The Factors Affecting the Yield of International Students at a Private Liberal Arts University

Ayman Khondker
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Faculty Advisor: Nicole Simpson

This paper examines the factors that affect the enrollment of international students once they are admitted at a private liberal arts university. By using a Probit model on a panel dataset from one undergraduate institution's office of admissions to estimate the probability of enrollment, this paper finds that a higher cost of attendance and quality of applicants have a statistically significant and negative affect on the applicants' probability of enrollment. The presence of larger kinship networks also has a statistically significant and positive effect on enrollment probability. While the results do find some evidence of variation in enrollment probability and cost sensitivity across region and home country income categories, the results are mostly statistically insignificant and do not provide support for these as determining factors.

This study aims to look at the enrollment choices of international students at U.S. universities based on the institutions' financial aid policies by focusing on the factors that may affect the regional yield rates of international applicants. The yield rate in the context of student admissions is defined as the percentage of admitted applicants who end up enrolling at the institution. As universities become increasingly aware of the added benefits of a more diversified and international student body, it has become more important to model the yields of international students from applicant pools. While studies have been conducted to show that there are indeed strong correlations between student enrollment and institutional aid packages, there has been no substantial research done focusing specifically on the enrollment of international students. By controlling for factors such as the applicant's sex, SAT scores, regional income levels, the ratio of financial aid to the total cost of attendance, the applicants' region of origin and the existence of networks, this study will aim to understand the factors that affect the yield of international students at a private liberal arts university in the Northeast of the United States (henceforth referred to as College X). These findings will help similar institutions better target their international student populations.

Having a significant and diverse international student body is beneficial to the institution as well as the US economy as a whole. Research from NAFSA: Association of International Educators has shown that the 886,052 international students and their families at universities and colleges across the U.S. supported 340,000 jobs and contributed $26.8 billion to the U.S. economy during the 2013-2014 academic year alone (NAFSA, 2014). This is an 8.5% increase in job support and creation, and a nearly 12% increase in dollars contributed to the economy from the previous academic year (NAFSA, 2014). Furthermore, as pointed out by the same study,

international students not only contribute economic value, they can also build bridges between the U.S. and other countries; bring global perspectives into U.S. classrooms and research labs; support U.S. innovation through science and engineering coursework, making it possible for U.S. colleges and universities to offer these courses to U.S. students; and support programming and services on campus for all students by paying out-of-state tuition, funded largely by non-U.S. sources. Understanding the factors that can influence international student enrollment can thus be deemed important not only for the difference they bring to the academic experience at universities, but also for the economic value they provide to the country. Therefore, by analyzing the factors that affect the enrollment choices of accepted applicants at College X, my study can potentially help comparable universities understand what kind of factors can determine the composition of their international student body and achieve the optimum mix of international students.

The remainder of the paper is organized as follows. Section I gives a brief review of the existing literature on college enrollment. Section II describes the sample and explains the advantages and limitations of the dataset. Section III explains the hypotheses being tested. Section IV specifies the model to be used. Section V analyses and explains the results of the regressions. Section VI concludes.

I. Background and Literature review

The majority of studies on student college choice examine how select factors influence a student's decision to enroll, conditional on being admitted to the institution. Many of these studies find that the factors affecting students' enrollment decisions fall under two general

headings: academic, biographic, demographic, and institutional variables; or economic and financial variables.

For the most part, admissions researchers try to determine the effects of the latter set of variables by controlling for the former. Although most of these studies report a positive and statistically significant effect of financial aid on enrollment, the implied magnitude of the impact has varied from study to study: from negligible or small (Seneca and Taussig, 1987; Linsenmeier et al., 2006) to considerable (Ehrenberg and Sherman, 1984; Braunstein et al, 1999). The estimates differ for alternative samples of institutions and students. To be specific, the effect on yield of an increase in financial aid is likely to vary with the base tuition level for each institution, its prestige and financial aid policy, the characteristics of its students and its applicant pool, as well as the prestige, tuition, and aid policies of competing institutions.

Over the last three decades, many studies have been conducted to understand the student decision process. Ehrenberg and Sherman (1984) used admissions and financial aid data from Cornell University to demonstrate an optimal financial aid policy for the university. In their model they assume that the university derives “quality-units” of different categories (race, sex, ethnic status, income class, alumni relatives, etc.) of enrolled students, with the average quality of a category declining with the number admitted and the fraction of admitted students who enroll increasing with the financial aid package offered to the category. They used a Probit model with the logarithm of the likelihood of a student enrolling being the explanatory variable, and found that a $1,000 increase in the scholarship offer (in 1984 dollars) at Cornell will raise the yield on accepted applicants by roughly 9.5 to 10 percent in the privately funded divisions of the university and 4 to 4.5 percent in the publicly funded divisions.

McPherson and Schapiro (1991) estimate enrollment rates separately across public and private institutions for differences in time-series changes in net cost and other variables such as gender and income group of applicant using enrollment, tuition, and financial-aid data for population subgroups over the 1974-1984 period. They use this time frame to test the effects of introduction of the Basic Educational Opportunity Grant Program (later renamed Pell) that was enacted in 1974. The Pell program contributed significantly to a large increase in the amount of federal-sponsored need-based aid. Their findings show that increases in the net cost of attendance have a negative and statistically significant effect on enrollment for white students of low-income families, while they found no evidence in their data that showed the same correlation for high-income groups. This is corroborated by St. John (1990), who examined the influence that tuition charges and the amount of aid offered had on the enrollment decisions by college applicants in the high school class of 1982. He used a Logit model, where the outcome variable was student enrollment, and the explanatory variables included region, social background, ability/achievement, high school experience, postsecondary aspiration, and student aid. His study found that all forms of financial aid (i.e. grants, work-study, and loans) were effective in promoting enrollment, a $100 (in 1982 dollars) of aid of any form had a stronger influence on enrollment on a $100 reduction in tuition, and low-income students and students of racial minorities (Hispanics and blacks in this study) were more responsive to increases in grant aid than to increases in loans or work study, with higher-income students not being responsive to changes in aid amount.

Braunstein et al. (1999) found similar results in their analysis of the impact of demographic, socioeconomic, and financial factors on the enrollment behavior of accepted

college applicants. They used a model similar to St. John (1990), and broke down the explanatory variables into variables with dichotomous outcomes. Using this method, they found none of the demographic or social background variables were even remotely significant, but for every $1,000 increase in the amount of aid offered, the probability of enrollment increased between 1.1% and 2.5%. They also found a positive correlation for grants and loans, but work study did not entice prospective students unless it was packaged with some grant or loan assistance. Consistent with the above discussed literature, upper-income applicants were less likely to enroll at their institution regardless of financial aid incentives.

As noted earlier, findings by Seneca and Taussig (1987) on student enrollment at Rutgers differ from the above research. Though they assume that there are no effects of the race and ethnicity of the effect on enrollment probability, their study differs from the above accounting for alternative universities which had also accepted the applicant. Their results showed that the effect of cost of attendance on enrollment, while statistically significant, are not so economically. They hypothesize that this might be due to the fact that Rutgers tuition is low in absolute amount and also low in comparison to tuition levels at the schools with which Rutgers competes for students. Van der Klaauw (2002) also noted that it is essential to control for the alternative choices a student might have when making their enrollment decisions. Using a quasi-experimental regression-discontinuity approach, he shows that there is a statistically significant correlation with student yield and college financial aid.

