The Student Money Management Center
University of Illinois System

MONEY MATTERS:

A DATA MINING PROJECT ON UIC UNDERGRADUATE MATRICULATION RATES AND FINANCIAL INFORMATION

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December 17, 2019

ABSTRACT

This report will be divided into three sections. The first section will summarize the data. In this section we will discuss the sample size,demographics and enrollment rates. The next section we will analyze the data,determine the matriculation rates,the amount of students that receive financial holds and financial aid. The final section will be predictive analysis. In this section we will determine what financial factors determine if students receive a hold and matriculation rates.

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We would also like to acknowledge the Student Money Management Center Team: Andrea Pellegrini, Kristin Palmsiano, and Husain Kurawadwala. We are grateful for their assistance throughout this project, and we wouldn't have been able to accomplish what we have without their feedback and support.

OBJECTIVE

University of Illinois at Chicago (UIC) has been implementing a large-scale project called the Student Success Initiative (SSI). This project began in 2012 and is committed to providing opportunities for all students-opportunities to get into college, thrive while on campus, and to be prepared for successful careers in a constantly changing global society[1].

This year, they are focusing on finances as a means to improve retention and matriculation for undergraduate UIC students. As the billing office for the University of Illinois System, University Student Financial Services and Cashier Operations (USFSCO) plays an important part in informing policy and implementing any changes to help improve the financial well being of UIC students.

"The Student Money Management Center (SMMC), a division of USFSCO, empowers University of Illinois' students to make positive behavioral changes associated with their

finances. Through a multi-faceted approach that integrates comprehensive online and in person platforms, they ensure students take control over their financial futures" (Student Money Management Center, 2019).

Our goal as data analysts for the SMMC is to investigate variables in Banner data (financial information on student accounts) to see if they play a role in student matriculation. Some of these variables include financial aid, financial holds, and cost of enrollment. We hope to provide insight on influential factors and shed light on disparities to focus efforts on critical areas such as low matriculation from Spring to Fall semesters, and effects of financial variables such as financial aid, financial holds, and cost of tuition on matriculation. Ultimately, we aim to focus on improving overall student success at UIC.

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SECTION I: *Summarizing the Data*

In this section we will be going over the demographics of the population. This includes their year in school, gender,residency and what college they are in. Finally we will see the dropout rates by semester and by year.

Description of Target Population and Sample Size

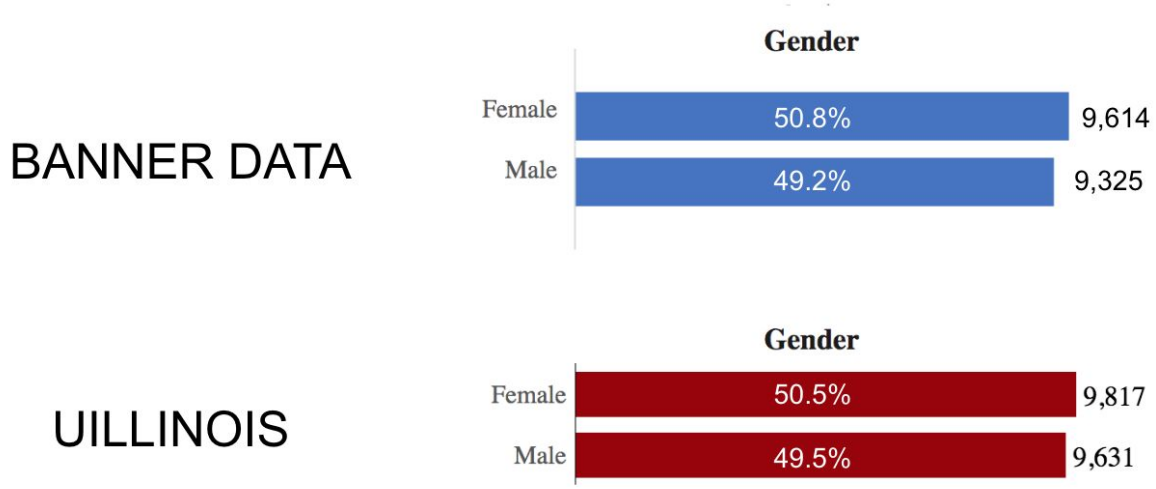
"How many total students are in the sample?"

There are total 19,454 undergraduate students in the sample. Among those, there are 16,645 students who continued from 17/18 academic year. There are 2,809 students who did not continue their education at any point from the beginning of Fall 2017 to the end of Spring 2018. For this project, we only focus on the undergraduate students from UIC.

Demographics of Sample: Gender

"What does the demographics look like for the entire sample? Male vs Female."

Figure 1



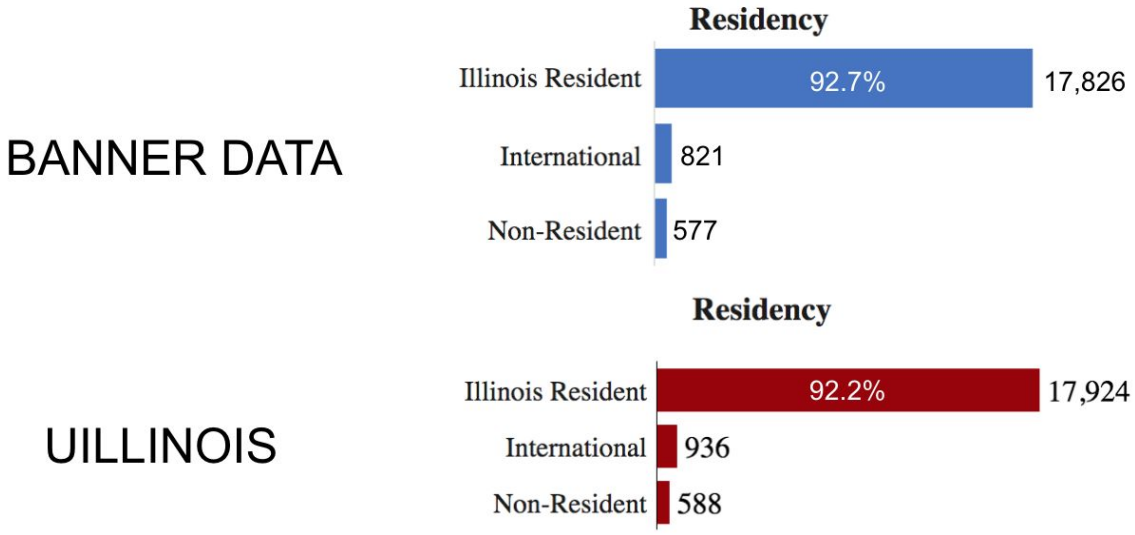
Note. Data from UIllinois comes from UIS >> Data >> Enrollment (University Data, 2019)

Looking at our target population of undergraduates at UIC during Fall 2017, we identified 9,614 students to be female and 9,325 students to be male based off the Banner data we were given (indicated by the blue bar graph in Figure 1). At an almost even split, females make up 50.8% of the population, and males make up 49.2% of the population. Our findings are fairly consistent with the UIllinois data (indicated by the red bar graph above in Figure 1). The differences between these two datasets will be explained later in "Section II: Representative Sample."

Demographics of Sample: Residency

"What does the demographics look like for the entire sample? In-state vs Out-of-State."

Figure 2



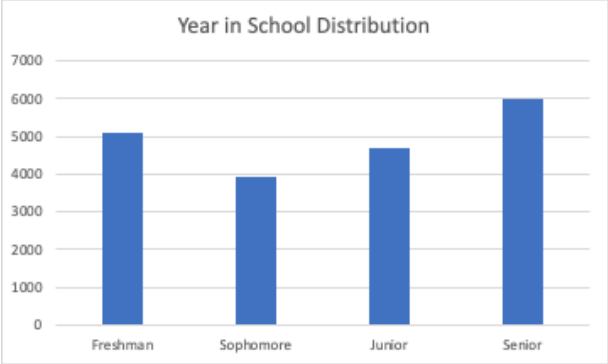
Note. Data from UIllinois comes from UIS >> Data >> Enrollment (University Data, 2019)

Again, only focusing on our target population of undergraduates at UIC during Fall 2017, we identified 17,826 students to be Illinois Residents, 821 students to be International, and 577 students to be Non-Residents based off the Banner data we were given (indicated by the blue bar graph in Figure 2). Illinois Residents make up a significantly higher representation of our sample making up 92.7% of the population, whereas International and Non-Resident students make up a significantly less portion of the sample at 4.3% and 3.0% respectively. Our findings are fairly consistent with the UIllinois data (indicated by the red bar graph in Figure 2). The differences between these two datasets will be explained later in "Section II: Representative Sample."

