and open cognitive pathways to studying abroad that did not exist previously. That is, connecting with other students in another country may reduce fear of the unknown and allow students to visualize themselves in those cultures.

⁵ For more background, see: EVOLVE (<https://evolve-erasmus.eu/>); Virtual Exchange Coalition (<http://virtualexchangecoalition.org/>); SUNY COIL Center (<https://innovate.suny.edu/introtocoil/>); Stevens Initiative (<https://www.stevensinitiative.org/>); and The Collaboratory within the U.S. State Department Bureau of Educational and Cultural Affairs (<https://eca.state.gov/programs-initiatives/initiatives/collaboratory>) among others.

On the other hand, the exposure effect may have a contractionary impact on student mobility. For some students, exposure to another culture may actually increase the anxiety associated with traveling to and studying in another country. Topics discussed in an IVE course may highlight differences that students did not previously recognize, generating new uncertainties. For instance, based on the 2018 pre and post-course surveys of the semester-long IVE courses examined in this paper, approximately 20 percent of students report a lower score on Ang et al.'s (2007) cultural intelligence scale after taking the course than before. For these students, it is possible that exposure to other cultures via IVE has caused them to reevaluate their true ability to interact in a multicultural setting and thereby reduced the likelihood that they will engage in subsequent international activity. We cannot rule out the possibility that more exposure may highlight the fact that working across cultures can be complicated, which may subsequently dissuade students away engaging in these types of activities. We theorize, therefore, that the net impact of the exposure effect is ambiguous, as it may have a positive impact on some students and a negative impact on others, but the net impact is unknown.

The second pathway through which IVE could impact student mobility, we call the *substitution effect*. While many students understand the importance of the skills gained through cultural immersion, such as perspective-taking, openness and tolerance of ambiguity, they also understand that resources are scarce. Some students may view IVE as a low-cost substitute to an international mobility program. To the extent that these beliefs are held by students, participation in IVE could lower the probability they engage in a subsequent study abroad or cultural immersion program.

Given this theoretical framework, it is uncertain whether participation in IVE will lead to higher subsequent participation rates in international mobility programs or lower participation rates. The exposure effect could be positive or negative depending on a variety of factors, and the substitution impact is unambiguously negative; therefore, the net impact of participation in IVE on participation in international study is an empirical question – the one we investigate in this paper.

Institutional context

IVE is an emerging field that has seen tremendous growth in the last three years as institutions begin to recognize the value of the modality. Interest is likely to expand quickly in response to travel restrictions and uncertainties associated with the COVID-19 pandemic. While most institutions are just starting in this arena, there are a handful of universities that have mature IVE programs. This research was conducted at a university with an IVE program that started in 2004. The primary IVE activity is a full semester multidisciplinary course called Global Understanding (GU) that is offered through a variety of departments. In these courses, each class works synchronously with 3 internationally diverse institutions twice a week for 4

weeks each. Individual class-to-class links are primarily centered around student-led discussions of standardized topics including college life, family life and cultural traditions, bias and prejudices, and religion and meaning of life. Students also work asynchronously on collaborative projects with counterparts from partner universities. The majority of GU course meets the university's general education requirements for social sciences and satisfies the university's global diversity requirement.

In this paper we investigate the impact of taking the IVE Global Understanding course on the probability of engaging in subsequent student mobility, both in terms of short-term, faculty-led programs and longer-term, exchange programs. For comparison purposes we also estimate the impact of taking a foreign language course on the probability of engaging in subsequent student mobility. For many universities, foreign language programming is one of the more popular on-campus comprehensive internationalization strategies and therefore represents a good comparison.

Data

The data used for this study consists of a panel of students from the Fall 2008 semester until the Fall 2018 semester. The dataset begins with new freshman entering in the Fall 2008 semester, and new students are added to the sample as they enroll in subsequent semesters. Likewise, students leave the sample upon matriculation or termination of enrollment. Overall, the sample consists of 456,542 observations of 39,381 students enrolled at the university between 2008 and 2018. Importantly, the data contain a unique longitudinal identifier for each student allowing us to track students over time as they complete foreign language (FL) or Global Understanding (GU) courses. This feature of the data is crucial for our identification strategy which relies on estimating the increased likelihood of student mobility after completion of GU or FL in comparison to a control group of students who do not participate in GU or FL courses.

