

Money Matters:

A data mining project on
UIC undergraduate matriculation rates
and financial information

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The Student Success Initiative @ UIC

SSI

A large-scale project at University of Illinois at Chicago that has been going for several years

This year they are focusing on finances as a means to improve retention and matriculation for undergraduate UIC students



STUDENT SUCCESS INITIATIVE



UNIVERSITY OF ILLINOIS AT CHICAGO



UNIVERSITY STUDENT FINANCIAL SERVICES
AND CASHIER OPERATIONS (USFSCO)



STUDENT MONEY MANAGEMENT CENTER



DATA MINING TEAM (INTERNS)

Presentation Overview

SECTION I.

Summarize the data

sample size
demographics
enrollment rates

SECTION II.

Analyze the data

representative sample
matriculation rates
financial holds, aid, costs

SECTION III.

Predictive analysis

matriculation rates
financial holds, aid

SECTION I.

Summarize the data

sample size UIC undergraduate students (2017-2019)

demographics gender, residency, year in school, college

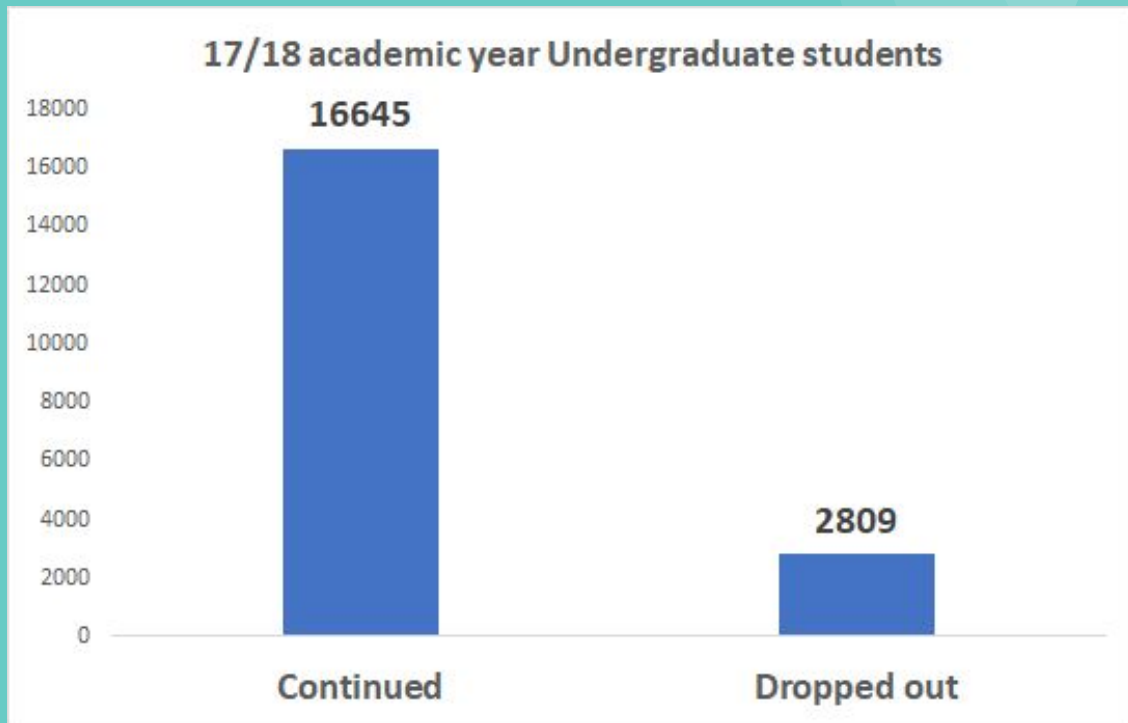
dropout rates semester & yearly (2017-2019)

Sample Size

Total : 19454

**Sample contains all
undergraduate students who
enrolled Fall 2017**

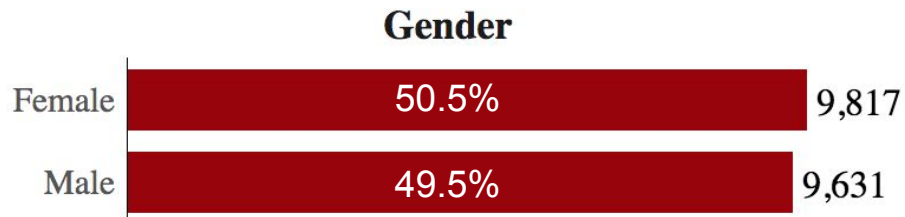
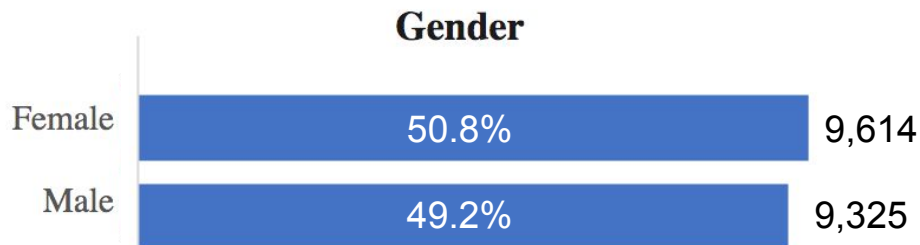
**Drop-out sample contains who
choose not to continue their
education at any point from the
beginning of Fall 2017 to the end
of Spring 2018**