Demographics of Sample: Year in School

"What does the demographics look like for the entire sample? Year in school."

Figure 3



The split of the population of students is about even. But, a majority of students are seniors. 26.1 percent of the population are freshmen, 19.1 percent of the population are sophomores, 24 percent of the population are juniors and 30.8 percent of the population are seniors.

Demographics of Sample: College

"What does the demographics look like for the entire sample? College distribution."

Figure 4

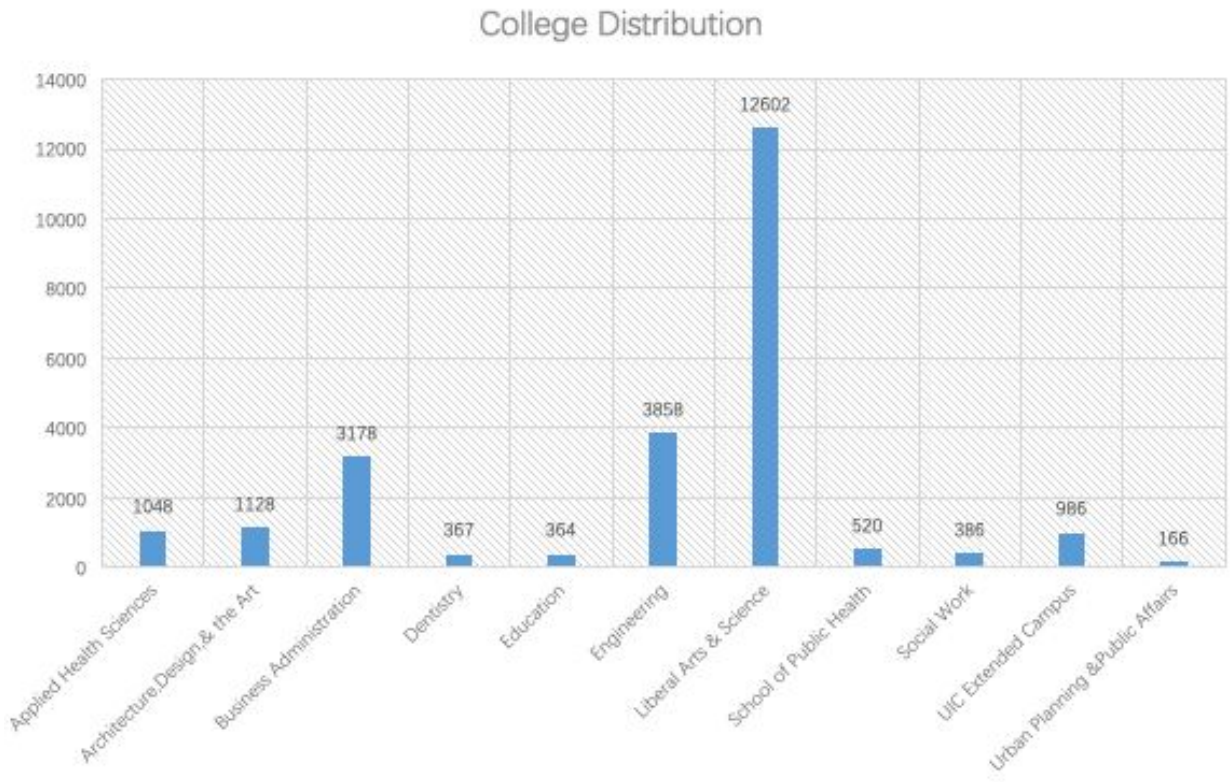
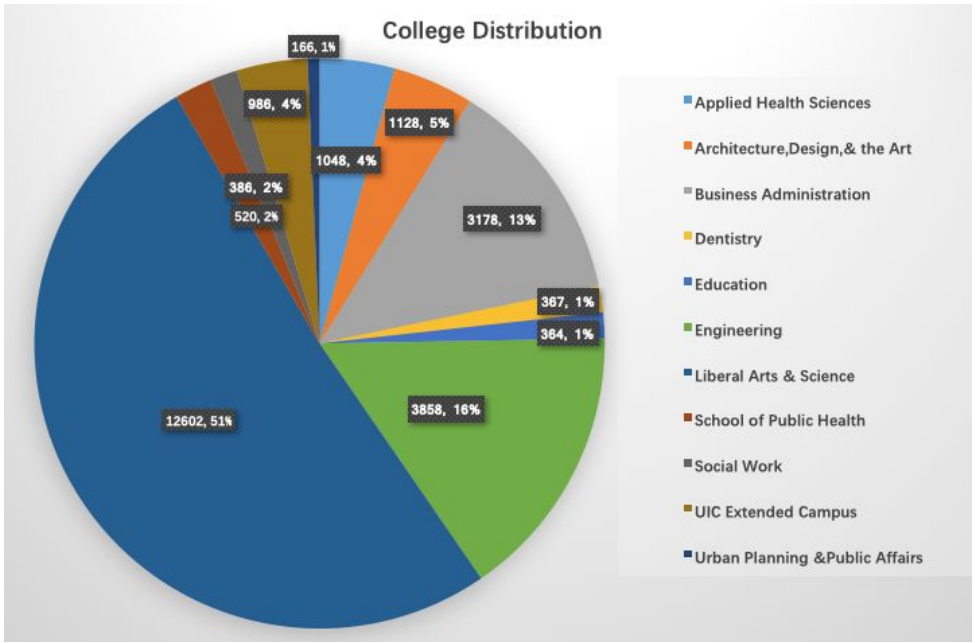


Figure 5



In our target population of undergraduates at UIC during Fall 2017, we identify that there are total 12,602 students who enrolled in Liberal Art & Science College, which makes up a significantly higher representation of our sample making up 51% of the population. The second largest college is Engineering College which has 3,858 students enrolled. But compared to LAS College, the percentage of Engineering College is lower, which is about 16%. And the third largest college is Business College. 3,178 students chose to study in business-related majors, making up 13% of the total population. The number of students in Applied Health Science, Architecture Design & Art, and UIC Extended Campus are about the same. And among the rest colleges, students are evenly distributed. Those colleges makes up a small representation of out sample, each making up only 1% of the population.

Semesterly and Yearly Drop-out Rates

There were total 19,454 undergraduate students enrolled in fall 2017. Among them, 16,458 students continued their education, 1,175 students completed their degree by the end of fall 2017. There were 1,821 students who didn't return to complete their degrees, which makes drop-out rate to be 9.96%. The drop-out rate counts the proportion of students who were supposed to continue on their education but choose to quit.

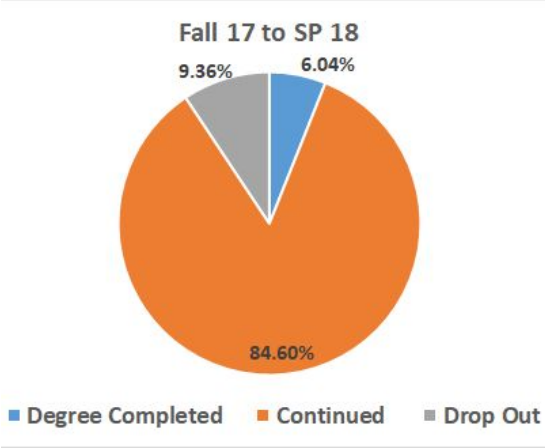


Figure 6: Fall 17 to SP 18

In the Spring semester of 2018, there are 18,336 undergraduate students who enrolled in the UIC. Among them, 13,589 continued, 2,750 graduated and 1,997 students either quit before the semester ended or quit without completing the degree after completing the semester, which makes drop out rate to be 12.81%.