Summary statistics for the full sample are presented in column 1 of Table 1. Columns 2 and 3 show the summary statistics for the GU and FL treatment group, respectively, and columns 4 through 6 present sample averages for three potential counterfactual groups that we consider in our analysis. Overall, roughly 8.4% of students participate in study abroad, defined as short-term faculty-led programs abroad, or foreign exchange, defined as semester-long experiences at universities abroad, during their enrollment at the university. The majority of the student population identifies as white (70.9%) with an additional 15.2% identifying as African American. Female students account for roughly 59% of the student body population.

While socioeconomic data is not directly available at the student level, the data do contain a few rough proxies. First, approximately 40% of the student population is eligible for federal assistance through the Pell Grant program, indicating a low level of household income. The second proxy is based on county of residence. The state's counties are ranked in terms of

economic distress using a three-tier system, where Tier 1 is most distressed, and Tier 3 is least distressed. The rankings are based on unemployment, income, population growth, and property tax base.⁶ In terms of place of origin, the student body population of the university is roughly representative of the overall state population. Specifically, roughly 20% of the state's population lives in a Tier 1 distressed county, and 35% of the population resides in a Tier 2 county. Among the in-state students in our sample these percentages are 22% and 32%, respectively. These data are important in our analysis since many university policies and programs are evaluated internally by how they impact students from the most distressed locations.

Moving to columns 2-4 of Table 1, distinguishing by treatment group (GU & FL participants) and non-participating controls, we see a higher participation in study abroad or foreign exchange among GU (14.0%) and FL (16.4%) participants in comparison to non-participants (6.1%). Indeed, a naïve estimate of the impact of GU and FL courses can be calculated directly from the difference in these means, suggesting that GU and FL participation are associated with a 7.9 and 10.3 percentage point increase in international study, respectively. This naïve estimate, however, (1) does not account for the order of occurrence of GU, FL, and international study, and (2) does not address potentially important confounding characteristics between our treatment group and all remaining controls. The first issue suggests the naïve estimate may be biased upwards if some students participate in international study prior to taking GU or FL courses. With regards to the second issue, the potential bias could go in either direction, and the data do indeed suggest there are important differences between our treatment and control groups that should be considered in the statistical analysis. Specifically, GU and FL treatment groups are more likely to receive Pell grants, and have a higher share of African American students and women (65%) in comparison to the full control group in column 4. In addition, student athletes, who likely face more time constraints than non-athletes, account for a disproportionate 4.7% of GU participants in comparison to 2.9% of all control observations.

In order to address the potential bias from students with heterogeneous characteristics selecting into GU and FL courses, our preferred estimation technique employs a matching strategy to construct separate GU and FL counterfactual groups that more closely resemble each of the respective treatment groups on the observable characteristics. More specific information on the mechanics of the matching strategy is presented in the following empirical section. Columns 5 and 6 of Table 1 present the summary statistics for the GU and FL matched control groups, respectively. Importantly, the matched set of controls are more closely balanced with the GU and FL treatment groups along most of the observable characteristics in Table 1 suggesting they may serve as better counterfactuals in comparison to all controls if the heterogeneity in students selecting GU and FL courses is correlated with propensity for international study.

⁶ A full set of distressed county rankings are available online at the following: <https://www.nccommerce.com/grants-incentives/county-distress-rankings-tiers> (last accessed July, 2019).

Empirical Model and Results

In order to estimate the impact of GU and FL participation on subsequent education abroad, we first estimate the following student fixed-effects model:

$$Y_{i,t} = a + \beta_1 * GU_{i,t} + \beta_2 * FL_{i,t} + I_i + T_t + \varepsilon_{i,t} \quad (1)$$

In equation (1), $Y_{i,t}$ is the outcome consisting of an indicator variable equal to 1 if student i in semester t participated in international study. We estimate separate treatment effects for three outcomes of interest including study abroad, foreign exchange, and the combined effect of study abroad or foreign exchange. The variable $GU_{i,t}$ is an indicator variable equal to 1 for Global Understanding participants *after* completion of the GU course and equal to 0 otherwise. Likewise, $FL_{i,t}$ is an indicator variable equal to one post-FL course completion. As such, the key coefficients of interest are β_1 and β_2 measuring the impact of GU and FL courses on subsequent participation in international study. The regression also includes a full set of student (I_i) and semester (T_t) fixed effects to control for time-invariant student characteristics and differing trends in international study, respectively. Finally, equation (1) includes a random error term, $\varepsilon_{i,t}$, clustered at the student level to control for inter-temporal correlation within students.