Demographics: Gender

BANNER DATA

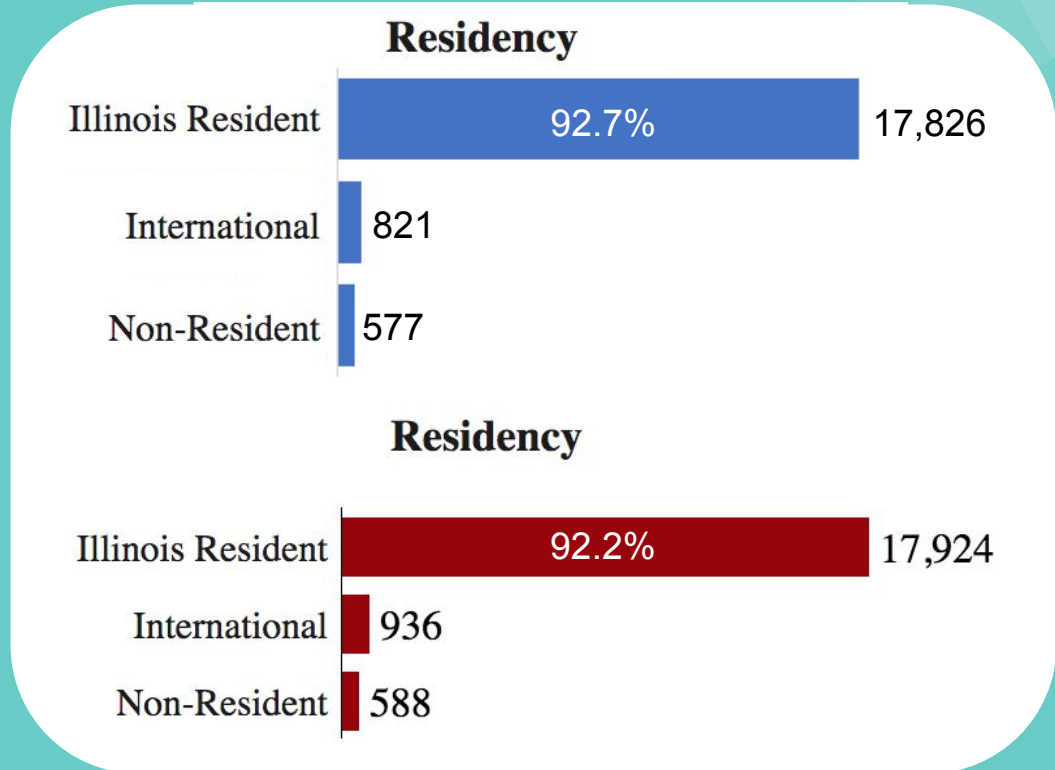
UILLINOIS



Demographics: Residency

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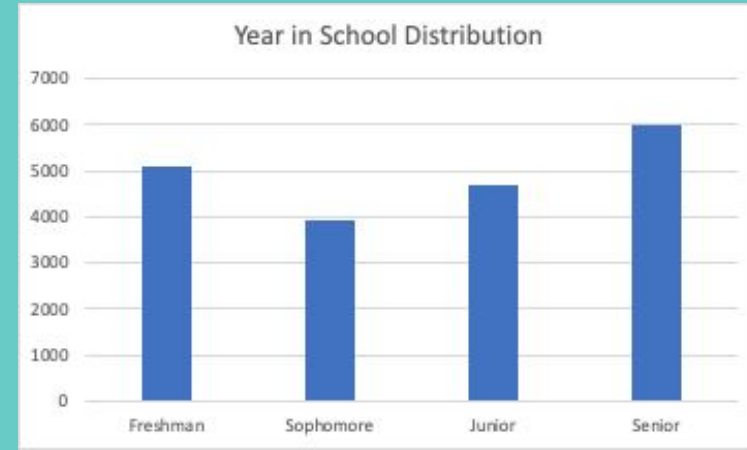
UILLINOIS



Demographics: Year in School

Most Students are
seniors (n = 6,000)

Sophomores have the
smallest amount of
students (n = 4,000)