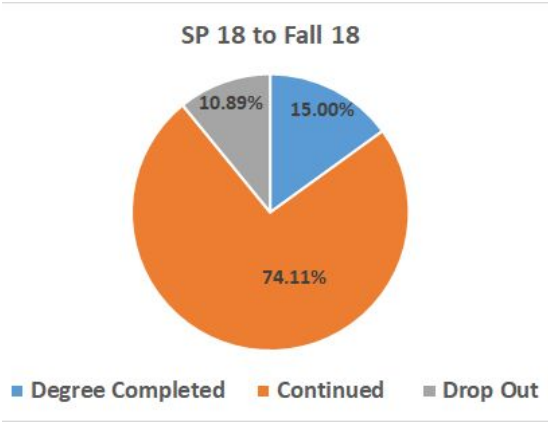


Figure 7: Sp 18 to Fall 18

Overall, if we look at the drop-out rate based on year, from fall 2017 to fall 2018. There are total 12,745 students continued, 3,900 graduated in fall 2017, spring 2018, or summer 2018. There are 2,809 who dropped out sometime before fall 2018 started. This only counts the students who enrolled in Fall 2017.

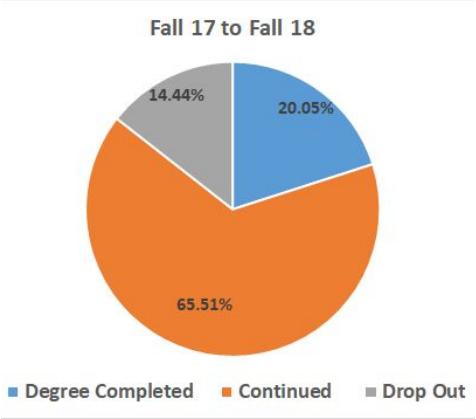


Figure 8: Fall 17 to Fall 18

Key Takeaways From Section One

By comparing sample's gender distribution and residency distribution with the population, we can say that our sample is a decent representative of the population. The gender distribution shows UIC is a college with well-balanced gender. Majority of the population are in-state students. College of LAS contains over half of the students, due to the attribute of being most major-diversified college. Based on the drop-out rate report, we learned that a slightly more students would drop out of school after Spring semester. In the next two sections, we will further discuss the drop-out rate and what could impact student's matriculation rate.

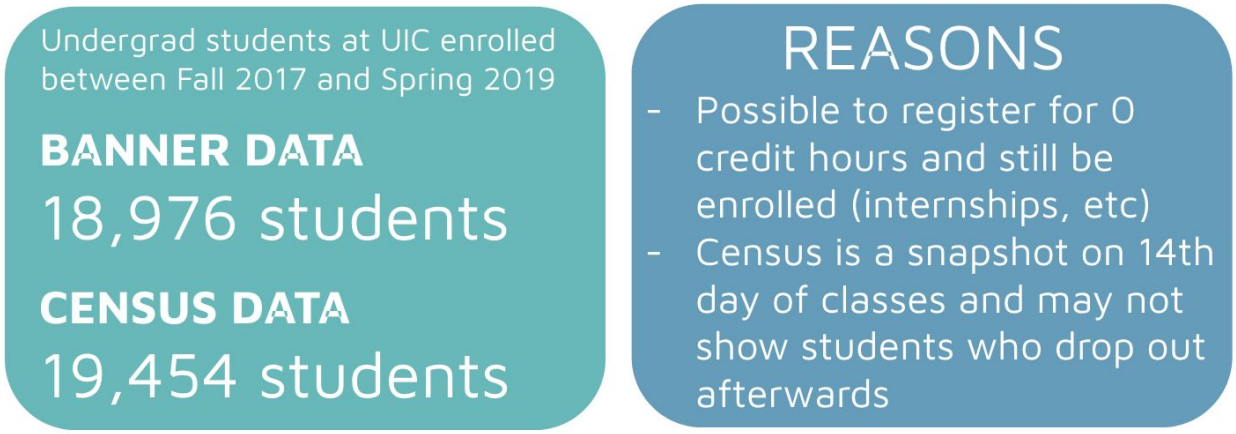
SECTION II: *Trends Analysis*

In this section, we analyzed the data from both banner and census based on different factors. Both banner and census data was provided by our client. We calculated the matriculation rate semester by semester from Fall 2017 to Fall 2019. Based on the information about matriculation rate, we were able to figure out the relationship between the dropout rate and some financial variables such as financial holds and financial aids. And we also gathered information about the cost of attendance, which can have significant impact on the matriculation rate.

Representative Sample

"Is the sample representative of enrollment trends for UIC during the correlated terms?"

Figure 9



Note. Data from UIllinois comes from UIS >> Data >> Enrollment (University Data, 2019)

In the left box of Figure 9, we analyze the target population of undergraduate students at UIC during the Fall 2017 semester given 2 sources to draw data from. The first source is called Banner, where we were given de-identified financial information on students such as demographics, major, financial aid information, and much more. We strategically identified students enrolled in the Fall 2017 semester based off credit hours they are enrolled in, but did not include students graduating between Fall 2017 and Spring 2019 as to not mistake their graduation as dropping out of college. From the Banner data, we identified 18,976 students as our target population.

The second source we drew data from is Census data: A snapshot on the 14th day of the semester in which students are still enrolled. This data included information on demographics and major but no information on their financial accounts. From this data, we know that the true number of undergraduate students at UIC enrolled in the Fall 2017 semester is 19,454. That means we identified a population with a small error of 2.5%. This error can be explained by various factors such as the following.

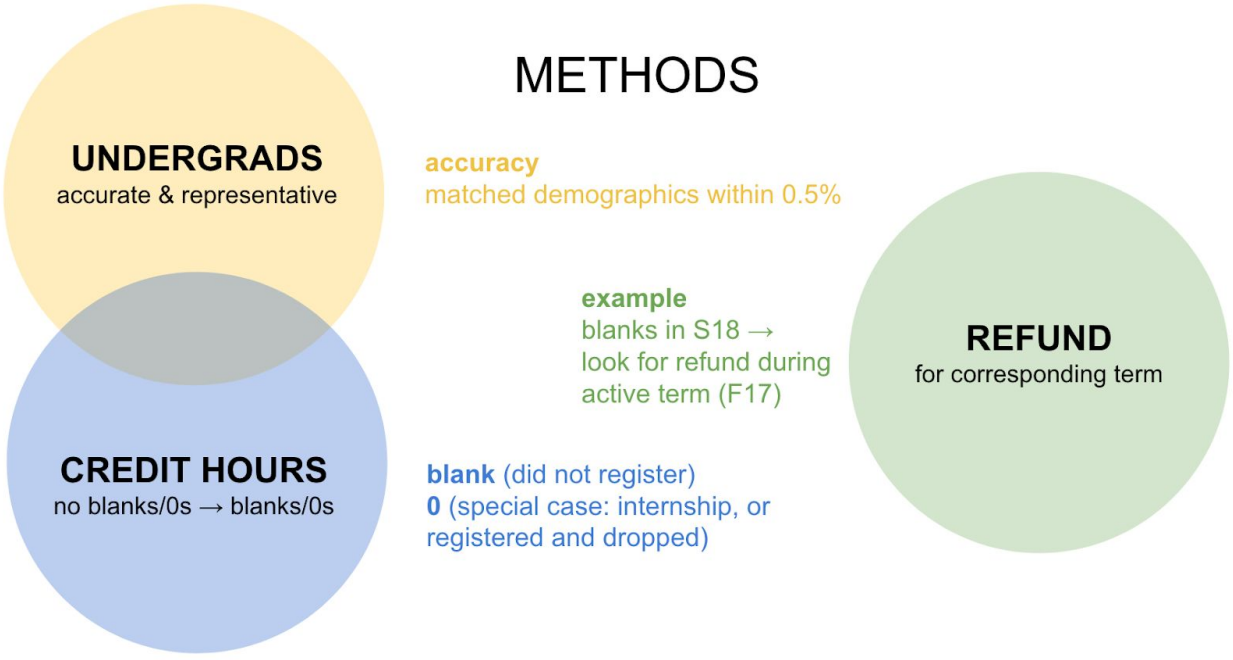
In the right box of Figure 9, we identify the first reason that we may not have perfectly identified the target population is because of the method of identifying undergraduate students by credit hours. In Banner, students can register for 0 credit hours but still be enrolled due to an internship or other academic options. Another reason is that because Census data is a snapshot on the 14th day of the semester, it may not accurately depict the students who choose not to continue during that semester after the 14th day. These are 2 possible reasons for the imperfect sample.