Panel A of Table 2 presents the results from the model in equation 1 using the full set of all possible counterfactual control observations. Participation in GU courses is estimated to increase the likelihood of study abroad by 5.6 percentage points and increase the likelihood of foreign exchange by 1.0 percentage points. Overall, there is a 6.7 percentage point increase in international study associated with GU, with the 95% confidence interval ranging from a 3.7 to a 9.6 percentage point increase. Across the board, FL completion is estimated to have a slightly larger impact on the likelihood of international study, but the effects are not statistically different from those of GU at any conventional level of significance. Specifically, FL is associated with a 7.2 percentage point increase in study abroad, a 2.0 percentage point increase in foreign exchange, and a combined effect of a 9.2 percentage point increase in any international study. The 95% confidence interval shows that participating in an FL course increases the probability of engaging in some form of international study by between 7.5 and 10.9 percentage points.

The key identifying assumption of the baseline model results presented in Panel A of Table 2 is that treatment and control groups follow a common trend in the absence of any GU or FL participation. This assumption allows us to compare the before and after participation in international study among treatment and control groups in order to identify the causal effect of GU and FL participation as presented graphically in Figure 1. As discussed in the data section, there are significant differences among GU/FL participants and the set of all possible control observations in terms of race, gender, income (as proxied by Pell eligibility), and student athlete classification. If these heterogeneous students also have different time trends for international study activities, it can bias our estimates in an unknown direction. In order to ameliorate such

concerns of bias, we next employ a matching fixed effects estimator that chooses three non-participating control students for each GU and FL participant who are an exact match on initial enrollment semester and most closely resemble the treatment observations based on the following additional criteria: race/ethnicity, gender, county distress designation, citizenship status, SAT score, high school GPA, Pell eligibility, first-generation college student, student athlete, and fraternity/sorority membership.⁷ The matching algorithm first uses Probit to estimate a propensity score for GU participation for each of the 11 Fall semester start dates during the 2008 to 2018 sample period. We then choose three control observations with the closest propensity scores for each GU participant. The process is then repeated for FL participants. Finally, equation (1) is estimated using the matched sample and including separate time trends for the GU participants and their matched controls.

Results of the preferred matching fixed effects estimator are presented in Panel B of Table 2. In general, the GU and FL treatment effects are similar to those produced by the full sample and there is a slight narrowing of the differences between the effects of GU and FL participation using the matched sample. Specifically, GU courses are associated with a 6.4 percentage point increase in study abroad, a 1.3 percentage point increase in foreign exchange, and a 7.7 percentage point increase in either of these international study activities. The FL effects on the aforementioned activities are an increase of 6.6, 1.8, and 8.4 percentage points, respectively. Statistical tests for the equality of the GU and FL effects find no statistically significant differences in terms of the effects of the two courses on international study.

Self-selection bias

Based on our results, there appears to be a strong and statistically significant relationship between virtual exchange and foreign language study and students' subsequent study abroad decisions. While the matched fixed effects estimator reduces the impacts of varying observable characteristics on the dependent variable – the probability of study abroad – there still may be unobservable characteristics that are confounding our analysis. Specifically, it can be argued that interest in international or intercultural experiences is an unobserved variable that impacts both the decision to take courses like GU and FL and the decision to study abroad. While it is not possible to directly test that proposition with the historic data we collected, we did have an opportunity to conduct surveys of current students to determine whether such a pattern was observable.

