



UNIVERSITY OF  
TORONTO

# The impact of T-Card and U-Pass Repurchases on UTM students' finances

## MOTIVATION

Focus: To study the correlation between the amount of T-Cards to U-Passes lost by UTM students with the motive of drawing conclusions about overall financial effect on the UTM student population.

### **COST OF REPURCHASING A T-CARD**

- \$12.00 per T-Card replacement regardless of the term

### **COST OF REPURCHASING A U-PASS**

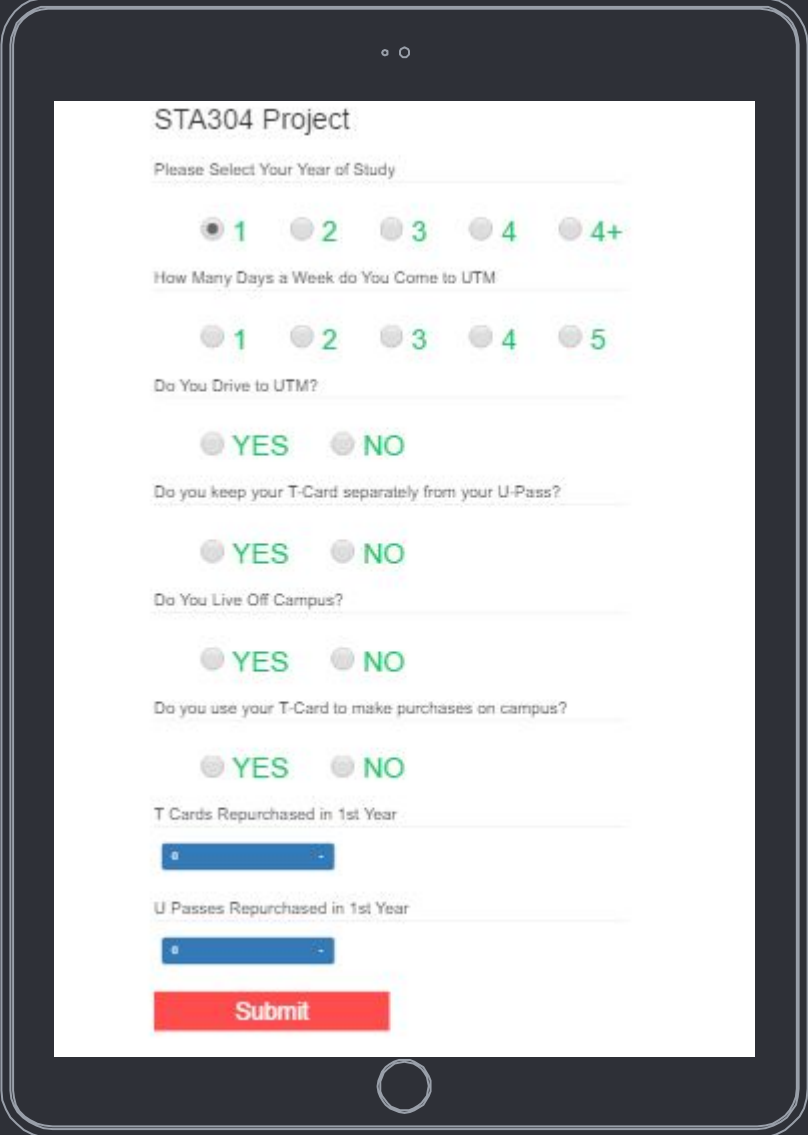
- Summer U-Pass replacement cost: \$60.00 per U-Pass
- Fall/Winter U-Pass replacement cost: \$100.00 per U-Pass

**The inferences that are to be drawn from the analysis can potentially be used to reduce the amount of student funds spent inefficiently**



# Survey Methodology

- Systematic Random Sampling:
  - Interval - each 35th student
  - Required sample size is 400 units
- Survey collected via in-house developed web application:
  - Tailored to our project's specifications
  - Allowed the entered data to be transferred to a csv file on the back-end



STA304 Project

Please Select Your Year of Study

☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 4+

How Many Days a Week do You Come to UTM

☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Do You Drive to UTM?

☒ YES ☐ NO

Do you keep your T-Card separately from your U-Pass?

☒ YES ☐ NO

Do You Live Off Campus?

☒ YES ☐ NO

Do you use your T-Card to make purchases on campus?