However, the given sample **does appear to be representative.** Looking back at the Gender and Residency findings under the demographics portions of Section I (Figure 1, Figure 2), we see that we identified a very similar spread of Banner data that very closely resembles the spread from Census data. We see that there is less than a 0.5% difference between the spread of these two datasets under these two variables, and we thus conclude that the Banner data sample that we identified as our target sample is representative of the population.

Semesterly Matriculation

"How many students actually matriculate to spring from fall/from fall to spring?"

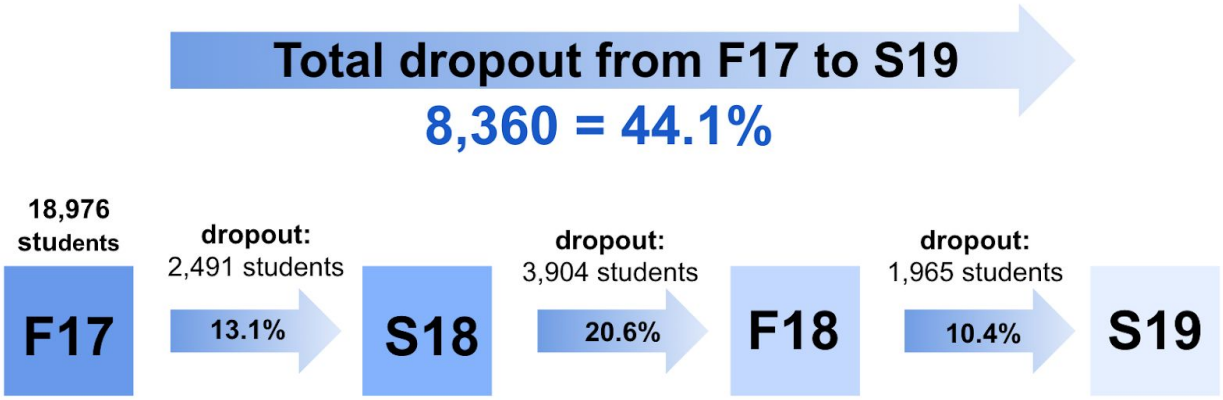
Figure 10



To identify students that matriculate between semesters, we chose to look at the intersection of certain variables as indicated by the intersection of the yellow and blue circle on the left of Figure 10. We start with the representative sample that we discussed in the last section of 18,976 undergraduate students in Fall 2017. From there, we identify students that have a 0 or blank for credit hours as ones who are not enrolled during that semester by the suggestion of Erin

(Wheet) Herrich, Senior Associate Director, AR Operations and Billing Services, who is familiar with Banner data. Although the majority of refunds are due to overpayment or excess financial aid, we choose to take a look at refunds specifically with the label 'Tuition Refund' for additional insight. Not all students receive refunds for withdrawing or discontinuing from a semester, but it is an interesting variable to consider as well as indicated by the non-intersecting green circle on the right of Figure 10.

Figure 11



As we see from this Figure 11, we begin the Fall 2017 semester with 18,976 undergraduate students enrolled at UIC. Over the the 4 semesters observed, 8,360 students do not matriculate to a following semester which is 44.1% of the original Fall 2017 sample.

2,491 students don't continue from Fall 2017 to Spring 2018.

This is 13.1% of the original Fall 2017 sample.

3,904 students don't continue from Spring 2018 to Fall 2018.

This is 20.6% of the original Fall 2017 sample.

1,965 students don't continue from Fall 2018 to Spring 2019.

This is 10.4% of the original Fall 2017 sample.

The largest portion of students not matriculating occurs between the Spring 2018 and Fall 2018 having a 20.6% dropout rate which is significantly higher than the other 2 dropout rates of 13.1% and 10.4% by semester.

Table 1

Semesterly Matriculation: Subsequent Semesters

F17	S18	F18	S19	COUNT	REFUND TUITION
	did not continue			2,491	1,231
		did not continue		3,904	2,545
			did not continue	1,965	976

*overlap of 108 students in rows 1 & 3

Table 1 represents the same data from Figure 11 but in a different representation. The top row indicates which semesters are being looked at, how many students do not continue under "COUNTS", and how many received a refund in tuition specifically indicated in Banner as 'Tuition Refund' (of those that did not continue). It is interesting to see that approximately 50% of those that withdrew from Fall to Spring semesters received a tuition refund, whereas 65% of those that withdrew from Spring 2018 to Fall 2018 received a tuition refund (2,545 students). The Spring to Fall dropout rate is the highest and also has the highest percentage of students that received a tuition refund. The reason that not all students receive a tuition refund may be due to when the withdrawal is initiated (Refund Schedules, 2018). One may note that there is an overlap of 108 students in rows 1 & 3 which is relatively small for this large sample, but still notable.

Table 2

Semesterly Matriculation: 'Complete Dropout'

F17	S18	F18	S19	COUNT
				2,069
				3,643
				1,857
				10,724

Table 2 is another visualization of a dropout that we will call "complete dropout": once a student does not matriculate to another semester, they do not return (in the frame of time we observed) As one can see, among the semesters of discontinuing students, the highest number of students who do not continue is from Spring 2018 to Fall 2017 (3,643 students). This is

consistent with the matriculation pattern indicated in the previous paragraph. Another finding worth mentioning is the bottom row indicated by four green boxes. This indicated students enrolled in all four semesters and makes up the majority of our sample being 10,724 students.

Table 3

Semesterly Matriculation: 'Skipping' Semesters

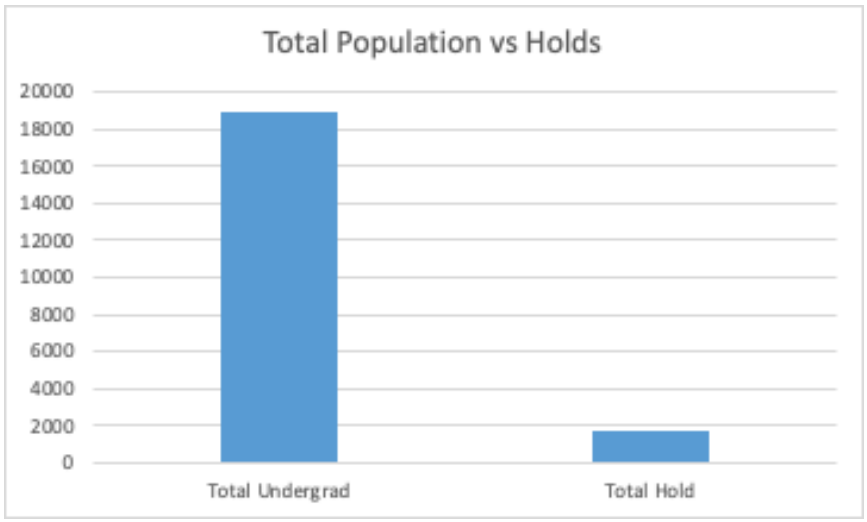
F17	S18	F18	S19	COUNT
	skip 1			375
		skip 1		261
	skip 2			47

The last type of matriculation worth mentioning is the least prevalent. This is the case of students not matriculating to one semester, but eventually returning the next one, as shown in Table 3. Of these students, most of them do not enroll in the Spring 2018 semester, but come back to enroll in the Fall 2018 semester. Like mentioned earlier, these cases are much more rare the the two already mentioned above, being only 375 students or less in each of these cases of skipping semesters.