As a follow up to this study, we surveyed three groups of current students using the Ang (2007) cultural intelligence (CQ) scale. The first group were taking a GU course, the second were

⁷ Most of the matching characteristics are included in Table 1, but our race/ethnicity categories include more detailed controls for Native American, Pacific Islander, Asian, Non-residents, and “other” in addition to white, black, and Hispanic.

studying abroad and the third group was a control group of randomly selected students. The results of these pre-treatment surveys showed that students participating in the GU course had a lower pre-course CQ score, both in the aggregate and across all four subscales, than either the control group or the group that studied abroad (Lee et al., 2020). These results provide evidence that the students who take GU courses are actually not more culturally adept than other students. In fact, they have less cultural fluency, as measured by the CQ scale, than a randomly selected student and far less cultural fluency than students who elect to study abroad. While not definitive, these results cast doubt on the notion that inherent interest in international study drives both the decision to take GU and to study abroad.

Treatment Heterogeneity

We next explore the possibility of treatment effect heterogeneity of GU and FL participation using the preferred matched sample. We ask, does the impact of GU and FL courses on the probability of subsequent international study differ across demographic groups? To answer this research question, equation (1) is modified as follows:

$$Y_{i,t} = a + \beta_1 * GU_{i,t} * X_i + \beta_2 * FL_{i,t} * X_i + I_i + T_t + \varepsilon_{i,t} \quad (2)$$

where X_i is a vector of variables measuring first generation college students, Pell recipients, race/ethnicity, citizenship status, gender, and distressed county designation. As indicated in equation (2) X_i is interacted with the $GU_{i,t}$ and $FL_{i,t}$ treatment period indicator variables to estimate heterogeneous effects of program participation across groups. In total there are six models estimated to separately control for each of the aforementioned time-invariant characteristics, and the remaining variables in equation (2) are as defined in (1) above.

The heterogeneous effects from equation (2) are presented graphically in Figure 2. Point estimates of the impact of GU on subsequent study abroad participation are larger for: first generation students than non-first generation students; non-Pell grant eligible students than Pell eligible students; out-of-state students than in-state students; females than males; and non-citizens than citizens. Point estimates of the impact of FL courses on study subsequent study abroad participation are larger for: non-first generation students than first generation students; females than males; and non-citizens than citizens. However, across most categories analyzed in Figure 2 it is worth pointing out that there is significant overlap of 95% confidence intervals. This suggests that while the treatment effect point estimates invariably differ across groups, we find little evidence to support statistically significant differences in group treatment effects.

There are, however, a few exceptions that bear mentioning. First, the estimated impact of GU and FL courses on Native American and Pacific Islander populations' propensity for international study is significantly lower than that of white students at the 10% confidence level or less. Native American GU and FL participants actually experience a decline in international study of 16.6 and 18.4 percentage points, respectively, but due to small sample size the effect is

statistically indistinguishable from zero. Similarly, international study among Pacific Islanders declines by 0.2 percentage points for FL participants and increases by 0.3 percentage points for GU participants, and these effects are also statistically indistinguishable from zero. By contrast, white students experience a 7.9 percentage point (95% confidence interval of 5.6 to 10.2) increase in international study from FL participation and an 8.2 percentage point (95% confidence interval of 4.3 to 12.0) increase from GU participation.

Second, for FL participants there is a significantly larger impact on international study among non-citizens in comparison to US citizens. Specifically, US citizens completing FL increase international study by 8.2 percentage points (significant at the 1% level), and non-citizen FL participants increase international study by 24.2 percentage points (95% confidence interval of 7.1 to 41.4). Finally, GU is estimated to have a significantly larger impact on out-of-state students (18.4 percentage points) in comparison to the least distressed tier 3 county students (a 4.7 percentage point increase), and FL is estimated to have a lower impact on tier 2 county students (6.0 percentage points) in comparison to those from tier 3 counties (a 9.8 percentage point increase).

Discussion and Conclusions

University international programs offices are charged with encouraging students to engage with the world in a variety of forms, including globally focused courses, foreign language acquisition, international research or community engagement activities, virtual exchange and short- and long-term study abroad programming. Often universities will couple internationalization at home strategies with attempts to engage students in immersive experiences abroad. In order to develop effective, appropriate, and strategic comprehensive internationalization plans it is important to understand how internationalization at home strategies can impact students' subsequent choices regarding more immersive activities.