Linsenmeier et al. (2006) find similar results. They look at the change in financial aid policy by a university which involved a shift from financial aid to low-income students from one which consisted of grants, loans, and campus jobs to one where the entire aid package was

given through grants. They implemented a difference-in-differences approach to study the impact of this policy change on the probability that admitted low-income students enroll, and found that the program increased the likelihood of matriculation by low-income students by approximately 3%, although the effect was not statistically significant. However, they found that the effect among low-income minority students was between 8-10% and statistically significant at the 10% level, showing that it is important to control for both ethnicity as well as income levels of the households of applicants.

Kim et al. (2009) tackle this issue of racial and ethnic differences on the elasticity of the yield to different types of financial aid. They calculate the probability that an applicant will receive each of the following types of aid – grant, loan, work-study, and no aid. Using this as a basis, they go through the entire process of college application and make binary outcome models to estimate the probabilities of individual student application, admission, and enrollment into their institution using dummy variables to control for type of financial aid, as well as variables that include personal and academic characteristics, family socio-economic characteristics, and institutional characteristics. They found that students from different race and income groups had differential responses to aid packages in their application and enrollment decisions depending on their levels of aid expectations. In application behavior, Asians at all income levels were expected to increase their likelihood of application at a greater rate in response to an increase in their aid expectations than other racial groups. Their simulations also indicated that enrollment probabilities declined more for African American and Hispanic students than whites and Asians when they expected to receive financial aid but do not. Kim (2012) further explored the relationship between state financial aid policies and

postsecondary enrollment for high school graduates. By utilizing an event history modeling for a nationally representative sample from the National Education Longitudinal Study (NELS:88/2000) in addition to state-level policy variables, this study examined how state aid policies differentially affect students' postsecondary enrollment choices depending on their family income and race/ethnicity between the years 1992 through 2000. The findings showed there was a clear and consistent gap in college enrollment for students who are from different income and race/ethnic groups, and that changes in state financial aid policy are significantly related with the type of institutions a student attends across income and racial groups.

In terms of differential financial aid policies that might affect yield rates and college attendance, Dynarski's (2000) study on the effects of Georgia's HOPE Scholarship Program on the college attendance rate in the state. Her difference-in-difference analysis showed evidence how that specific scholarship program may have widened the gap in college attendance between blacks and whites, as well as between those of low- and high-income families, specifically lowering attendance for blacks and people of low-income households. Similar to Dynarski (2000), Kane (2007) examines the effect of the D.C. Tuition Assistance Grant Program on D.C. residents, and found a large increase in the number of enrollments in public institutions as a result and, Gross et al. (2013) found that State grants, primarily need-based, played a significant if not modest role in encouraging persistence among Latino students, more so than peers from other racial/ethnic groups.

Finally, Person and Rosenbaum (2006) have recently applied the concepts of chain migration put forward by MacDonald & MacDonald (1964) and kinship networks as explained by Choldin (1973) to a theoretical framework for explaining college choice among immigrant

students. Analyzing ongoing enrollment patterns among other students in their social network, they found that established networks of social contacts for Latino students are particularly important in obtaining information about college but, correspondingly, that information gaps are obstacles for these students in obtaining widespread access to and success in college. Using a similar chain migration perspective, Perez and McDonough (2007) argue that access to strong networks and social capital provides greater exposure to a range of college choice options, whereas social networks that are limited in scope can significantly reduce a student's postsecondary options.

The variables controlled that are common across all studies are the sex and standardized test scores. While Seneca and Taussig (1987) imply that the race or ethnicity of the applicant does not have statistically significant effects on the enrollment, later studies, such as the ones by Dynarski (2000), Kim et al (2009) and Gross et al (2013) do show that race and ethnicity can have an effect on the applicants' responsiveness to financial aid.

To sum up the existing literature, the factors identified as affecting enrollment can be summarized as follows:

- Price effect: As the price of college goes up, the probability of enrollment tends to go down. Additionally, there are different levels of enrollment sensitivity between changes in tuition and changes in various forms of financial aid
- Difference among income groups: Lower income students being more sensitive to changes in tuition and aid than are students from upper income families

- Difference among ethnic groups: Minority students are more sensitive to changes in tuition and aid than are white students.
- Network effect: The existence of kinship networks are correlated with a positive effect on the probability of enrollment.

II. Data

Data sources in the previous literature have varied from admissions data (Ehrenberg and Sherman, 1984; Braunstein et al, 1999; Van der Klaauw, 2002) to Federal and State-level data (McPherson and Schapiro, 1991; Gross et al, 2013) and combinations of the two (Kim et al, 2009) along with College Board data (Linsenmeier et al, 2006). There are also studies that use student surveys and privately collected data (Seneca and Taussig, 1987); the limitations include:

a) Admissions Data: omitted variables bias in the form of lack of data on the applicants' alternatives to the institution being studied (Van der Klaauw, 2002). Specific information regarding the alternatives would include prestige of alternative institution(s), relative sizes of financial aid packages (Seneca and Taussig, 1987), and the applicants' personal qualitative preferences for alternative institutions.
b) State-level data: While this kind of data makes it easy to view the overall change in yields as a result of state policy on institutions (specifically state-sponsored institutions), it fails to provide insight into the micro-variables such as sex and individual institutional preferences on institutional yields.

Some of the studies have incorporated both datasets, as noted, and may thus have more accurate results for the effects of financial aid on yield. The data used for this study is

panel data obtained from the Office of Admissions of College X, which is a small Liberal Arts College in the Northeastern US. It has a small student body of less than 3000, with roughly 10% international students. The data contains acceptance and enrollment data as well as valuable information such as applicant's sex, standardized test scores, and country of origin. While it contains information on 10,462 applicants over the period 2005-2014, the applicants of interest are the ones who got accepted, which account for 1,384 of applicants, of which 485 chose to enroll.

There are two types of applicants in the dataset that I need to account for – student-athletes and special scholarship awards. Student-athletes at College X have to apply as early decision applicants, which means that, if they get accepted, they must enroll at College X. As they have a 100% yield, they don't really explain a student's enrollment decision, therefore I drop the 90 international student athletes from the dataset. As for students who receive special scholarship awards, their entire financial aid package is grant-aid, which might make enrollment more attractive for them as compared to a fellow applicant who got the same amount of aid but as a combination of grant and work-study. However, applicants who receive these awards are amongst the "top 200 applicants" that the Office of Admissions received that year, therefore it can be assumed that they have desirable academic and extracurricular qualities, making it more likely for them to have gotten accepted at comparable or better institutions. To that end, I code a dummy variable *alumni* for these award recipients and add the variable to my model to account for these students who might have a more desirable alternative to College X.

As already discussed, financial aid reduces the cost of attendance. Using data on the total cost of attendance obtained from the Admissions office, I create a variable that shows the

ratio of financial aid to total cost of attendance. This takes out the problem of looking at nominal versus real dollar values of tuition, as the aid ratio variable essentially shows what fraction of the total cost of attendance is being met by financial aid. Table 1 reports the breakdown of the cost of attendance over the ten years of the study, as well as the average aid granted to accepted international applicants.