Students with Financial Holds

"How many students end up with a financial hold?"

Figure 12



The number of students who end up with a financial hold any time from fall 2017 to fall 2018 is 1,655. This is about 9 percent of the total population. There are two types of financial holds a student could receive on their account. A 9R hold only prevents the release of transcripts. A 9H hold prevents the release of transcripts and registration for classes. This hold would be significant for enrollment for the following semester.

Students who Dropout due to Financial Holds

"How many students end up unable to continue (enroll in a subsequent semester) due to a financial hold, either from financial aid or USFSCO?"

Figure 13

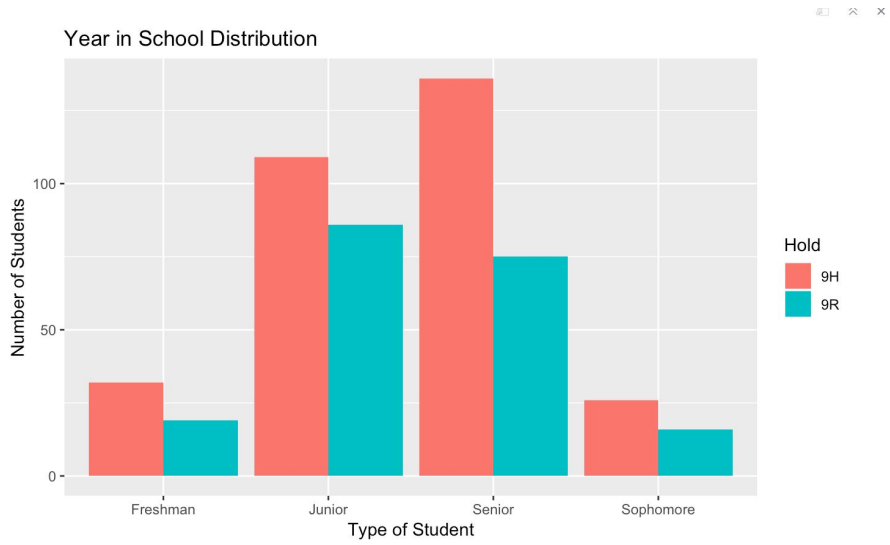
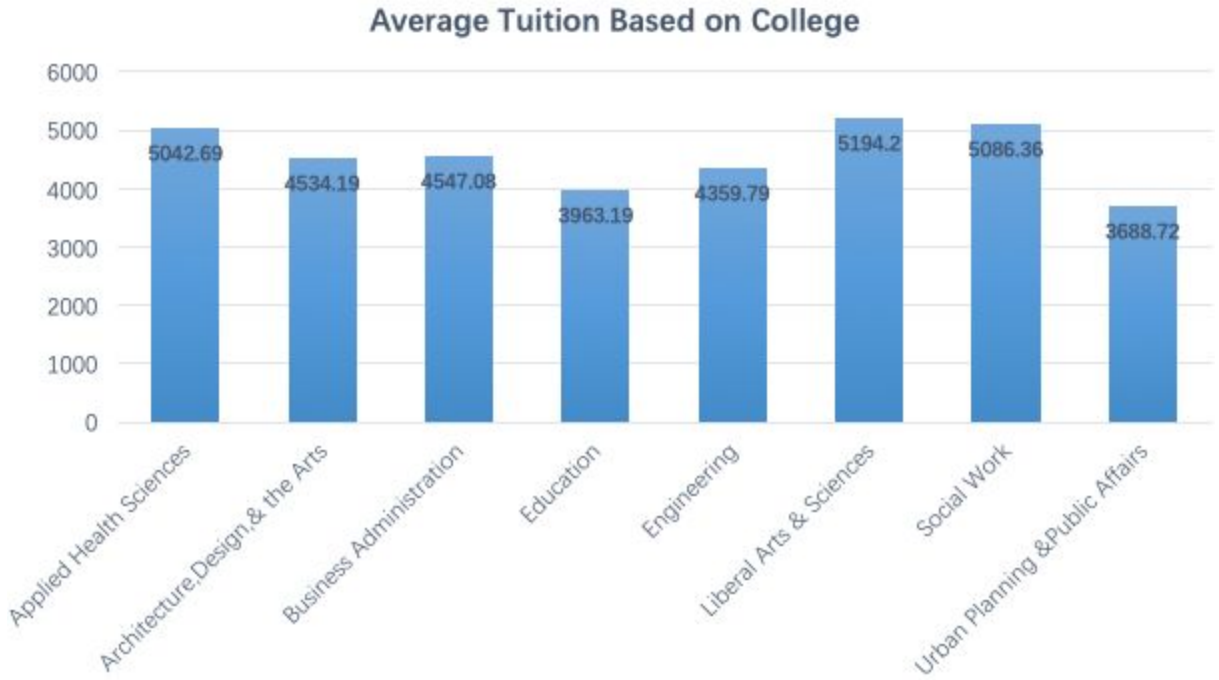


Figure 13 shows the year of school for the students who dropped out and had a financial hold. The amount of students that dropped out because they had a hold was 504. 300 of these students are seniors and most of these students had a 9H hold. This hold occurs when a student owes more than $199 on their account. The 9R hold is when a student owes between $25 to $199.

Cost of Attendance

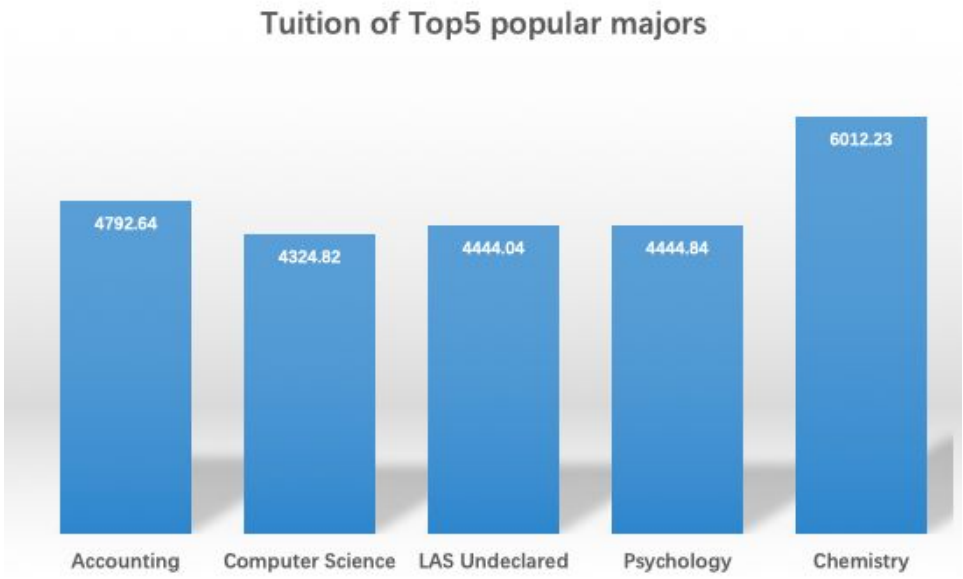
"What is the average cost of attendance for the sample? How does it differ based on college and/or major?"