In this paper, we develop a simple theoretical framework for understanding the impact of participation in an internationalization at home activity on the probability of engaging in more immersive activities abroad. In our model, *exposure* to another culture or cultures can have a positive or a negative impact on students' willingness to participate in education abroad. At the same time, students may feel international activities at home may serve as a *substitute* for activities abroad, thereby depressing interest in international study. Theoretically, then, it is unknown whether engagement in internationalization at home activities stimulate or depress immersive activities abroad. Here, we specifically test the impact of participating in foreign language study or international virtual exchange on the probability students engage in subsequent educational activities abroad, including both short-term, faculty-led programs and longer-term exchange programs. Based on previous research, the overall impact of foreign language study on

subsequent international study seems to be positive, but the overall impact of international virtual exchange programming on participation in international study is less well known.

In order to empirically assess the impacts of IVE and foreign language on international study we employ a fixed-effects estimator. The estimation strategy compares the change in individual study abroad participation for our IVE and foreign language participants (before and after IVE/foreign language class completion) to a control group of non-participants. Baseline results using our full sample of possible control observations suggest a 6.7 and 9.2 percentage point increase in international study among IVE and foreign language participants, respectively. Our preferred model then uses a subset of our control observations that demographically most closely resembles the IVE and foreign language participants.

Based on our preferred matched-sample model our results show that students who have taken an IVE course are roughly twice as likely to subsequently study abroad as those who do not take such courses. Evaluated at the sample means, the probability of studying abroad goes up from 6.4% to 14.1%, after the IVE “treatment” compared to demographically similar students who do not receive such “treatment”. Similarly, taking a foreign language course increases the probability of international study from 6.8% to 15.2% when evaluated at the sample means. These results imply that the exposure effect of IVE and FL are both unambiguously positive and larger in magnitude than the substitution effect. That is, for an average student, the exposure to another culture through GU and FL programming positively influences their interest in, and subsequent interaction with, other cultures more broadly. Furthermore, this positive impact is decidedly larger than the substitution effect students may feel having already exposed themselves to other cultures via GU or FL.

The second question we investigated in this paper related to the differential impacts that foreign language study and IVE programming have on various demographic groups. In order to investigate the existence of heterogeneous treatment effects across demographic groups we first interact our IVE and foreign language participation variables with a variety of demographic group classifications. We then employ an F-test for the pairwise equality of the IVE and foreign language effects on international study across groups. While our results did find differences in the point estimates of the effects across major demographic groups, we were not able to say with statistical certainty that IVE or foreign language study had larger impacts for groups typically underrepresented in terms of participation in international education.

These results have significant policy ramifications for universities interested in developing low-cost strategies for motivating students to study abroad or engage in more immersive longer-term international programs. Our results are encouraging for practitioners in the field who are interested in both promoting International Virtual Exchange as a method of internationalization at home with extensive benefits in its own right and supporting IVE as a gateway to further international activities. Relatively low cost IVE models, including

Collaborative Online International Learning, have the potential to provide the scaffolding that many students may need to encourage them to study abroad or engage in other formative, immersive experiences. Based on our results, foreign language study provides similar simulative effects, however an advantage of IVE over foreign language study in accomplishing the goal of advancing education abroad is that it can be incorporated as a new teaching modality in existing courses in a variety of disciplines, while adding new foreign language requirements may place strains on already tight curriculum plans.

Finally, it must be noted that despite every effort to make corrections by using the matching methods described previously, these results may suffer from selection bias if students select into IVE or foreign language courses based on intrinsic, but unobservable personal characteristics. If students are selecting into IVE or foreign language courses because of an inherent interest in other cultures, travel or study abroad that cannot be accounted for through demographic controls, then the impacts these types of courses have on subsequent international study probabilities will be inflated. However, based on subsequent surveys of IVE, study abroad, and a control group of students, the IVE group does not appear to be particularly inclined toward international education and, in fact, scored lower on one popular measure of cultural competency than either students preparing to study abroad or a control group of randomly selected students. Future research into this topic may involve supplementing students' demographic data with survey data that is able to tease out some of these otherwise unobservable drivers of interest in international study.