Table 1: Breakdown of Cost of Attendance at College X, 2005-2014

	2005-06	**2006-07**	**2007-08**	**2008-09**	**2009-2010**
Tuition	$32,885.00	$34,795.00	$37,405.00	$39,275.00	$40,690.00
Fees	$220.00	$235.00	$255.00	$270.00	$280.00
Room	$3,895.00	$4,120.00	$4,430.00	$4,650.00	$4,815.00
Meals	$4,170.00	$4,410.00	$4,730.00	$4,975.00	$5,155.00
	$41,170.00	$43,560.00	$46,820.00	$49,170.00	$50,940.00
Personal/Books	$1,830.00	$1,840.00	$1,880.00	$1,920.00	$1,940.00
TOTAL	$43,000.00	$45,400.00	$48,700.00	$51,090.00	$52,880.00
Avg Aid	$21,658.80	$26,812.90	$21,837.20	$29,243.00	$22,858.50
Avg Aid Ratio	0.5037	0.5906	0.4483	0.5724	0.4323

	2010-11	**2011-12**	**2012-13**	**2013-14**	**2014-2015**
Tuition	$41,585.00	$42,625.00	$44,330.00	$46,060.00	$47,855.00
Fees	$285.00	$295.00	$310.00	$320.00	$320.00
Room	$4,920.00	$5,140.00	$5,345.00	$5,555.00	$5,775.00
Meals	$5,270.00	$5,510.00	$5,730.00	$5,955.00	$6,195.00
	$52,060.00	$53,570.00	$55,715.00	$57,890.00	$60,145.00
Personal/Books	$1,970.00	$2,000.00	$2,030.00	$2,160.00	$2,260.00
TOTAL	$54,030.00	$55,570.00	$57,745.00	$60,050.00	$62,405.00
Avg Aid	$18,264.30	$15,595.50	$14,744.90	$14,561.90	$15,743.30
Avg Aid Ratio	0.3380	0.2806	0.2553	0.2425	0.2618

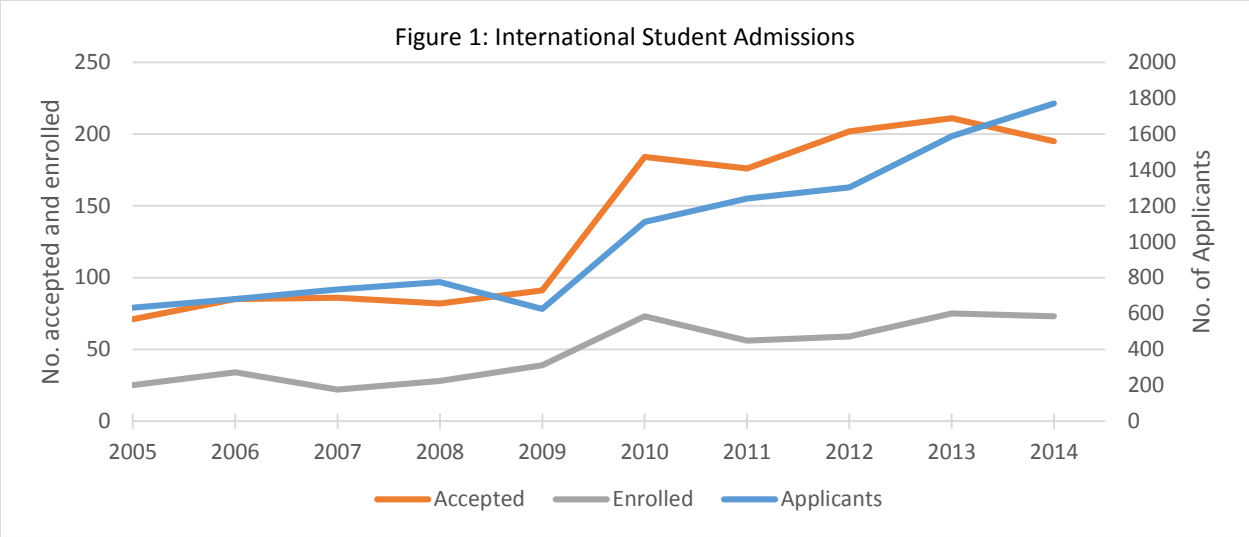
Unfortunately for the dataset, the financial aid variable encompasses not just grant-aid but also the anticipated work-study remuneration the applicant would receive once enrolled if he or she chooses to get an on-campus job. There is also an additional dummy variable *askaid* that is equal to 1 if the applicant has asked for aid in their application, and zero otherwise.

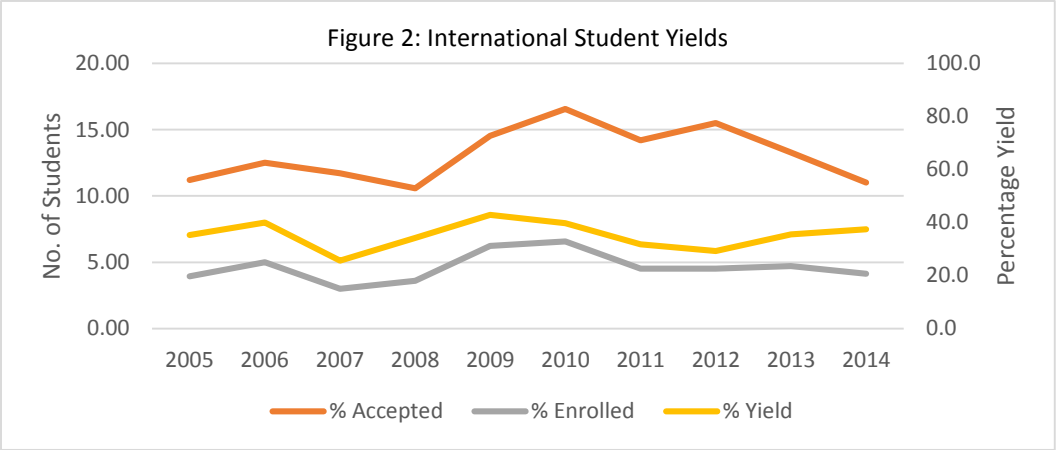
Students who ask for aid may or may not get aid granted upon admission, and it may or may not cover the full cost of attendance.

The other factors, such as SAT scores and the applicant's sex, need also be controlled as they may be correlated with the yield of students. I code the applicant's sex as a dummy variable equal to 1 if the applicant is female and 0 otherwise. Some of the applicants in the dataset took the ACT tests instead of the SATs. To account for this, I used the ACT-SAT concordance table provided in the ACT website[1] to convert those applicants' ACT scores to SAT. Additionally, I create a set of continuous stock variables, which accounts for the number of enrolled students at College X from the applicant's home country from the previous year, the previous two years, the previous three years, and the previous four years. This is created to test for the significance of networks in influencing an applicant's enrollment decision.

As seen in Figure 1, there is a clear increase in the number of applicants, as well as admitted and enrolled international students over time. This is a reflection of the efforts taken by College X to market itself to a larger international student body, and attract more applications. While the numbers have definitely been going up, the yield of international student enrollment has stayed within 30-40% during this time, as shown in Figure 2. This is a factor of the yield targeting by Admissions, and is a policy undertaken by many undergraduate institutions.