Figure 14



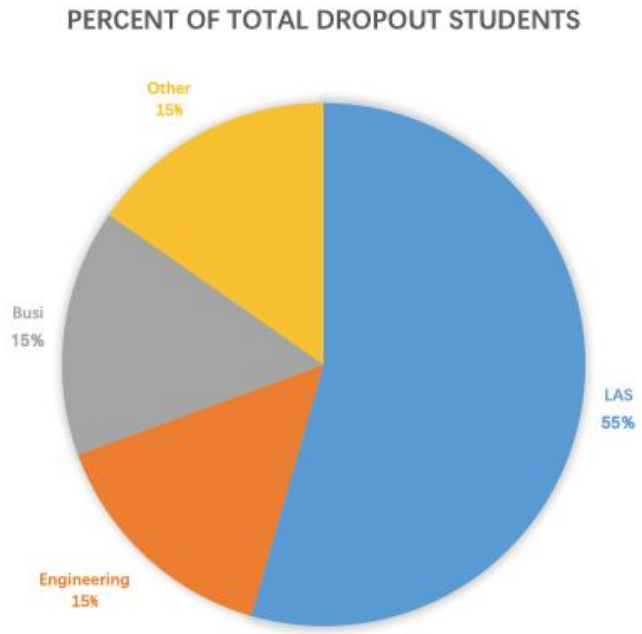
Based on the banner and census data, we calculated the average registration tuition and fees based on college. The numbers in the above graph represent the average tuition and fees in each college in dollars. As you can see, Liberal Arts & Science has the highest average tuition and fees. And the School of Urban Planning & Public Affairs has the lowest average tuition fees, which is about 1506 dollars less than the tuition and fees of Liberal Arts & Science. The School of Social Work has the second highest tuition and fees, which is pretty much the same as the cost of School of Applied Health Sciences.

Figure 15



Moreover, we calculated the average tuition and fees based on majors. We chose the top five popular majors to analyze, which means those five majors have the highest number of students enrolled. As you can see in the above graph, chemistry has the highest average tuition and fees among the five majors. The second highest is accounting, but it still costs about 1220 dollars less than chemistry does. And the costs of the other three majors(Computer Science, LAS Undeclared, and Psychology) are roughly the same.

Figure 16



We related the information of cost of attendance to the matriculation rate. From all students who dropout from Fall 2017 and Fall 2019, 55% are from Liberal Art & Science College, 15% are from Engineering College, and another 15% are from Business College. LAS has the highest average tuition and fees and the highest percentage of total dropout students. There is no strong relationship between the cost of attendance and the dropout rate except the LAS College. However, we can say that the cost of attendance should be considered as a factor that can impact the matriculation rate from Fall 2017 to Fall 2019.

Key Takeaways From Section Two

Although there are some differences between the data received from sample data and the census data, the sample data is a valid representative of the UIC undergraduate population. A majority of students who drop out do it between the spring and fall semester. A smaller amount of the population skip semesters. Those who skip semesters tend to skip the spring semester and come back in the fall. About 9 percent of the total population of students receive a hold in the fall 2017- spring 2018 school year. But only a small amount of these students drop out because they have a hold. Most students who have a hold have a 9H hold. Most students who drop out are in LAS but, it should be noted that LAS has the most amount of students so that can explain why a majority of students who drop out are in LAS.

SECTION III: *Predictive Analysis*

In this section, we will be applying statistical analysis techniques to study the hidden pattern within the data set. First, we will talk about whether students have higher chance to receive a financial hold in a specific college or degree program. Then, we will talk about whether a student would be more likely to receive a financial aid if the student is enrolled in a specific college or degree program. Third, we want to see what type of charges incurred in the past is correlated to the future likelihood of getting a financial hold. Also, we will see how would having an authorized payer would do to the chance of getting a financial hold. At last, we will study how the funding methods impact to the student matriculation.

Financial Holds by College

"Are students from a specific college or degree program more or less likely to receive a financial hold?"

Table 4

Proportion of Students that Have a Hold by College

College	Prob. Of Hold
Nursing	17.82%
Engineering	21.48%
Education	23.71%
Applied Health Sciences	24.12%
Business	24.60%
Liberal Arts & Sciences	26.46%
Public Health	26.81%
Urban Planning	31.23%
Architecture	33.46%

The probability of any student regardless of college of having a hold is 25 percent. We ran a regression analysis to determine whether any of the probabilities of receiving a hold were significantly different from 25 percent. When taking a student's college into account, a student nursing is least likely to have a hold and a student in architecture is the most likely to have a hold. These were the only two colleges that were statistically different from 25 percent. So we can conclude that college only matters for students in nursing and students in architecture. But, it should be noted that these colleges are smaller in size compared to most of the colleges in UIC so this might have affected the results.

Financial Aid by College

"Are students from a specific college or degree program more or less likely to receive financial aid?"

In this section we split up financial aid in to two different types: loans, and other financial aid (including types such as benefits, exemptions, waivers, scholarships, and prizes/awards, and grants). Because loans need to be paid back eventually, they have different implications compared to money that can be paid straight to an account like the other types of financial aid. Research shows that students that do not complete their degree are less likely to pay off their loans than those that do complete their degree (Trends in Student Aid, 2019). First we will look at some analysis of students who were offered money through loans.

Table 5

Loans Offered by College

COLLEGE	STUDENTS IN COLLEGE	HOW MANY OFFERED LOAN	PERCENTAGE	AVG AMOUNT ($)
LAS	9,691	3,915	40.40%	4,986
Engineering	3,604	1,558	43.23%	5,309
Business	2,987	1,329	44.49%	4,879
Arch/Design/Art	1,064	540	50.75%	5,751
App. Health Sci	999	465	46.55%	5,205
Nursing	477	229	48.01%	6,004
Education	388	139	35.82%	4,780
Urb Planning	147	81	55.10%	5,126
Public Health	97	46	47.42%	5,397
ALL COLLEGES	**19,454**	**8,302**	**42.68%**	**5,271**

Table 5 indicates findings from loans offered by college. Here we see that of the 19,454 students in our sample, 8,302 receive an offer for some amount in loans which is 42.68% of the sample. By college, we see in the purple column that the School of Education has the smallest percentage (35.82%) of students who receive an offer of a loan whereas the School of Urban Planning and School of Architecture have the highest percentages (55.10% and 50.75% respectively). If we take a look at the most right column, it tells us the average amount of money offered to a student that was offered a loan. On average, total offered loan amounts are on average $5,721, but the college with the highest average amount offered is the Nursing School ($6,004) and the Lowest being the school of education ($4,780).

It is interesting to see that the School of Education has the lowest percentage of students that receive offer of a loan and the smallest average amount of money offered in loans, as indicated by the lighter colored cells in each column. This may be explained by the possibility

that the school of Education merely has no need for financial support in loans. There are many other forms of financial support for educators in Illinois such as Golden Apple Scholarships (Golden Apple Scholars of Illinois Program, 2019). This may show that outside sources of financial support are successful as claimed by the School of Education's low need for loan assistance.

Table 6

Financial Aid (not including loans) Offered by College

COLLEGE	STUDENTS IN COLLEGE	HOW MANY OFFERED AID	PERCENTAGE	AVG AMOUNT ($)
LAS	9,691	6,604	68.15%	6,369
Engineering	3,604	2,009	55.74%	6,260
Business	2,987	1,901	63.64%	6,341
Arch/Design/Art	1,064	678	63.72%	5,816
App. Health Sci	999	636	63.66%	6,225
Nursing	477	296	62.05%	6,975
Education	388	242	62.37%	5,680
Urb Planning	147	80	54.42%	5,784
Public Health	97	69	71.13%	6,301
ALL COLLEGES	**19,454**	**12,515**	**64.33%**	**6,195**

Table 6 indicates findings from specifically financial aid excluding loans. Here we see that of the 19,454 students in our sample, 12,515 receive an offer for some amount of financial aid (grants, scholarships, etc.) which is 64.33% of the sample (significantly more than those offered loans). By college, we see in the blue column that the College of Engineering has the second lowest percentage of students offered financial aid (55.74%). Although the School of Urban Planning and School of Public Health have the extrema statistics for percentages, we will not analyze them in this section due to their small sample size and potentially underrepresentation. If we take a look at the most right column in green, it tells us the average amount of money offered to a student that was offered financial aid. On average, financial aid typically amounts to $6,195 (slightly more than loans for average assistance per student), but the college with the highest average amount offered is the School of Nursing ($6,975) and all other schools ranging from $5,600 to $6,400.