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Table 1. Summary Statistics

Variable Name	Mean (Std. Deviation)					
	Full Sample	GU Participants	FL Participants	All Controls	GU Matched Controls	FL Matched Controls
<i>Study Abroad</i>	0.0734 (0.261)	0.118 (0.322)	0.133 (0.340)	0.0552 (0.228)	0.0587 (0.235)	0.0609 (0.239)
<i>Foreign Exchange</i>	0.0113 (0.106)	0.0216 (0.146)	0.0308 (0.173)	0.00562 (0.0747)	0.00562 (0.0748)	0.00674 (0.0818)
<i>First Generation College Student</i>	0.167 (0.373)	0.176 (0.381)	0.180 (0.384)	0.163 (0.369)	0.174 (0.379)	0.178 (0.383)
<i>Pell Grant Recipient</i>	0.401 (0.490)	0.444 (0.497)	0.459 (0.498)	0.382 (0.486)	0.482 (0.500)	0.470 (0.499)
<i>Student Athlete</i>	0.0288 (0.167)	0.0473 (0.212)	0.0246 (0.155)	0.0286 (0.167)	0.0474 (0.213)	0.0289 (0.168)
<i>Fraternity/Sorority</i>	0.218 (0.413)	0.191 (0.393)	0.196 (0.397)	0.226 (0.418)	0.207 (0.405)	0.218 (0.413)
<i>White</i>	0.709 (0.454)	0.618 (0.486)	0.641 (0.480)	0.733 (0.442)	0.573 (0.495)	0.640 (0.480)
<i>African American</i>	0.152 (0.359)	0.214 (0.410)	0.197 (0.398)	0.135 (0.342)	0.244 (0.430)	0.199 (0.399)
<i>Hispanic</i>	0.0473 (0.212)	0.0511 (0.220)	0.0561 (0.230)	0.0447 (0.207)	0.0603 (0.238)	0.0593 (0.236)
<i>Male</i>	0.412 (0.492)	0.348 (0.476)	0.345 (0.475)	0.435 (0.496)	0.310 (0.463)	0.330 (0.470)
<i>Non-citizen</i>	0.0113 (0.106)	0.0197 (0.139)	0.0116 (0.107)	0.0105 (0.102)	0.0229 (0.150)	0.0144 (0.119)
<i>High School GPA</i>	3.609 (0.512)	3.613 (0.511)	3.588 (0.511)	3.615 (0.513)	3.659 (0.514)	3.625 (0.517)
<i>SAT Score</i>	1,047 (109.9)	1,043 (111.8)	1,056 (113.6)	1,044 (108.6)	1,052 (111.0)	1,059 (111.8)
<i>Tier 1 County</i>	0.189 (0.391)	0.180 (0.385)	0.175 (0.380)	0.194 (0.395)	0.177 (0.382)	0.172 (0.378)
<i>Tier 2 County</i>	0.275 (0.447)	0.283 (0.450)	0.277 (0.447)	0.274 (0.446)	0.293 (0.455)	0.281 (0.450)
<i>Out-of-state</i>	0.150 (0.357)	0.142 (0.349)	0.151 (0.358)	0.151 (0.358)	0.146 (0.353)	0.149 (0.356)
<i># of Obs.</i>	456,542	35,802	99,637	335,366	142,784	262,875
<i># of Students</i>	39,381	2,644	7,505	30,209	6,497	13,028