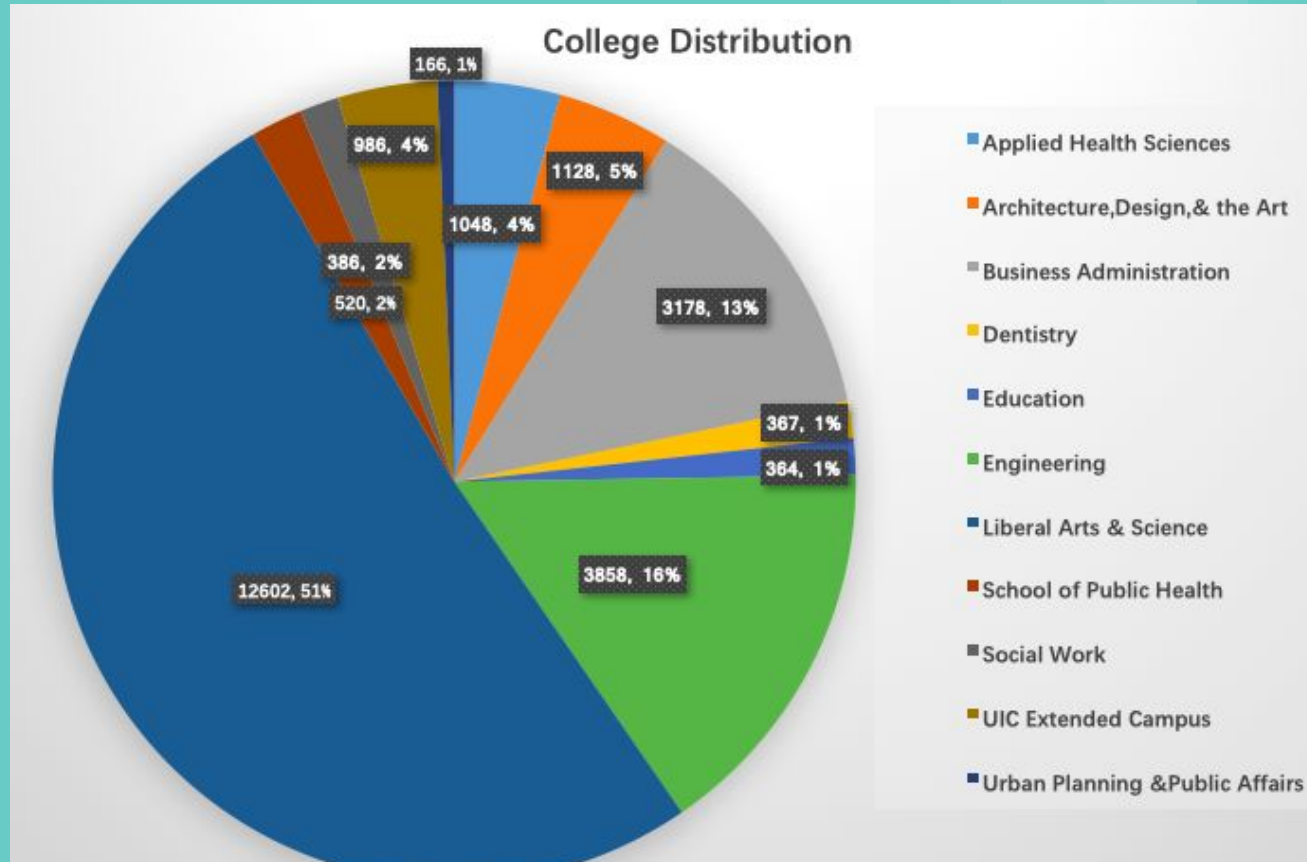
Demographics: College

Most students choose to study in:

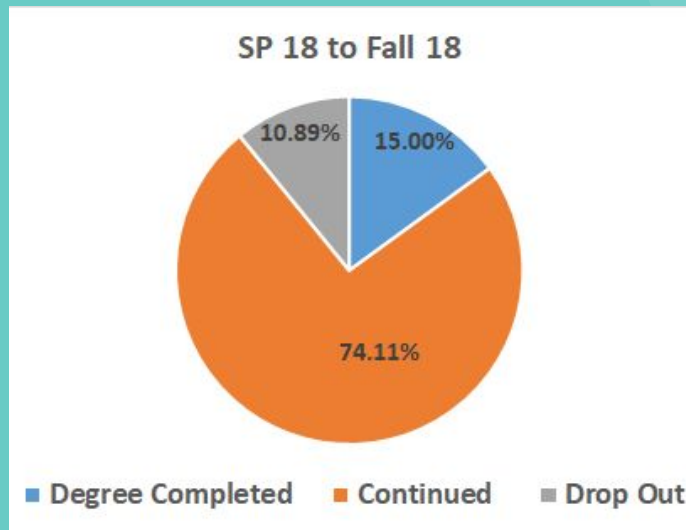
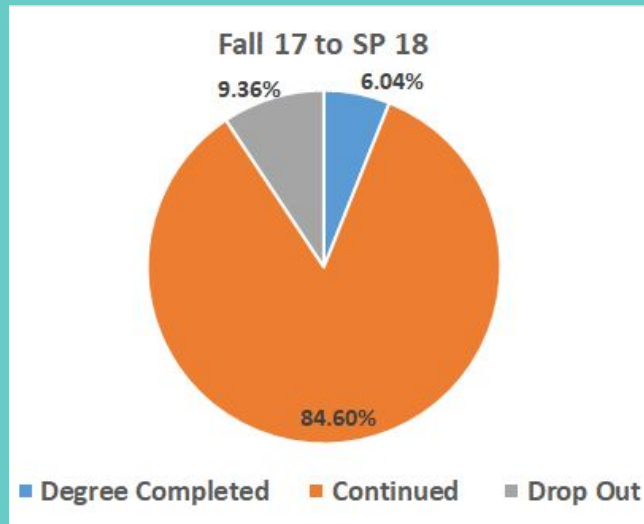
Liberal Arts & Science

Engineering College

Business College



Drop-out Rates (by Semester)