[1] http://www.act.org/solutions/college-career-readiness/compare-act-sat/





From the reported country of origin of the applicant, I create two sets of dummy variables: one for all the different regions and another for the income levels of the applicant's countries, and use dichotomous outcomes for the factors that have binary choices (regional groupings for countries are provided in appendix B and income level groupings are provided in appendix C). These dummy variables are constructed using the World Bank Database[2], along with the Standard Country and Area Code Classifications[3] from the UN Statistics Database. The

[2] World Bank List of Economies (July 2014)
[3] http://millenniumindicators.un.org/unsd/methods/m49/m49regin.htm

region dummies will be expected to account for shared characteristics of different regions, while the income dummies will act as a proxy variable for the applicant's household income, as unfortunately the admissions data does not report the applicant's true household income. Investigating the drivers of these regional changes and trying to discern how much of this can be explained by changes in financial aid would thus be the basis of this study.

Tables 2 and 3 show the variation in applicant characteristics by region as well as by home country income level. Both these tables show that there exists a variation overall in the applicant cohorts by these regional and income classifications, as well as the average aid received by the accepted applicants, and the academic quality of applicants as measured by SAT scores.

There are definitely some limitations to this dataset - there are certain unobserved variables such as the student's other options that can also play a part in a student's decision to enroll at an institution (Van der Klaauw, 2002). Of the applicants in the dataset, 5% reported the institution they chose to attend other than College X, but that accounts for 40% of admitted applicants. This is however still not completely helpful, as just knowing the alternate institution may not be enough to explain student choice. The choice will eventually boil down to whether the other institutions provided more attractive aid packages, information that is not available in the dataset.

Table 2: Summary of Applicant Characteristics by Region

Region	tot. obs.	aidamount	aidratio	alumni	convertedSAT
Caribbean	45	32816.4	0.6476	0.2083	1414.583
East Asia	523	9356.22	0.1709	0.1377	1458.812
Europe	24	27198.2	0.5026	0.1667	1430.417
European Union	146	24130.1	0.4719	0.3401	1437.891
Latin America	81	16113.7	0.3147	0.1235	1364.074
Middle East	5	40315	0.6833	0.0000	1368
North Africa	12	34411.3	0.5889	0.1667	1405
North America	119	7822.03	0.1493	0.1513	1387.059
Pacific	12	7432.33	0.1348	0.1667	1417.5
South Asia	144	21995.3	0.4150	0.2014	1457.917
Southeast Asia	75	33977.3	0.6189	0.2667	1469.6
Sub-Saharan Africa	109	40864.4	0.7472	0.1364	1382.273

Region	Female	Stockyear1	Stockyear2	Stockyear3	Stockyear4
Caribbean	0.54	0.53	0.87	1.15	1.64
East Asia	0.59	12.42	21.78	30.02	36.51
Europe	0.46	0.04	0.05	0.06	0.12
European Union	0.46	0.58	1.15	1.57	1.81
Latin America	0.53	0.05	0.11	0.16	0.22
Middle East	0.20	0.00	0.00	0.00	0.00
North Africa	0.50	0.00	0.00	0.00	0.00
North America	0.58	3.70	7.50	11.46	15.55
Pacific	0.42	0.17	0.33	0.73	0.80
South Asia	0.36	2.04	4.06	5.97	7.78
Southeast Asia	0.53	2.03	3.75	5.77	7.98
Sub-Saharan Africa	0.39	0.70	1.34	1.83	2.22

Table 3: Summary of Applicant Characteristics by Country Income Level

Income Level	aidamount	aidratio	alumni	convertedSAT
OECD	10259.3	0.1902	0.1549	1419.738
high income	19466.6	0.3810	0.0986	1416.479
upper middle income	15060.5	0.2858	0.1883	1449.29
lower middle income	26935.1	0.4992	0.2227	1438.242
low income	42781.6	0.7871	0.1633	1422.347

Income Level	sex	Stockyear1	Stockyear2	Stockyear3	Stockyear4
OECD	0.52	2.85	5.99	8.96	11.20
high income	0.54	0.34	0.46	0.55	0.63
upper middle income	0.57	12.20	21.58	30.37	38.02
lower middle income	0.46	1.69	3.29	4.96	6.64
low income	0.31	0.90	1.75	2.28	2.76

III. Enrollment Theory

The existing literature provides the basis for the hypotheses that I test in my regressions. The main hypotheses help to establish the significance of a number of factors that affect international student enrollment, and are outlined as follows:

Hypothesis 1 (H1): The probability of enrollment increases as the cost of attendance decreases

By looking at international student applications at College X over the last 10 years, and controlling for factors such as the applicants' own academic abilities, their region of origin, the income level for their country of origin, the presence of country networks, and their sex, I expect to find that that lowering the cost of attendance will be positively correlated with student enrollment as this lowers the cost of attendance for accepted students. Therefore as the *aidratio* variable goes from 0 (indicating none of the cost of attendance is paid for by College X) to 1 (indicating that the entirety of the cost of attendance is paid for by College X), I expect to find that the accepted student will tend to be more likely to enroll.

Hypothesis 2 (H2): The existence of country networks tends to increase the probability of enrollment

As an extension to the studies by Person & Rosenbaum (2006) and Pérez & McDonough, 2008) on the network effect, having a larger number of current students at the institution from the applicant's home country should be associated with an increase in the applicant's probability of enrollment. A larger network of countrymen would not only create more publicity for the institution in question in the applicant's native country, but also provide incoming students with a support group that can help them adjust to their new lives in the US in general

and in the institution in particular. Therefore, I hypothesis that a larger network, or stock of current students from a specific country would increase the probability of enrollment of an applicant coming from that same country.

Hypothesis 3 (H3): the probability of enrollment varies by region

Extrapolating from the findings by Kim et al. (2009), Dynarski (2000) and Gross et al. (2013) where it was shown that, while controlling for cost of attendance, there are differences in enrollment probabilities between different ethnic minorities, I expect to find a regional variation in the probability of enrollment. The logic here is that, similar to ethnic groups, who share common social and cultural characteristics and inclinations, there will be shared social and cultural characteristics for regional groups, in addition to amenities and difficulties that are specific to particular regions. For example, residents of European Union countries might be less likely to enroll at College X - or any US college for that matter – compared to residents of European countries which are not in the EU. Some explanations could be that being a citizen of the EU provides students with massive subsidies for higher education, or that non-EU country citizens would be more likely to want to settle in the US due to greater post-graduation opportunities compared to their home countries, making entry into US institutions like College X seem like a more desirable decision.

Hypothesis 4 (H4): The changes in the probability of enrollment with respect to changes in the cost of attendance vary by region

This is a combination of H1 and H3, and essentially hypothesizes that, controlling for factors such as the applicants' sex, academic scores, and whether they asked for aid, different

regions will respond differently to the changes in cost of attendance. In other words, I expect to see that regions such as East Asia and South Asia, for example, will respond differently to changes in the *aidratio*.

Hypothesis 5 (H5): There exists a variation by the income level of an applicant's country on the probability of enrollment

In line with St. John (1990) and Linsenmeier et al. (2006), I expect to see applicants coming from countries with different income levels to have different effects on the probability of the applicants' enrollment. More specifically, I expect to find that different income levels will have different responses to the changes in the cost of attendance, with lower income country applicants (such as an applicant from Bangladesh, or Kenya) to be more sensitive to changes in the cost of attendance as compared to applicants from higher income countries (such as Canada, or the Republic of Korea).