☒ YES ☐ NO

T Cards Repurchased in 1st Year

U Passes Repurchased in 1st Year

**Submit**



## LOCATION: DAVIS BUILDING

- MIWAY BUS TERMINAL
- HOME TO A NUMBER OF FACILITIES AND STUDENT SERVICES
- THE LARGEST FOOD COURT ON CAMPUS
- THE LARGEST PARKING GARAGE



# LIMITATIONS

# • Limitations

## **Lack of time and manpower**

Instead of surveying every 35th student, a minimum interval of 8 was set.

## **Data collection software issues**

Additional data collection had to be carried out due to errors in the back-end

## **Sampled students' misunderstanding**

Attempt of minimizing this error by proactively clarifying the questions during the collection process.



# DETAILED FINDINGS





## ● ANALYSIS

○ LINEAR  
REGRESSION

○ PROPORTIONS

○ RESULTS

## LINEAR REGRESSION FOR TOTAL NUMBER OF T CARD LOSS

Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	-0.55473	0.37400	-1.483	0.1389
<i>Year_Of_Study</i>	<i>0.24649</i>	<i>0.04452</i>	<i>5.537</i>	<i>6.04e-08 ***</i>
<i>Total_Number_Upass_Loss</i>	<i>0.74059</i>	<i>0.07862</i>	<i>9.421</i>	<i>&lt; 2e-16 ***</i>
Separate	0.09148	0.13164	0.695	0.4876
Off_Campus	-0.15554	0.16463	-0.945	0.3454
Drive	-0.11350	0.13223	-0.858	0.3913
<i>Days</i>	<i>0.13865</i>	<i>0.06096</i>	<i>2.274</i>	<i>0.0235 *</i>
Purchases	0.28323	0.18066	1.568	0.1178

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Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.9469 on 351 degrees of freedom  
(41 observations deleted due to being missing)

Multiple R-squared: 0.3137, Adjusted R-squared: 0.3

F-statistic: 22.92 on 7 and 351 DF, p-value: < 2.2e-16

## PROPORTIONS

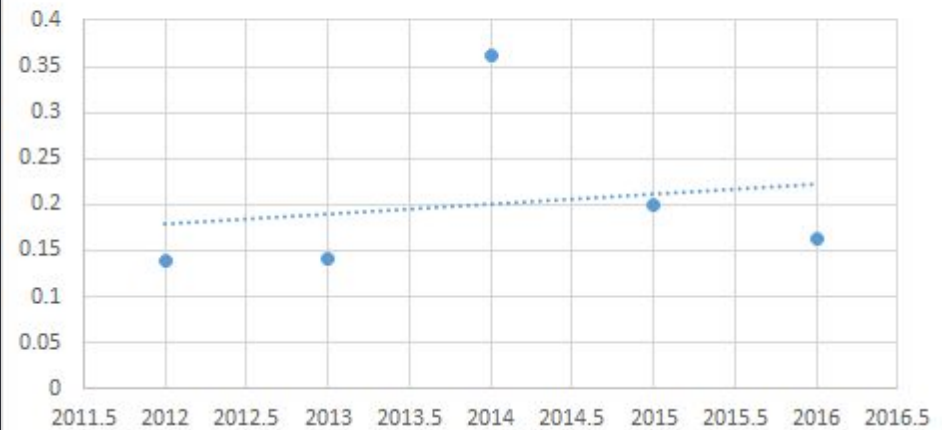
The fitted line for both proportions was generated.

Implications:

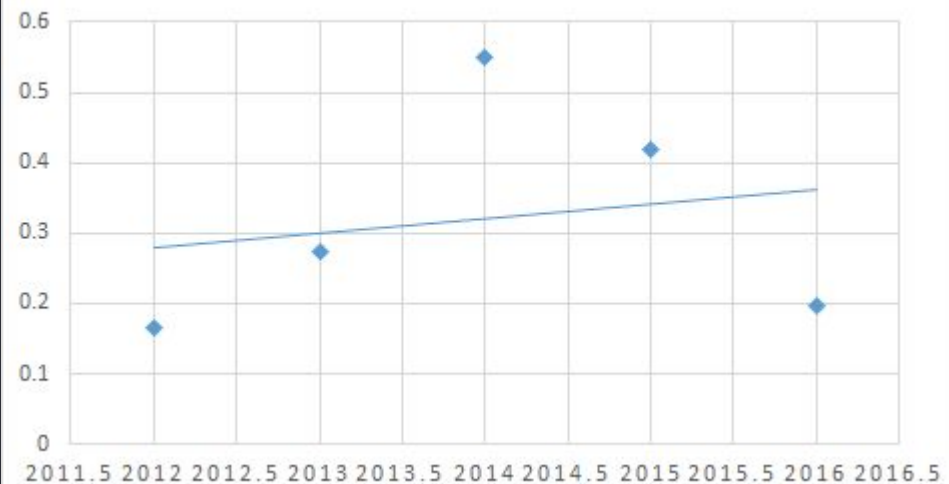
- Positively sloped:
  - o Increased amount of losses for each consequent year
  - o Problem: implies that the amounts of items lost will be approaching infinity as we look further in the future

For the purpose of this project the mean proportions of T-Cards and U-Passes lost per student were used to estimate our prediction.