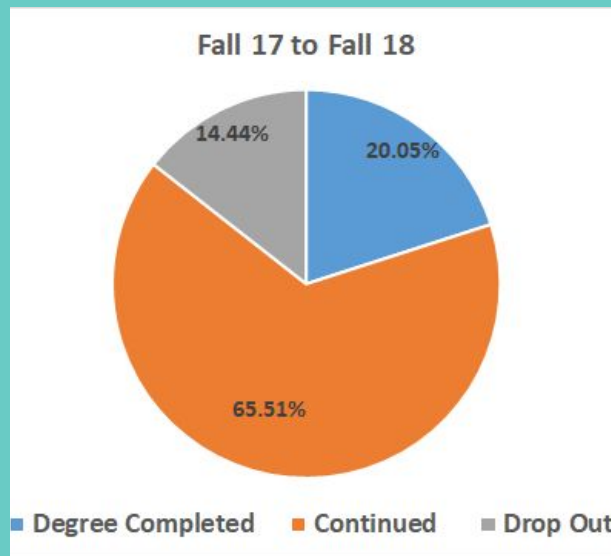


Drop-out

Drop-out + Continued

	Fall 17 to SP 18	SP 18 to Fall 18
Drop Out Rate	9.96%	12.81%

Drop-out Rates (Yearly)



Drop-out

Drop-out + Continued

	Fall 17 to Fall 18
Drop Out Rate	18.06%

Key Takeaways from Section I

- The gender distribution of students in the sample is about even.
- A large majority of the population are in state students.
- The year in school distribution is about even but a majority of students are seniors and sophomores have the least amount of students.
- Over half of the students are in LAS.
- Dropout rates are higher from the spring semester of 2018 to the fall semester of 2018 compared to the fall semester of 2017 to the spring semester of 2018.

SECTION II.

Analyze the data

representative sample banner, census
matriculation rates semesterly (2017-2019)
financial variables financial holds, financial aid
cost of attendance costs by college, by major

Representative Sample

Undergrad students at UIC enrolled between Fall 2017 and Spring 2019

BANNER DATA

18,976 students

CENSUS DATA

19,454 students

REASONS

- Possible to register for 0 credit hours and still be enrolled (internships, etc)
- Census is a snapshot on 14th day of classes and may not show students who drop out afterwards

Demographics data accurate within **0.5% error**

Matriculation Rates by semester

METHODS

UNDERGRADS

accurate & representative

accuracy

matched demographics within
0.5%

example

blanks in S18 →
look for refund during
active term (F17)

CREDIT HOURS

no blanks/0s → blanks/0s

blank (did not register)

0 (registered and dropped,
there are a few exceptions)

REFUND

for corresponding term

Matriculation Rates by semester

Total dropout from F17 to S19

8,360 = 44.1%

18,976
students

F17

dropout:
2,491 students

13.1%

S18

dropout:
3,904 students

20.6%

F18

dropout:
1,965 students

10.4%

S19

UG Discontinue: at least 1 semester

↓ PREVIOUS
SLIDE

F17	S18	F18	S19	COUNT	REFUND TUITION
	did not continue			2,491	1,231 (49.4%)
		did not continue		3,904	2,545 (65.2%)
			did not continue	1,965	976 (49.7%)

*overlap of 108 students in rows 1 & 3

UG Discontinue: 'complete dropout'

F17	S18	F18	S19	COUNT
	did not continue			2,069
		did not continue		3,643
			did not continue	1,857
				10,724