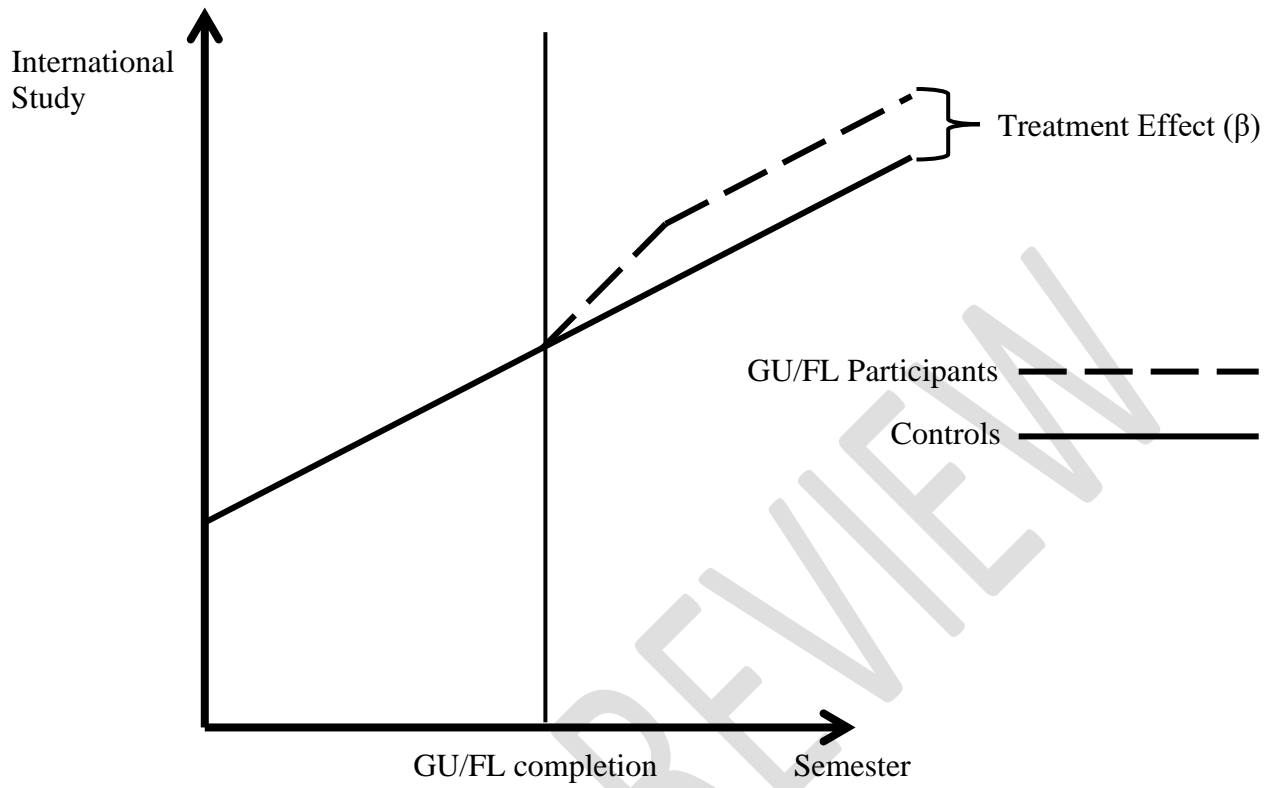
Table 2. Impact of Global Understanding and Foreign Language on International Activities

Variable Name	Dependent Variable		
	Study Abroad	Foreign Exchange	Study Abroad or Foreign Exchange
Estimated Coefficients (Std. Error)			
Panel A: Full Sample			
<i>Global Understanding</i>	0.056*** (0.014)	0.010* (0.006)	0.067*** (0.015)
<i>Foreign Language</i>	0.072*** (0.008)	0.020*** (0.003)	0.092*** (0.009)
Panel B: Matched Sample			
<i>Global Understanding</i>	0.064*** (0.014)	0.013** (0.006)	0.077*** (0.016)
<i>Foreign Language</i>	0.066*** (0.008)	0.018*** (0.003)	0.084*** (0.009)

Statistical Significance at the 10%, 5%, and 1% level are represented by *, **, and ***, respectively.