Some interesting trends show that the College of Engineering has a significantly lower percentage of students offered financial aid. One factor that may potentially explain this the amount of international students in the College of Engineering. In the 2016 Student Affair Highlights, UIC reports that over 70% of students are funded by personal and family funds, and that the majority of international students (45%) enrolled in the College of Engineering (Fall

2016 Profile of International Students and Scholars, 2016). Thus being self sufficient, these students may not have as much need for financial aid, thus explaining the lower percentage.

One other interesting trend is the high average amount of aid offered to students in the School of Nursing, this may be due to higher rates and fees associated with medical school. Because of more charges on an account, students in the School of Nursing may demonstrate higher need for financial aid, thus potentially explaining the higher average amount of financial aid offered.

Financial Holds predicted by Charges

"Are there certain types of charges that predict whether or not a student will receive a financial hold?"

To answer this question, we must know what are the other types of charges would incurred in the students' accounts other than registration fee and tuition. To do so, we organized the column in the data set representing the types of charges. We excluded the registration fee, tuition, refund and any type of charge that occurred on less than ten students in Fall 2018. For this question, we will train the statistical learning model to use the total amount of charges for each type incurred in fall 2017 to predict whether the students receive hold in the spring 2018. Since the data set only contains all the students who have enrolled in fall 2017, spring 2018 and summer 2018, we can only use one semester to predict another semester.

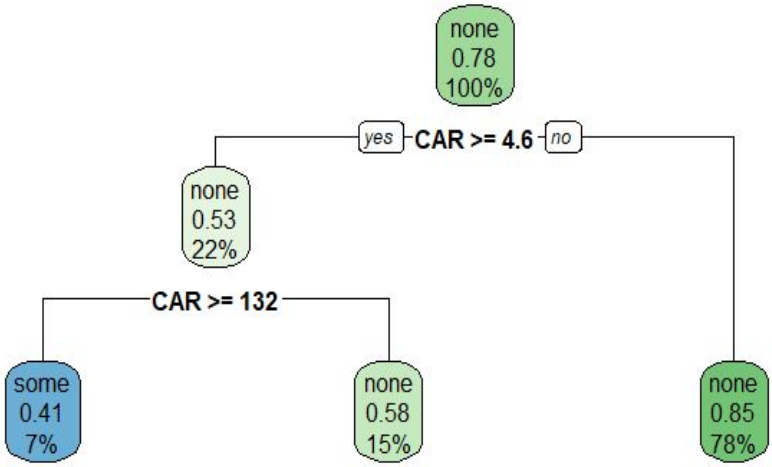
Types of charge	CODE
Course Fees	1CF
Student Development Svc	2DS
UIC Housing	2HO
International Service	2IS
UIC Library	2LB
Study Abroad	2SA
Anthropology	CAN
UIC Accounts Receivable	CAR
Aux Service	CAX
Sponsor Billing	CNT
Parking	CPK

Table 7

The table on the left shows all the types of charges used in the model training as the predictors. The column "Code" shows the simplified variable names in the model. We summed up the total incurred amount for each type of charge. Now we have the predictors. We also set up response variable, which has "none" meaning no hold at all and "some" meaning at least one hold. After applying different types of statistical learning techniques and training different models. We are able to achieve the best model for each type of responses.

To predict binary response, the best model is the decision tree. It turns out that late fee is the only significant variable to predict the hold.

Figure 17



The model shows that when a student's account incurred more than the total of $132 late fee, that student has 41% of chance to receive a hold in the next semester.

The sample only contains student information in one academic year. The model could be biased due to the variability of the sample could somehow time dependent. Thus, the only way to produce a better model is to collect more data from different years.

Financial Holds predicted by Authorized Payer

"Does having an authorized payer impact whether or not receives a financial hold?"

Table 8

Probability of Having a Hold by Authorized Payer Presence

Authorized Payer	Prob. Of Hold
No	25.64%
Yes	24.35%

By running a regression analysis we were able to determine the probability of a student receiving a hold if they have an authorized payer. The probability of any student receiving a hold regardless of whether they have an authorized payer is 25 percent. Although students who do not have an authorized payer are more likely to have a hold than those who do; this difference is not statistically significant so having an authorized payer does not impact whether a student receives a hold.

Student Matriculation by Funding Method

"Does funding method impact enrollment in a subsequent term (matriculation)? "

In this section we will classify funding methods into three different categories, loans, other financial aid, and payments. Loans eventually need to be paid back and therefore have different financial implications and repercussions than other types of financial aid, especially for students that dropout. As mentioned in the 'Financial Aid by College' section in the predictive analysis section, we already know that students that do not complete their degree are less likely to pay off their loans than those that do complete their degree (Trends in Student Aid, 2019). Financial aid will pertain to all types of financial aid not including loans. This is different because it counts as money that can be paid straight to the account and doesn't need to be paid back. Payments will be money paid in Figure 23 (e.g. card payments or a payment plan).

Figure 19

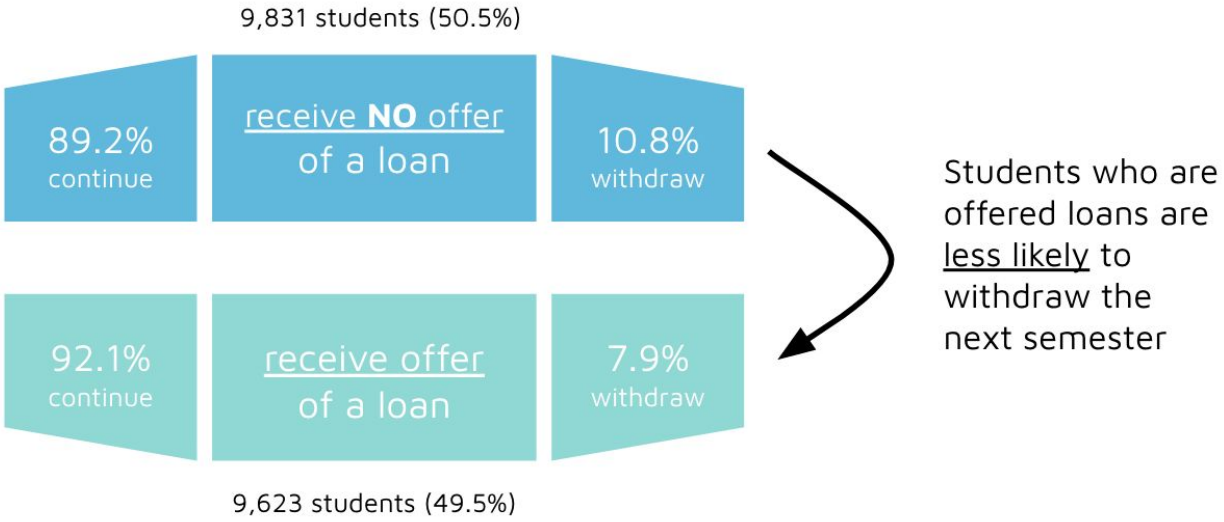


Figure 19 focuses on loans. We hypothesize that students that are offered loans have a better rate of matriculation because it helps them pay for account charges when needed, and they do not need to worry about paying for charges until after graduation.

We see from the dark blue portion of the graphic that students that are not offered a loan have a 10.8% withdrawal rate between the Fall 2017 and Spring 2018. The light blue section below shows that students who are offered a loan have a lower withdrawal rate of 7.9%. This supports our hypothesis above that offering students a loan will help more students matriculate and prevent withdrawing from enrollment.