By testing for these hypotheses, I aim to determine how analogous the decision-making process for the international applicant is compared to the general US admissions process described in the past literature. The following section explains the empirical models used to test these hypotheses.

IV. The Empirical Model

The methodology used in admissions data analysis makes use of the binary outcome of an applicant's enrollment decision. Accordingly, most of the previous studies have analyzed panel data and used Linear Probability Models (Seneca and Taussig, 1987; St. John, 1990), as well as Logit (Braunstein et al, 1999) or Probit (Ehrenberg and Sherman, 1984; Dynarski, 2000;

Linsenmeier et al, 2006) models where the outcome variable is the probability of enrollment. Studies that had cross-sectional data over time used discrete-time models (Kim, 2012; Gross et al, 2013). The dataset used in my analysis is panel data, and to that end I use a Probit model for my regressions, and report Average Partial Effects (APE) in my regression results.

My preliminary model will be a Probit model with year fixed-effects specified as follows:

$$En_i = \alpha + \beta_1 ACAD_i + \beta_2 DEMO_i + \beta_3 AID_i + \varepsilon_i \qquad (1)$$

where En_i is the probability that student i will choose to enroll at the institution; $ACAD_i$ is a vector of academic ability, such as the applicant's standardized test scores, and whether they were the recipient of the alumni award; $DEMO_i$ is a vector of student demographic characteristics such as their sex and the size of the kinship network; AID_i is a vector of cost of attendance characteristics, which include *askaid* and *aidratio*.

I add on the dummy variable for region and income in separate steps, as specified in models (2) and (3) below:

$$En_i = \alpha + \beta_1 ACAD_i + \beta_2 DEMO_i + \beta_3 AID_i + \beta_4 REGION_i + \varepsilon_i \qquad (2)$$

$$En_i = \alpha + \beta_1 ACAD_i + \beta_2 DEMO_i + \beta_3 AID_i + \beta_4 INCOME_i + \varepsilon_i \qquad (3)$$

Where $REGION_i$ represents the region dummies and $INCOME_i$ represents the income dummies. Finally, to understand the variation in the differences in the sensitivities to changes in the cost of attendance by region and income levels, I specify the final two models as follows:

$$En_i = \alpha + \beta_1 ACAD_i + \beta_2 DEMO_i + \beta_3 AID_i + \beta_4 REGION_i + \beta_5 REGION_i * aidratio_i + \varepsilon_i \qquad (4)$$

$$En_i = \alpha + \beta_1 ACAD_i + \beta_2 DEMO_i + \beta_3 AID_i + \beta_4 INCOME_i + \beta_5 INCOME_i * aidratio_i + \varepsilon_i \qquad (5)$$

Where I separately interact *REGION* and *INCOME* with the *aidratio*. These models are then used to test out the hypotheses I outlined in Section III. The regression results and their analyses are provided in the following section.

V. Analysis of Results

The first set of regressions is based on equation (1), and does not include any region or income dummies. The results are reported in Table 4, and provide support for H1 and H2. As the *aidratio* variable is a continues variable that goes from 0 to 1, with zero being no aid and 1 being cost of attendance fully covered by aid, I interpret the coefficient on *aidratio* by explaining the effect of a 0.1 increase in the ratio (or a 1/10 increase in aid as a fraction of total cost of attendance). Across the five variants of the basic model, the effect of an increase in *aidratio* of 0.1 is associated with around a 6% increase in the probability of enrollment, and this is statistically significant. Also, if the applicant had asked for aid in their application, their probability of enrollment goes down by around 20%. Both of these combine to support H1, as they show that the probability of enrollment is directly related to the cost of attendance: *aidratio* shows the direct relation, whereas *askaid* gives a more nuanced explanation, as students who asked for aid are the ones most likely to need aid, and might still not enroll if they don't get the total amount of aid they asked for. The stock variables also are positive and statistically significant, which provide evidence for H2 and show that students would be more likely to enroll if there is a larger kinship network already enrolled at College X. While a unit increase in the stock of students from the year immediately before the applicant class by 1% on average, the economic significance of the networks goes up as we account for the stock of students from the previous two years, previous three years, and previous four years.

Table 4: Probit Model APE estimates, excluding region and income dummies

VARIABLES	(1) *En*	(2) *En*	(3) *En*	(4) *En*	(5) *En*
aidratio	0.638***	0.621***	0.608***	0.594***	0.663***
	(0.0624)	(0.0620)	(0.0632)	(0.0634)	(0.0671)
askaid	-0.305***	-0.212***	-0.199***	-0.168***	-0.223***
	(0.0545)	(0.0566)	(0.0579)	(0.0582)	(0.0613)
convSAT	-0.00121	-0.00423**	-0.00423**	-0.00497***	-0.00514***
	(0.00163)	(0.00177)	(0.00184)	(0.00190)	(0.00200)
alumni	-0.125***	-0.105***	-0.0961**	-0.0921**	-0.0999**
	(0.0377)	(0.0387)	(0.0398)	(0.0416)	(0.0440)
female	-0.0306	-0.0506**	-0.0567**	-0.0572**	-0.0553**
	(0.0243)	(0.0247)	(0.0255)	(0.0265)	(0.0274)
OneYearStock		0.0111***			
		(0.00179)			
TwoYearStock			0.00700***		
			(0.00110)		
ThreeYearStock				0.00562***	
				(0.000829)	
FourYearStock					0.00460***
					(0.000706)
Observations	1,299	1,240	1,163	1,080	1,001

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Time Fixed-Effects not reported

These results stay similar throughout all the regressions, and provide strong evidence for both H1 and H2.

Table 5 reports the second set of regressions based off equation (2), and provide some support towards H3. This set of regressions, and the ones following it, highlight one major drawback in the panel data: the small sample size of the observations. For this reason, a lot of the coefficients on the region dummies progressively lose significance as the stock variables are added from columns 2 through 5 of Table 5. However, column one shows that there is indeed regional variation in the probability of enrollment. Compared to applicants from East Asia, it is seen that South Asians are 7.8% less likely to enroll, applicants from European Union countries are 24% less likely to enroll, while applicants from non-EU countries even less likely at 32%.