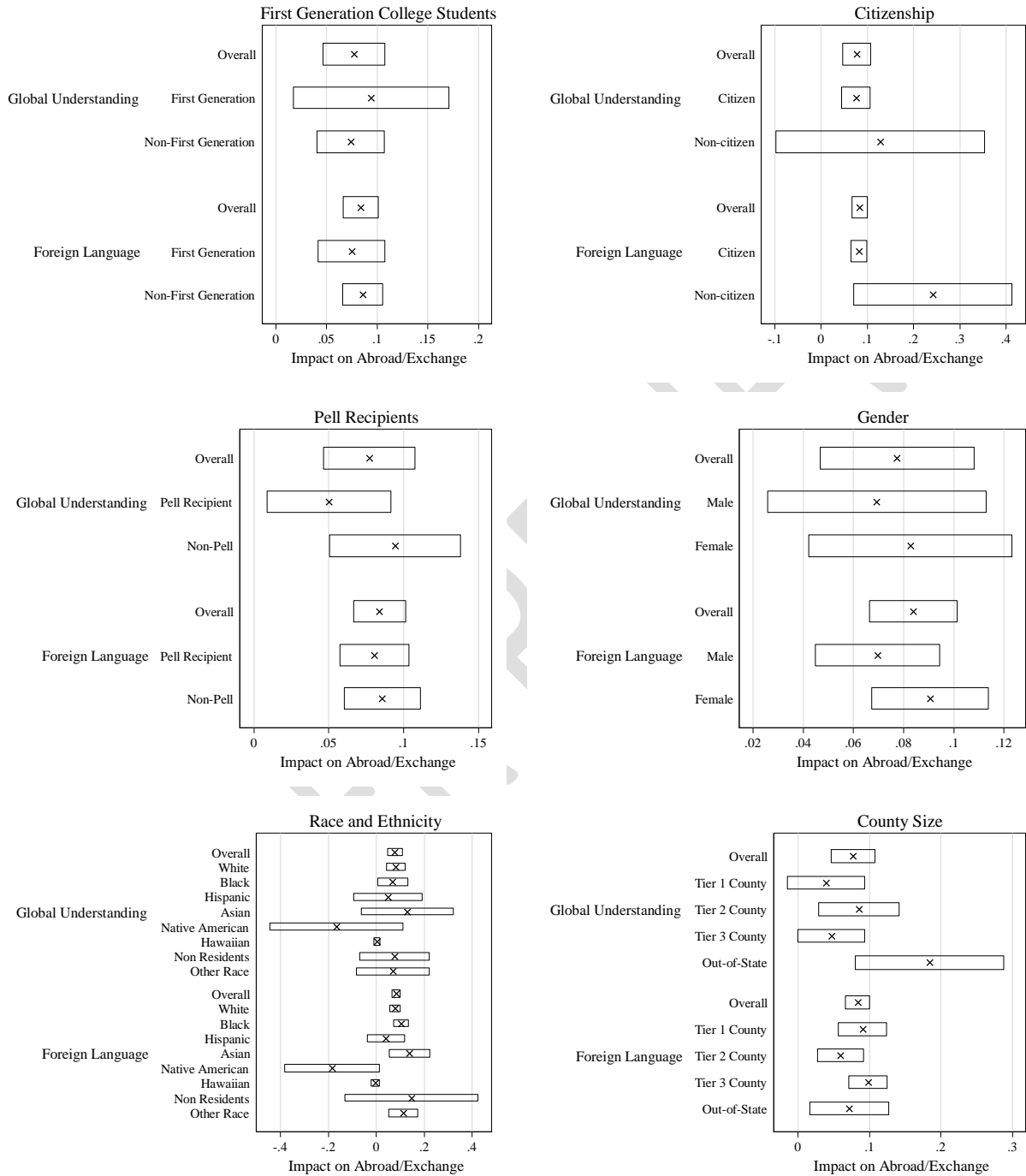
Note: Semester-specific treatment effects are evaluated at the mean number of semesters completed by students in the sample (11.59 semesters on average). As a result, coefficients can be interpreted as the percentage point change in the likelihood of Study Abroad and/or Foreign Exchange participation over the course of an academic career. Full Sample results include 456,542 observations of 39,381 students. Matched Sample Results include 429,599 observations of 25,602 students. Although not reported, each specification includes student, semester, and degree fixed effects. In addition, the matched results include separate time trends for Global Understanding and Foreign Language matched groups.

Figure 1.



UNDER REVIEW

Figure 2. Tests for Heterogeneity in Study Abroad/Foreign Exchange Participation by First Generation, Pell Recipients, Citizenship, Gender, Race/Ethnicity, and Distressed Counties.



Note: Results based on the matched sample of 429,599 observations of 25,602 students. Point estimates represented by the “x” marker, and bars represent 95% confidence intervals.