Figure 20

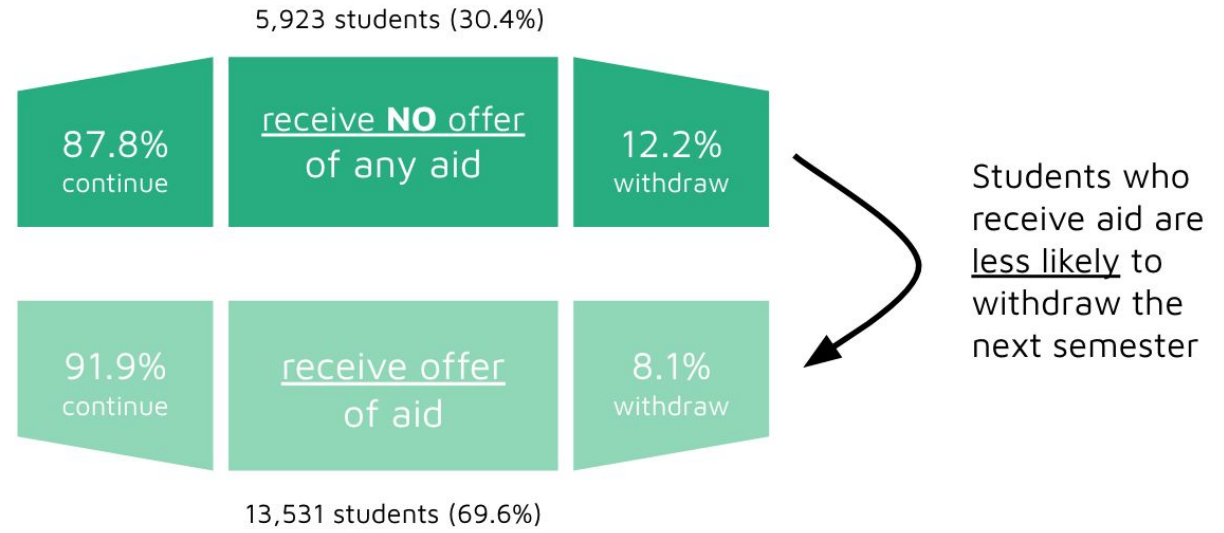


Figure 20 focuses on financial aid (not including loans). We hypothesize that students that are offered financial have a better rate of matriculation because it helps them pay for account charges immediately, without the worry of needing to pay it back later.

We see from the dark green portion of the graphic that students that are not offered financial aid have a 12.2% withdrawal rate between the Fall 2017 and Spring 2018. The light green section below shows that students who are offered a financial have a lower withdrawal rate of 8.1%. This supports our hypothesis above that offering students financial aid will help more students matriculate and prevent withdrawing from enrollment.

Figure 21

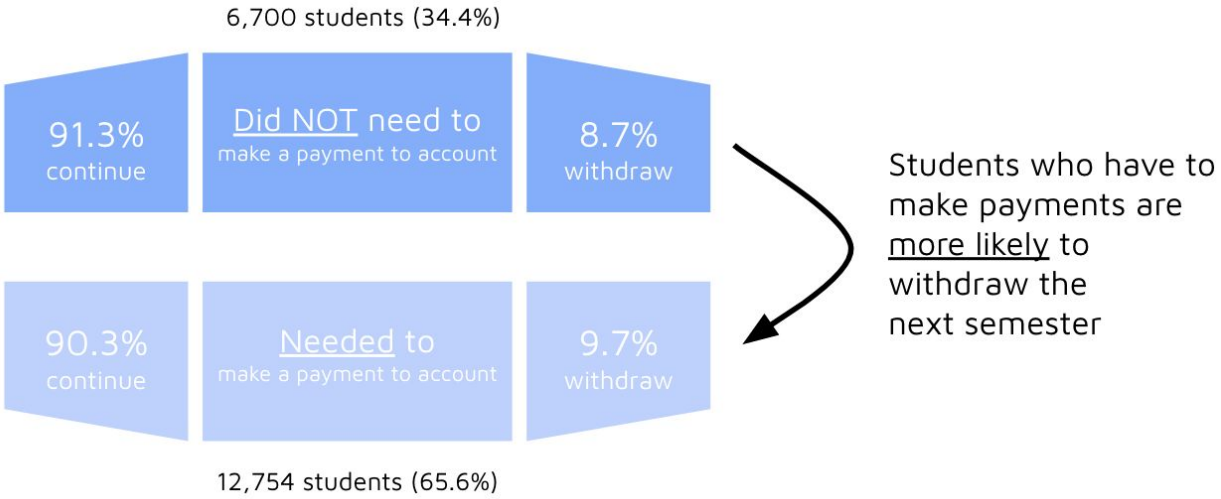


Figure 21 focuses on payments to the student account. We hypothesize that students must pay for their account charges straight out of pocket may have a lower matriculation rate than students who are offered loans or other forms of financial aid. Having to pay straight out of pocket without aid may cause more financial strain on students and make it difficult to provide means for continuing.

We see from the dark blue portion of the graphic that students that did not need to make payments to their accounts have a 8.7% withdrawal rate between the Fall 2017 and Spring 2018. The light blue section below shows that students who need to make a payment to their account out of pocket have a higher withdrawal rate of 9.7%. Although the percentage change in small, 1.0% of the population measures to be about 2,000 undergraduate students continuing because they did not need to pay their account charges. This supports our hypothesis above that offering students who have to make payments out of pocket have lower matriculation rates which may be due to not being offered financial aid options.

Key Takeaways From Section Three

Overall, we can see when it comes to financial hold, students from nursing is less likely to receive a hold. In contrast, students from architecture would have the highest probability of getting a hold among all other programs and colleges.

If we look at the charges, students with accumulated late fees exceeding $132 would have a 41% chance to receive a hold in the following semester. So, would having an authorized payer help reduce the chance of getting a financial hold? The answer is no. Having an authorized payer would only show the difference between payment method other than payment ability.

For the financial aid, no matter what type of aid is given to the students, college of public health would be always on the top two colleges who have the highest proportion of students receiving financial aid.

Finally, from the study of the matriculation rate, we know that students who are offered loans or financial aid are less likely to drop out. Also, students who have to make payment are more likely to withdraw from the college.

CONCLUSION

From predictive analysis, we learned that students who receive financial aid or loan would more likely to continue their education. Withdrawing from school would only increase the financial burdens on their shoulders. The students in the college of public health have higher chance to receive any type of financial aid, since their major is so important to the future warfare of the society. Student from College of Education would have more chance of receiving external financial aid. However, the average amount of financial aid in the college of Education is the lowest.

The average probability of receiving a hold for all 9 colleges is 25%. Most of the colleges have the probability close to the mean. However, the College of Nursing has significantly lower probability of getting a hold. Maybe the secret of taking good care of the patients is to take care of the bill first. The College of Architecture has the significantly higher probability of getting a hold. Perhaps, to learn how to build up a floor, they have to build up their bill first. To see if a student would end up a hold again next semester. We can see how much late fee was totally incurred in the previous semester. If it exceeds $132, that students have a really high chance to be late and get a hold again in the next semester.

Overall, given the time constraints, messy data, and limitations, we can conclude that, just like our title claims, money does matter. It plays a role in the lives of undergraduate students at UIC, and as a data mining team for the SMMC, we have provided insight on these key factors influencing student matriculation to the best of our ability. We see that financial aid, financial holds, and cost of attendance are not as equally distributed as one would expect, and we hypothesize explanations for these financial discrepancies to the best of our ability. We hope that these key findings are helpful and provide insight on the student matriculation and help aid the Student Success Initiative at UIC in providing a successful future to undergraduate students.

APPENDIX

AUTHOR CONTRIBUTIONS:

Smruthi Iyengar
-Abstract
-Demographics of Sample: Year in School
-Key Takeaways From Section One
-Students with Financial Holds
-Students who Dropout due to Financial Holds
-Key Takeaways From Section Two
-Financial Holds by College
-Financial Holds predicted by Authorized Payer

Kagen Quiballo
- Title Page
- Objective
- Outline
- Demographics by Sample: Gender
- Demographics by Sample: Residency
- Representative Sample
- Semesterly Matriculation
- Financial Aid by College
- Student Matriculation by Funding Method
- Conclusion
- References

Hanqing Wang
- Sample extraction
- Drop-out Rate
- Section Abstract For Section Three
- Section Key Takeaways For Section Three
- Financial Holds predicted by Charges
- Conclusion first two paragraphs

Yuxin Wang
- Demographics by Sample: College
- Cost of Attendance: College
- Cost of Attendance: Major
- Section Abstract For Section Two

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