Table 5: Probit Model APE estimates with region dummies

VARIABLES	(1) *En*	(2) *En*	(3) *En*	(4) *En*	(5) *En*
aidratio	0.750***	0.714***	0.720***	0.700***	0.762***
	(0.0670)	(0.0669)	(0.0689)	(0.0692)	(0.0744)
askaid	-0.221***	-0.160***	-0.152**	-0.117*	-0.149**
	(0.0585)	(0.0596)	(0.0612)	(0.0613)	(0.0658)
convSAT	-0.00971***	-0.0108***	-0.0115***	-0.0125***	-0.0136***
	(0.00189)	(0.00196)	(0.00202)	(0.00213)	(0.00224)
alumni	-0.104***	-0.0950**	-0.0871**	-0.0851**	-0.100**
	(0.0380)	(0.0390)	(0.0400)	(0.0419)	(0.0448)
Female	-0.0477**	-0.0539**	-0.0596**	-0.0616**	-0.0586**
	(0.0237)	(0.0242)	(0.0249)	(0.0258)	(0.0265)
carib	-0.353***	-0.329***	-0.391***	-0.379***	-0.423***
	(0.0748)	(0.0826)	(0.0927)	(0.101)	(0.114)
eur	-0.328***	-0.262***	-0.275***	-0.260**	-0.270***
	(0.0909)	(0.0921)	(0.101)	(0.105)	(0.104)
eu	-0.249***	-0.188***	-0.196***	-0.204***	-0.171***
	(0.0458)	(0.0509)	(0.0532)	(0.0567)	(0.0589)
latam	-0.389***	-0.339***	-0.360***	-0.366***	-0.492***
	(0.0722)	(0.0793)	(0.0887)	(0.0941)	(0.130)
meast	-0.354**	-0.276	-0.299*	-0.308*	-0.333*
	(0.179)	(0.177)	(0.177)	(0.176)	(0.175)
nafrica	-0.640***	-0.540***	-0.549***	-0.552***	-0.563***
	(0.159)	(0.162)	(0.165)	(0.166)	(0.165)
noram	-0.0620	-0.00778	-0.0443	-0.0704	-0.0787
	(0.0458)	(0.0489)	(0.0513)	(0.0556)	(0.0583)
pac	0.0166	0.0859	0.0771	0.0285	0.0481
	(0.118)	(0.121)	(0.122)	(0.135)	(0.138)
sasia	-0.0788**	-0.0325	-0.0383	-0.0422	-0.0466
	(0.0397)	(0.0441)	(0.0462)	(0.0482)	(0.0496)
seasia	-0.0597	0.00187	-0.00824	-0.00729	-0.0271
	(0.0524)	(0.0567)	(0.0579)	(0.0607)	(0.0627)
ssafrica	-0.354***	-0.311***	-0.363***	-0.384***	-0.393***
	(0.0552)	(0.0584)	(0.0615)	(0.0657)	(0.0679)
OneYearStock		0.00774***			
		(0.00197)			
TwoYearStock			0.00444***		
			(0.00125)		
ThreeYearStock				0.00357***	
				(0.000948)	
FourYearStock					0.00302***
					(0.000794)
Observations	1,299	1,240	1,163	1,080	1,001

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Time Fixed-Effects not reported

Applicants from the Caribbean, Middle East, Sub-Saharan Africa and Latin American countries

are around 35% less likely to enroll compared to East Asian applicants, while North African applicants are the least likely to enroll, being around 60% less likely. Applicants from the Pacific, North American, and Southeast Asian countries are more likely to enroll than South Asian applicants, but the coefficients on those region dummies are not very significant.

Some more of these region dummies lose significance as I add on the stock variables, which remain positive and significant. This goes to show that, while regional origin does seem to have some effect on the applicant's probability of enrollment, the presence of kinship networks that go beyond the broader region and focus specifically on the cultural capital and networks of an applicant's home country play a more important role in determining an accepted applicant's enrollment decision.

In addition to that, Table 6 shows little evidence for H4 regarding regional differences in response to changes to the cost of attendance. While it does show statistically significant results for differential enrollment probabilities for some region aid combinations, for the most part the results are statistically insignificant, and further show that the network effect at the country level is stronger than any regional commonalities in determining student enrollment probabilities.

Table 6: Probit Model APE estimates with region and aid interactions

VARIABLES	(1) *En*	(2) *En*	(3) *En*	(4) *En*	(5) *En*
aidratio	0.413***	0.669***	0.707***	0.676***	0.724***
	(0.0556)	(0.0851)	(0.0862)	(0.0883)	(0.0923)
askaid		-0.134**	-0.131**	-0.0984*	-0.119*
		(0.0581)	(0.0586)	(0.0598)	(0.0631)
convSAT	-0.00949***	-0.00952***	-0.0102***	-0.0109***	-0.0120***
	(0.00181)	(0.00190)	(0.00196)	(0.00205)	(0.00215)
alumni	-0.0964**	-0.0884**	-0.0829**	-0.0841**	-0.102**
	(0.0375)	(0.0393)	(0.0406)	(0.0425)	(0.0451)

Female	-0.0417*	-0.0478**	-0.0492**	-0.0532**	-0.0503*
	(0.0240)	(0.0242)	(0.0248)	(0.0258)	(0.0267)
carib	-0.666***	-0.446**	-0.617**	-0.577**	-0.550**
	(0.185)	(0.176)	(0.288)	(0.291)	(0.271)
eur	-7.643**	-7.696**	-6.246**	-6.223**	-6.026**
	(2.997)	(3.018)	(2.496)	(2.524)	(2.363)
eu	-0.179***	-0.0267	-0.0119	-0.0276	-0.0275
	(0.0611)	(0.0656)	(0.0670)	(0.0697)	(0.0696)
latam	-0.336***	-0.143	-0.110	-0.174*	-0.238**
	(0.0861)	(0.0889)	(0.0887)	(0.0976)	(0.112)
noram	-0.0493	0.0462	0.0249	0.00800	0.00809
	(0.0500)	(0.0534)	(0.0554)	(0.0598)	(0.0614)
pac	0.130	0.240*	0.246*	0.197	0.230
	(0.129)	(0.127)	(0.127)	(0.140)	(0.146)
sasia	-0.157***	-0.0470	-0.0367	-0.0351	-0.0263
	(0.0566)	(0.0611)	(0.0626)	(0.0646)	(0.0646)
seasia	-0.139	-0.0293	-0.0300	-0.0189	-0.0179
	(0.0960)	(0.105)	(0.106)	(0.107)	(0.107)
ssafrica	-0.532**	-0.330	-0.330*	-0.324*	-0.321*
	(0.222)	(0.201)	(0.200)	(0.195)	(0.189)
aidcarib	0.465*	0.207	0.319	0.298	0.226
	(0.251)	(0.239)	(0.365)	(0.371)	(0.359)
aideur	8.174**	8.253**	6.699**	6.679**	6.457**
	(3.185)	(3.208)	(2.653)	(2.683)	(2.514)
aideu	-0.0525	-0.232**	-0.293***	-0.287**	-0.239*
	(0.101)	(0.104)	(0.108)	(0.118)	(0.127)
aidlatam	-0.115	-0.345**	-0.509***	-0.357*	-0.584***
	(0.166)	(0.165)	(0.177)	(0.197)	(0.224)
aidnoram	-0.114	-0.146	-0.232	-0.261	-0.340*
	(0.136)	(0.144)	(0.154)	(0.161)	(0.177)
aidsasia	0.236**	0.105	0.0870	0.0820	0.0589
	(0.101)	(0.104)	(0.111)	(0.116)	(0.119)
aidseasia	0.211	0.100	0.0798	0.0750	0.0502
	(0.136)	(0.145)	(0.147)	(0.151)	(0.153)
aidssafrica	0.312	0.0909	0.0215	0.00245	-0.0106
	(0.258)	(0.235)	(0.234)	(0.229)	(0.223)
OneYearStock		0.0104***			
		(0.00198)			
TwoYearStock			0.00648***		
			(0.00126)		
ThreeYearStock				0.00499***	
				(0.000951)	
FourYearStock					0.00421***
					(0.000798)
Observations	1,296	1,237	1,160	1,077	998

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Time Fixed-Effects not reported