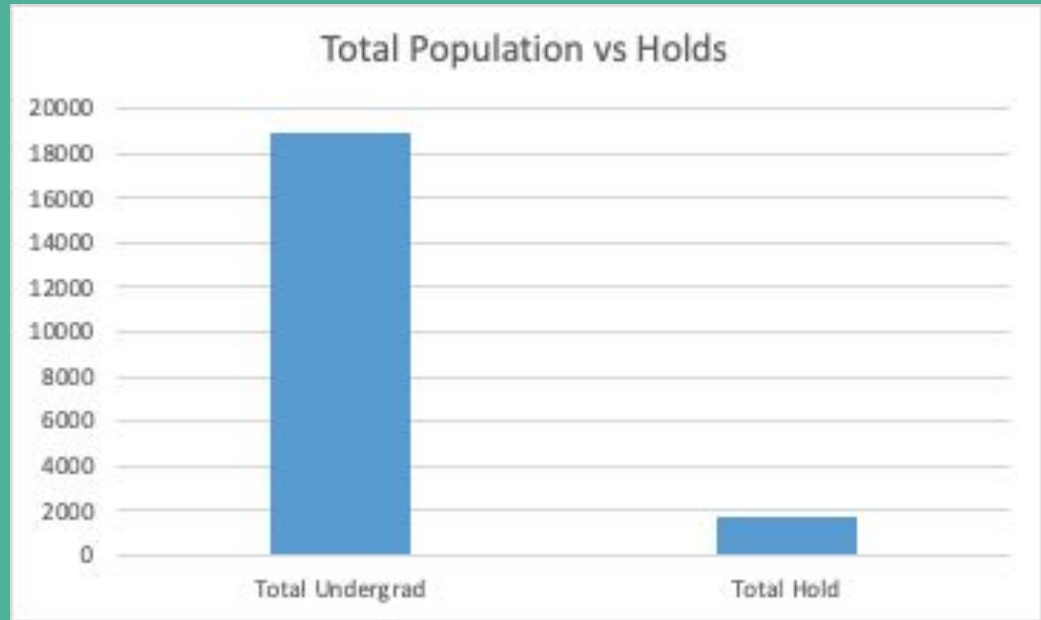
Matriculation Rates by semester

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

Financial Holds

1655 undergraduates had
a hold

9 percent of total
population

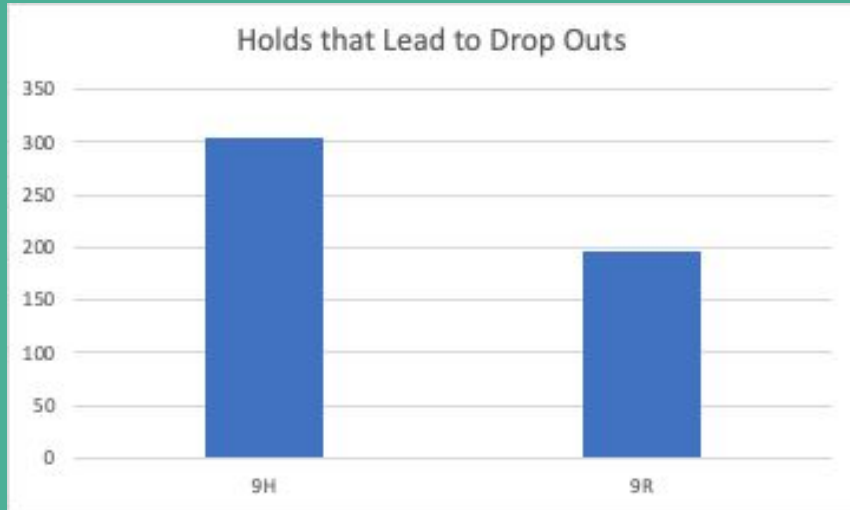


Financial Holds

(how many students cannot continue)

499 students can not continue due to a financial hold.

Most have 9H hold (n = 303)



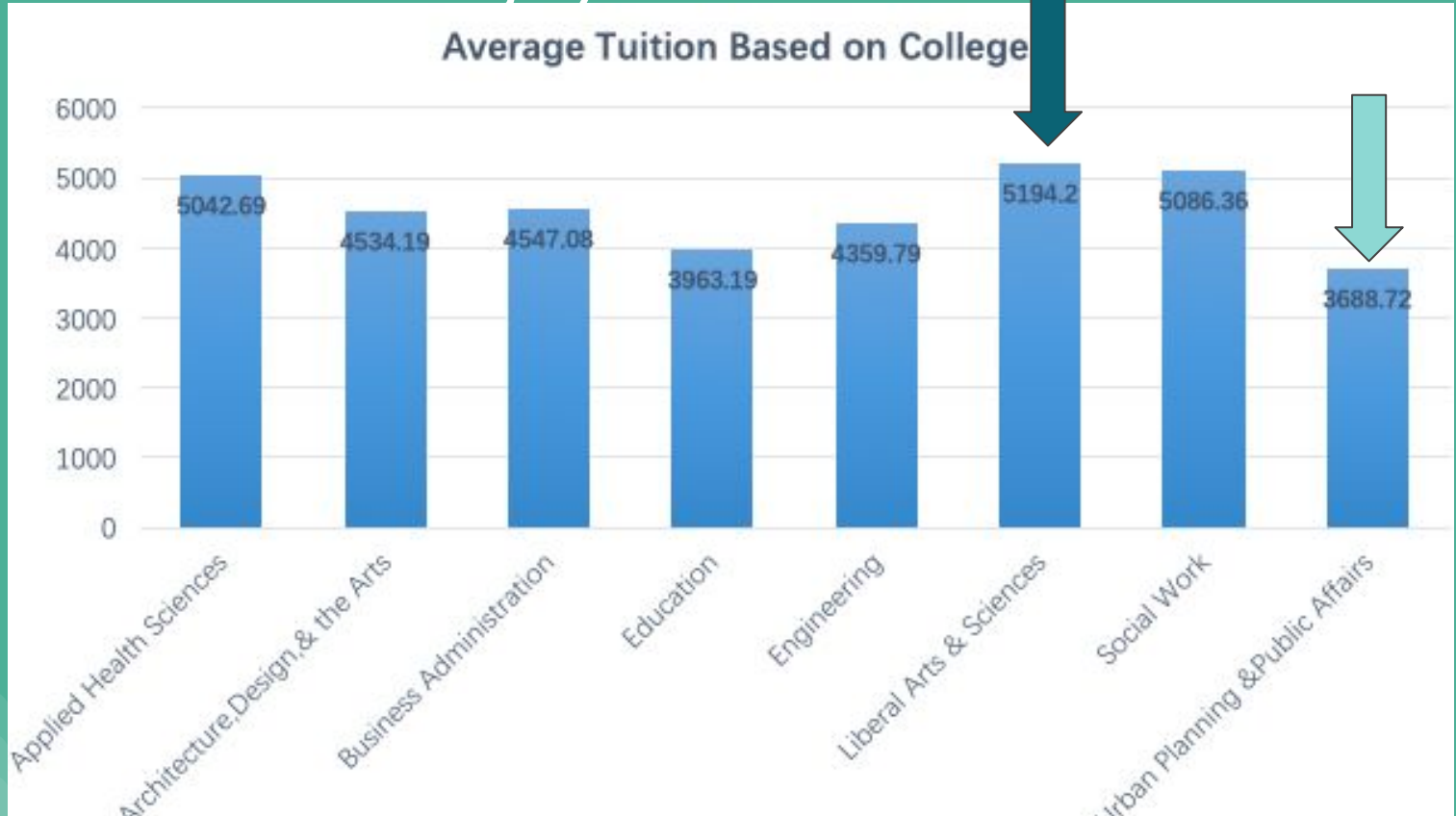
Cost of Attendance

What is the average cost of attendance for the sample?