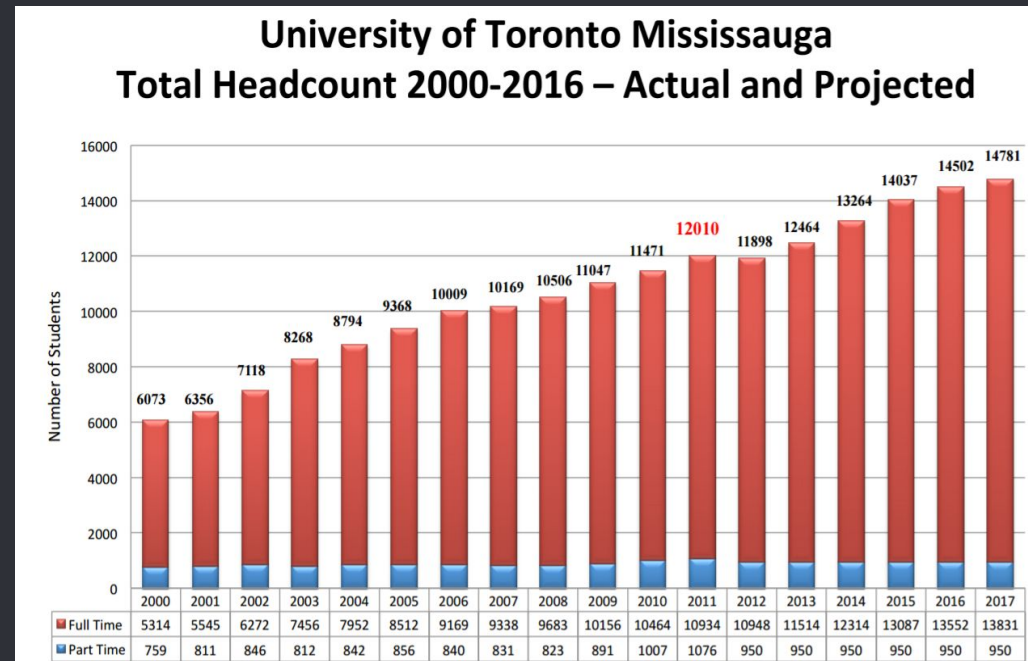
PROPORTION OF UPASS LOST PER STUDENT



PROPORTION OF TCARD LOST PER STUDENT



- As per the graph, the estimated UTM population in 2017 will be approximately 14781 students.



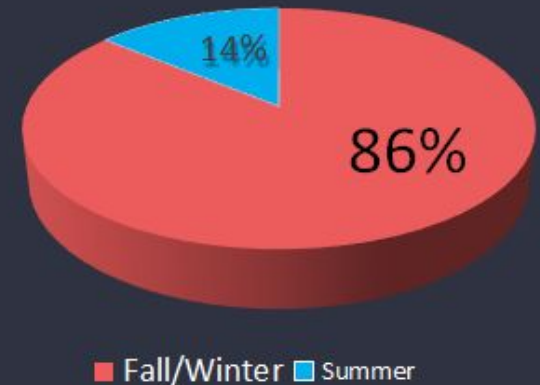
Therefore, the estimated amounts of T-Cards and U-Passes Lost in 2017 are 5936 and 3713 respectively.

- ACCOUNTING FOR DIFFERENCE IN COST OF U-PASSES PER TERM

Quantities lost per term:

- ✓ Summer: 506
- ✓ Fall/Winter: 3207

*Ratio of U-Passes Lost by term by UTM students*





# CONCLUSION



**\$422,292**

Whoa! That is A LOT of money!!!



# STRONG CORRELATION

Between T-cards and U-Passes Repurchases





## IS IT TIME FOR IMPROVEMENT?

- Implementation of electronic chips similar to PRESTO?
- Liquidation of paper U-Pass concept

## CREDITS

Special thanks to all the team members for contributing their time and effort in completing this project:

- Arsala Bangash
- Shun Ikeda
- Ryan Mazur
- Santiago Ordonez
- Jonathan Wang
- Inessa Zaslavskaya
- Dilan Goonerwardene
- Yesar Salmon Bassim

**Thank You!**

**ANY QUESTIONS?**