The final hypothesis to be tested, H5, involves variation in the income levels of the applicants. Similar to Tables 5 and 6, I run regressions replacing the region dummies with

income dummies in Tables 7 and 8 respectively. While Table 7 does show that the probability of enrollment tends to increase as the income level of the country of origin goes from high income to low income, the results are mostly statistically insignificant so do not provide strong

Table 7: Probit Model APE estimates with income dummies

VARIABLES	(1) *En*	(2) *En*	(3) *En*	(4) *En*	(5) *En*
aidratio	0.634***	0.648***	0.635***	0.613***	0.675***
	(0.0640)	(0.0646)	(0.0662)	(0.0662)	(0.0707)
askaid	-0.297***	-0.223***	-0.213***	-0.179***	-0.230***
	(0.0538)	(0.0567)	(0.0580)	(0.0580)	(0.0614)
convSAT	-0.00142	-0.00430**	-0.00427**	-0.00500***	-0.00524**
	(0.00166)	(0.00177)	(0.00186)	(0.00193)	(0.00203)
alumni	-0.129***	-0.104***	-0.0958**	-0.0938**	-0.102**
	(0.0379)	(0.0386)	(0.0396)	(0.0414)	(0.0440)
Female	-0.0308	-0.0479*	-0.0526**	-0.0537**	-0.0532*
	(0.0244)	(0.0247)	(0.0255)	(0.0265)	(0.0274)
hinc	-0.101*	-0.123*	-0.140**	-0.0935	-0.0796
	(0.0567)	(0.0628)	(0.0710)	(0.0755)	(0.0778)
umidinc	0.0231	-0.0851**	-0.0823**	-0.0757**	-0.0597
	(0.0305)	(0.0358)	(0.0369)	(0.0380)	(0.0391)
lmidinc	-0.00670	-0.0315	-0.0241	-0.0154	-0.0212
	(0.0368)	(0.0377)	(0.0392)	(0.0408)	(0.0429)
lowinc	0.0193	-0.0250	-0.0195	-0.0139	-0.00934
	(0.0522)	(0.0536)	(0.0565)	(0.0589)	(0.0613)
OneYearStock		0.0135***			
		(0.00215)			
TwoYearStock			0.00833***		
			(0.00134)		
ThreeYearStock				0.00659***	
				(0.00100)	
FourYearStock					0.00518***
					(0.000862)
Observations	1,299	1,240	1,163	1,080	1,001

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Time Fixed-Effects not reported

evidence for variation based on income level. Table 8 provides a similar story, in the sense that while there does seem to be a variation to responsiveness to changes in cost of attendance by

income level, the results are not statistically significant, thus provide little evidence to support H5.

Table 8: Probit Model APE estimates with region and aid interactions

VARIABLES	(1) *En*	(2) *En*	(3) *En*	(4) *En*	(5) *En*
aidratio	0.414***	0.696***	0.734***	0.741***	0.828***
	(0.0641)	(0.0894)	(0.0926)	(0.0950)	(0.0985)
askaid		-0.223***	-0.220***	-0.188***	-0.240***
		(0.0579)	(0.0599)	(0.0600)	(0.0633)
convSAT	-0.00256	-0.00391**	-0.00385**	-0.00452**	-0.00492**
	(0.00164)	(0.00180)	(0.00188)	(0.00196)	(0.00207)
alumni	-0.116***	-0.0941**	-0.0861**	-0.0851**	-0.0911**
	(0.0367)	(0.0386)	(0.0396)	(0.0412)	(0.0439)
Female	-0.0332	-0.0464*	-0.0538**	-0.0551**	-0.0560**
	(0.0246)	(0.0249)	(0.0256)	(0.0267)	(0.0276)
hinc	-0.186*	-0.149	-0.129	-0.0913	-0.0855
	(0.0971)	(0.0952)	(0.0984)	(0.102)	(0.101)
umidinc	0.124***	-0.0185	-0.00374	0.0107	0.0239
	(0.0364)	(0.0443)	(0.0456)	(0.0466)	(0.0465)
lmidinc	-0.0700	-0.0552	-0.0330	-0.00841	0.00777
	(0.0559)	(0.0567)	(0.0578)	(0.0595)	(0.0603)
lowinc	-0.124	-0.106	-0.0869	-0.0821	-0.0954
	(0.0939)	(0.0960)	(0.102)	(0.105)	(0.107)
aidhinc	0.155	0.0183	-0.0935	-0.0882	-0.0725
	(0.155)	(0.156)	(0.168)	(0.183)	(0.196)
aidumidinc	-0.278***	-0.169**	-0.224**	-0.261***	-0.285***
	(0.0817)	(0.0855)	(0.0904)	(0.0952)	(0.0979)
aidlmidinc	0.0650	0.00133	-0.0552	-0.100	-0.155
	(0.0961)	(0.0970)	(0.101)	(0.106)	(0.108)
aidlowinc	0.157	0.0675	0.00424	-0.0192	-0.0139
	(0.116)	(0.119)	(0.125)	(0.128)	(0.131)
OneYearStock		0.0111***			
		(0.00225)			
TwoYearStock			0.00675***		
			(0.00141)		
ThreeYearStock				0.00534***	
				(0.00105)	
FourYearStock					0.00427***
					(0.000883)
Observations	1,299	1,240	1,163	1,080	1,001

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Time Fixed-Effects not reported

The results of all of the regressions above provide another factor to be considered in determining the probabilities. The academic quality of applicants seem to have a statistically significant negative correlation with the probability of applicant enrollment. Throughout all the regressions, the coefficients on both *convSAT* and *alumni* are both negative, and provide some evidence to show that applicants with more desirable academic and extra-curricular qualities are less likely to enroll at College X once accepted. This makes sense, as such students might have gotten accepted at other institutions that they might perceive as more prestigious than College X. This kind of evidence provides the basis for more investigation into the opportunity costs involved in an applicant's enrollment decision.

VI. Conclusion

The results provide a good basis for understanding the factors that affect the enrollment decisions of accepted international students. To sum up, my regression analysis has shown that, for the most part, enrollment decisions of international students are based on factors similar to domestic US applicants. There is strong evidence for the importance of the cost of attendance and the kinship networks in determining the probability of enrollment, adding more support to the cost theory and chain enrollment theory. There is also evidence for the academic and extra-curricular qualities of applicants in determining their applicant choice. The results show that, *ceteris paribus,* more qualified applicants are less likely to enroll, possibly as a result of more enrollment options due to their higher quality compared to other applicants. The limitations in the dataset do not allow me to fully understand the applicant's opportunity costs such as the prestige of alternate institutions and the relative costs of attendance and distance from home,

but the academic variables do provide evidence for the importance of controlling for such variables in future studies.

Finally, the regressions find mixed evidence for regional and income-level variation in enrollment decisions. While the coefficients give an idea for variation both at the regional level as well as the income level, most of these results are not statistically significant. However, these factors should not be written off completely as unimportant. Several factors may attribute to the insignificance of the results from my analysis. The first is the limited number of observations in the dataset. While I do have observations over 10 years, it is still a small sample size, and unbalanced in both the regional and income level classifications. The other factor could be misspecification on my part in the regional aggregations. Perhaps my breakdown of the countries into twelve regional categories was not granular enough and clumped groups of countries that have very little in common. Future research should focus on attaining a better defined regional breakdown of countries to overcome this problem, or even look to see differences between countries themselves if the size of the data allows it.