Registration Fee: 578\$

Registration Tuition: 5640\$

Cost of Attendance (based on college)



Cost of Attendance (based on major)

Tuition of Top 5
popular majors:

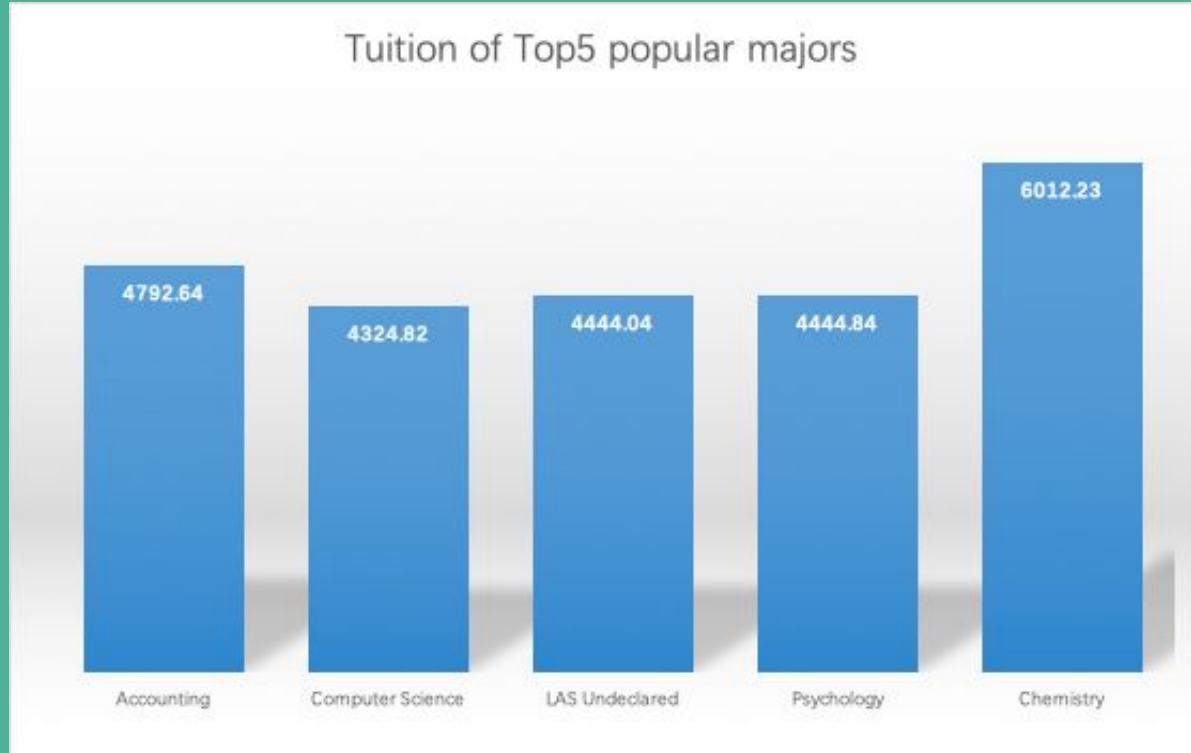
Chemistry

Accounting

Psychology

Computer Science

LAS Undeclared



Key Takeaways from Section II

- The total drop out rate from Fall 2017 to Spring 2019 is as high as 44.1%
- The Cost of attendance for Chemistry major is the highest among all majors
- Senior and junior have the highest proportion of students who receive the financial holds



SECTION III.

Predictive analysis

financial holds

by college, by degree, predicted by account charges or authorized payer

financial aid by college, by degree

matriculation rates by funding type



Financial Holds

(students from dif college/degree more likely to have one)

Nursing and Architecture are the only ones Statistically Different from the mean probability of having a hold (25%)

Nursing P value = 0.00651

Architecture P Value = 0

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%

Financial Aid by college

19,454 undergrads 1718 yr

INSTITUTIONAL

BENEFITS

EXEMPTIONS

WAIVERS

SCHOLARSHIPS

PRIZE/AWARD

5,611 students

EXTERNAL

SCHOLARSHIP
(has 'External' in desc.)

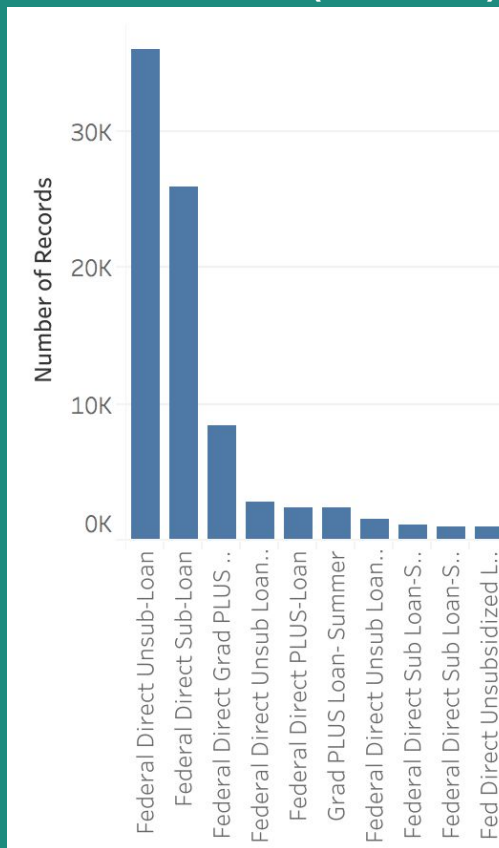
GRANT

LOAN

WORK

14,640 students

Top 10 Loan Names are Federal Direct (external)