VII. Appendix

Appendix A: List of variables

Variable	explanation
convSAT	Provides SAT scores along with SAT-equivalents for those students who took the ACTs instead; divided by 10
alumni	equal to 1 if recipient of alumni scholarship award, 0 otherwise
Female	equal to 1 if female, zero otherwise
aidratio	reported financial aid offered to accepted student / total cost of attendance for that application year
askaid	equal to 1 if aid requested in application, zero otherwise
regions:	
easia	East Asia
casia	Central Asia
sasia	South Asia
seasia	Southeast Asia
meast	Middle East
carib	Caribbean
eur	Europe (non-EU)
EU	European Union
latam	Latin America
nafrica	North Africa
ssafrica	Sub-Saharan Africa
pac	Pacific
income levels:	
oecd	OECD countries
hinc	non-OECD high income countries
umidinc	upper-middle income countries
lmidinc	lower-middle income countries
lowinc	low income countries
country stocks:	
OneYearStock	provides the number of enrolled students from same country from the previous year
TwoYearStock	provides the number of enrolled students from same country from the previous two years
ThreeYearStock	provides the number of enrolled students from same country from the previous three years
FourYearStock	provides the number of enrolled students from same country from the previous four years

Appendix B: Regional grouping of Countries

Region	Country
Sub-Saharan Africa	Angola
	Botswana
	Burkina
	Burundi
	Cameroon
	Congo
	Cote D'ivoire
	Eritrea
	Ethiopia
	Gambia
	Ghana
	Guinea
	Kenya
	Lesotho
	Liberia
	Malawi
	Mali
	Mauritius
	Mozambique
	Namibia
	Nigeria
	Rwanda
	Senegal
	Sierra Leone
	South Africa
	Sudan
	Swaziland
	Tanzania
	Uganda
	United Republic of Tanzania
	Zambia
	Zimbabwe

Region	Country
EU	Austria
	Belgium
	Bulgaria
	Croatia
	Cyprus
	Czech Republic
	Denmark
	Estonia
	Finland
	France
	Germany
	Greece
	Hungary
	Ireland
	Italy
	Latvia
	Lithuania
	Luxembourg
	Malta
	Netherlands
	Poland
	Portugal
	Romania
	Slovakia
	Slovenia
	Spain
	Sweden
	United Kingdom

Region	Country
Caribbean	Antigua and Barbuda
	Bahamas
	Barbados
	Bermuda
	Cayman Islands
	Cuba
	Dominica
	Dominican Republic
	Guyana
	Haiti
	Jamaica
	Trinidad and Tobago

Region	Country
Central Asia	Afganistan
	Kazakhstan
	Kyrgyzstan
	Tajikistan
	Turkmenistan
	Uzbekistan
East Asia	China
	Demo. People. Rep. of Korea
	Hong Kong
	Japan
	Laos
	Macao
	Mongolia
	Philippines
	Republic of Korea
	Singapore
	Taiwan

Region	Country
Middle East	Bahrain
	Iran
	Iraq
	Israel
	Jordan
	Kuwait
	Lebanon
	Palestinian Territory
	Qatar
	Saudi Arabia
	Syria
	United Arab Emirates
North Africa	Egypt
	Libya
	Morocco
	Tunisia
	Yemen
North America	Canada

Region	Country
Pacific	Australia
	New Zealand
	Solomon Islands
South Asia	Bangladesh
	Bhutan
	India
	Nepal
	Pakistan
	Sri Lanka
Southeast Asia	Brunei Darussalam
	Burma
	Cambodia
	Indonesia
	Malaysia
	Myanmar
	Thailand
	Timor Leste
	Vietnam

Region	Country
Europe (not in EU)	Albania
	Armenia
	Azerbaijan
	Belarus
	Bosnia and Herzegovina
	Georgia
	Iceland
	Kosovo
	Macedonia
	Moldova
	Monaco
	Montenegro
	Norway
	Russia
	Serbia
	Switzerland
	Turkey
	Ukraine

Region	Country
Latin America	Argentina
	Belize
	Bolivia
	Brazil
	Chile
	Colombia
	Costa Rica
	El Salvador
	Equador
	French Guiana
	Guatemala
	Honduras
	Mexico
	Nicaragua
	Panama
	Paraguay
	Peru
	Suriname
	Uruguay
	Venezuela

Appendix C: Income grouping of Countries

Income Level	Country
High Income non-OECD	Antigua and Barbuda
	Bahamas
	Bahrain
	Barbados
	Bermuda
	Brunei Darussalam
	Cayman Islands
	Croatia
	Cyprus
	French Guiana
	Guinea
	Hong Kong
	Kuwait
	Latvia
	Lithuania
	Macao
	Malta
	Monaco
	Qatar
	Russia
	Saudi Arabia
	Singapore
	Taiwan
	Trinidad and Tobago
	United Arab Emirates
	Uruguay

Income Level	Country
OECD	Australia
	Austria
	Belgium
	Canada
	Chile
	Czech Republic
	Denmark
	Estonia
	Finland
	France
	Germany
	Greece
	Iceland
	Ireland
	Israel
	Italy
	Japan
	Luxembourg
	Netherlands
	New Zealand
	Norway
	Poland
	Portugal
	Republic of Korea
	Slovakia
	Slovenia
	Spain
	Sweden
	Switzerland
	United Kingdom

Income Level	Country
	Albania
	Angola
	Argentina
	Azerbaijan
	Belarus
	Belize
	Bosnia and Herzegovina
	Botswana
	Brazil
	Bulgaria
	China
	Colombia
	Costa Rica
	Cuba
	Dominica
	Dominican Republic
	Equador
	Hungary
	Iran
	Iraq
	Jamaica
Upper Middle income	Jordan
	Kazakhstan
	Lebanon
	Libya
	Macedonia
	Malaysia
	Mauritius
	Mexico
	Montenegro
	Namibia
	Panama
	Peru
	Romania
	Serbia
	South Africa
	Suriname
	Thailand
	Tunisia
	Turkey
	Turkmenistan
	United Republic of Tanzania
	Venezuela

Income Level	Country
	Armenia
	Bhutan
	Bolivia
	Cameroon
	Cote D'ivoire
	Egypt
	El Salvador
	Georgia
	Ghana
	Guatemala
	Guyana
	Honduras
	India
	Indonesia
	Kyrgyzstan
	Laos
	Lesotho
	Moldova
Lower Middle income	Mongolia
	Morocco
	Nicaragua
	Nigeria
	Pakistan
	Paraguay
	Philippines
	Senegal
	Solomon Islands
	Sri Lanka
	Sudan
	Swaziland
	Syria
	Timor Leste
	Ukraine
	Uzbekistan
	Vietnam
	Yemen
	Zambia

Income Level	Country
	Afganistan
	Bangladesh
	Burkina
	Burma
	Burundi
	Cambodia
	Congo
	Demo. People. Rep. of Korea
	Eritrea
	Ethiopia
	Gambia
	Haiti
	Kenya
Low Income	Kosovo
	Liberia
	Malawi
	Mali
	Mozambique
	Myanmar
	Nepal
	Palestinian Territory
	Rwanda
	Sierra Leone
	Tajikistan
	Tanzania
	Uganda
	Zimbabwe

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