Financial Aid by college: External

COLLEGE	STUDENTS IN COLLEGE	HOW MANY RECEIVED AID	PERCENTAGE RECEIVED AID	AVG AMOUNT (\$)
LAS	9,691	7,618	78.61%	13,375
Engineering	3,604	2,430	67.43%	14,743
Business	2,987	2,207	73.89%	13,455
Arch/Design/Art	1,064	792	74.44%	14,762
App. Health Sci	999	765	76.58%	13,235
Nursing	477	318	66.67%	17,438
Education	388	328	84.54%	12,549
Urb Planning	147	104	70.75%	15,148
Public Health	97	78	80.41%	14,445
ALL COLLEGES	19,454	14,640	75.25%	14,350

KEY FINDINGS

Inverse relationship between percentage and avg amount

Reason: more money to give to less people

Financial Aid by college: Institutional

COLLEGE	STUDENTS IN COLLEGE	HOW MANY RECEIVED AID	PERCENTAGE RECEIVED AID	AVG AMOUNT (\$)
LAS	9,691	2,707	27.93%	4,632
Engineering	3,604	1,034	28.69%	4,772
Business	2,987	1,054	35.29%	4,824
Arch/Design/Art	1,064	277	26.03%	4,868
App. Health Sci	999	276	27.63%	4,696
Nursing	477	75	15.72%	4,456
Education	388	95	24.48%	4,075
Urb Planning	147	31	21.09%	4,322
Public Health	97	62	63.92%	5,910
ALL COLLEGES	19,454	5,611	28.84%	4,728

KEY FINDINGS

Approximately
same average
amount except for
Public Health

Nursing lowest % for
both types

Public Health highest %
for both types

Institutional: fair
allocation

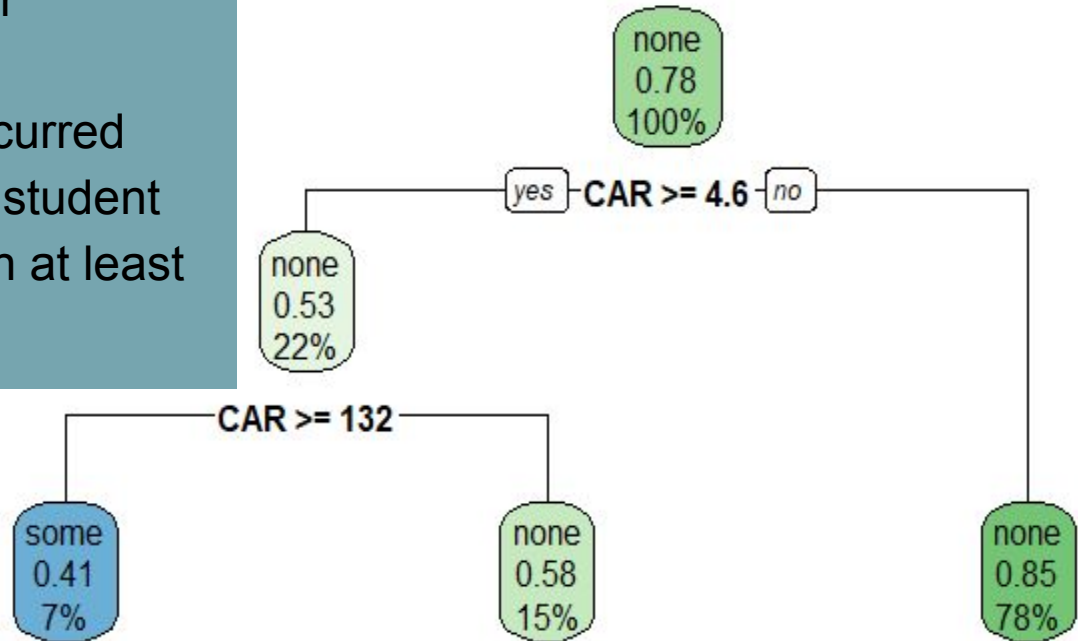
Financial Hold (predicted by charges)

- One model predicting hold based on previous semester charge incurred
 - None, Some
- One model predicting which type of hold based on previous semester charge incurred
 - None, 9H, 9R, Both

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

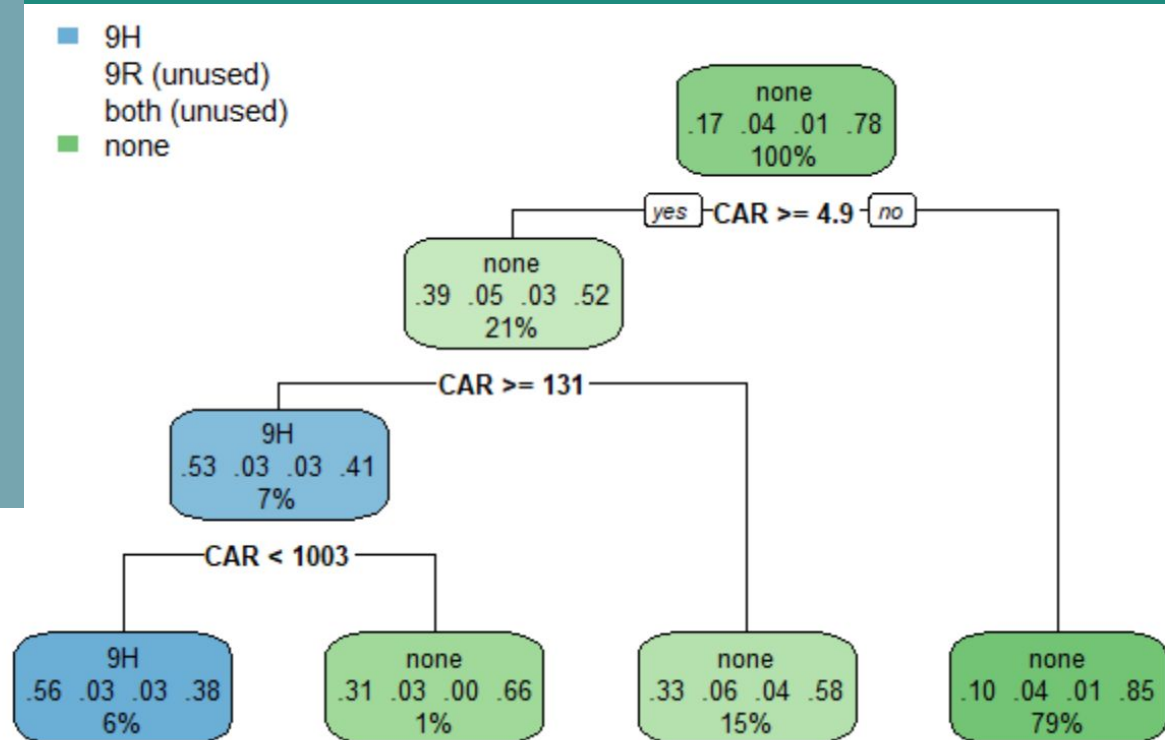
Model #1 charge predict Hold

- Among 11 types of charge, late fee charge (CAR) is significant for predicting hold
- When total late fee charge incurred exceeds 132 in fall 2017, the student has 41% chance ends up with at least 1 hold in Spring 2018



Model #2 charge predict Hold

- late fee charge (CAR) is significant for predicting hold
- When total late fee charge incurred exceeds 131 in fall 2017, the student has 56% chance ends up with 9H hold in Spring 2018



Financial Hold

(having an authorized payer: more or less likely to have a hold)

Methodology - Regression Model

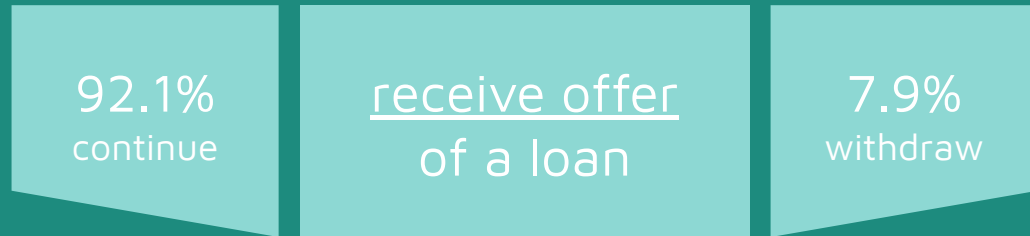
There is **no** statistically significant difference between students who have a authorized payer vs students that don't.

P value = 0.0634

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

Matriculation Rates: Loans (F17/S18)

9,831 students (50.5%)



9,623 students (49.5%)



Students who are offered loans are less likely to withdraw the next semester

Matriculation Rates: Financial Aid (F17/S18)

NOT including loans

5,923 students (30.4%)



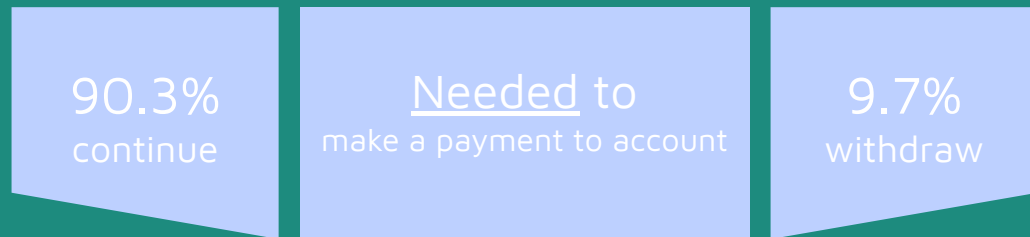
13,531 students (69.6%)



Students who receive aid are less likely to withdraw the next semester

Matriculation Rates: Payment (F17/S18)

6,700 students (34.4%)



12,754 students (65.6%)



Students who have to make payments are more likely to withdraw the next semester

Key Takeaways from Section III

Students from nursing program is less likely to receive a hold

College of public health would be always on the top two colleges who have the highest proportion of students receiving financial aid

Having an authorized payer would only show the difference between payment method other than payment ability

Students who are offered with 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

Conclusions

Money DOES play a role in students continuing in college

The patterns might be vague, but we know financial information such as holds, aid, and costs do play role