Postsecondary Transfers into the University of Toronto:
Findings from a New TDSB-UofT Data Linkage
Final Report

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Executive Summary

Student who move from the Toronto District School Board (TDSB) into the University of Toronto (UofT) provide ideal cases for examining characteristics and outcomes of a range of transfer students. In 2020 I compared transfer students and direct-entry students using a dataset with 29,000 former TDSB students who attended UofT. However, that data set lacked transfer flags and measures of transfer credits awarded. This report describes a new study that examines a second dataset on 18,000 students in the TDSB-UofT pathway. It contains similar measures, but also contains transfer credit flags and measures numbers of credits awarded. This new dataset is used to address six research questions: 1) What is the overall proportion of transfer students among undergraduates in the TDSB-UofT pathway? 2) From which institutions do they transfer into UofT? 3) Do transfer and direct entry students differ in their demographics and high school academic profiles? 4) How many transfer students are awarded some credits at UofT for previous course work, and how many credits did they receive? 5) Do transfer and direct entry students differ in their academic outcomes at UofT, and 6) Do transfer credits awarded influence those outcomes? This report describes the following major findings:

1) Overall, 1.6% of undergraduates in the TDSB-UofT pathway were transfers from another postsecondary institution; among them, 44% transferred from another Ontario university, 28% were from Ontario community colleges, and the remainder were from other Canadian universities, international universities, and private career colleges.
2) Most transfers came from Toronto-based universities and colleges; the remainder were mainly from other institutions in Southern and Eastern Ontario
3) Compared to direct entry students, transfer students were significantly more likely to speak English as their first language, to be female, born in Canada and to self-identify as 'white'. Academically, they had significantly lower high school grades and worse high school attendance than direct entry students. Transfers from Ontario community colleges generally had the least conventional academic records.
4) Almost all transfers from universities were awarded transfer credits, receiving 4.7 credits on average; most transfers from community colleges also received credits, receiving 2.6 credits on average; none of the small number of transfers from private career colleges received credits.
5) While transfers from universities were less likely to enter STEM fields at UofT than were direct entry students, they had similar cumulative grade point averages, total credits earned, and graduation rates. Transfers from community colleges were also less likely to enter STEM fields of study, but also earned fewer total credits and had significantly lower graduation rates.

Just over half of community college transfers graduated within the timelines of the study. Their lower graduation rates were driven largely by their weaker academic records in high school and fewer transfer credits awarded.
6) Having greater numbers of transfer credits awarded boosted outcomes among all students. Statistical models predicted that if community college transfers had greater numbers of credits awarded they could narrow graduation gaps between themselves and other students.

Key differences in findings between this study and the previous TDSB-UofT study are traced to a key methodological issue: namely, that data sources can detect greater proportions of transfers and academic gaps between direct entry and transfer students if they track larger numbers of students who were geographically mobile during high school. The reason is that those students in turn are more prone to become postsecondary transfers and to have checkered high school academic records.

Using these findings, two policies aimed at improving university outcomes for transfer students, and one direction for future research are discussed. First, universities should be encouraged to further develop mechanisms for granting transfer credits while maintaining their academic integrity at the same time. Second, since gaps in outcomes between community college transfers and other students can be partly attributed to the former's lesser academic preparation, universities should consider bolstering their academic supports for transfer students, such as remedial opportunities, mentoring and related programs. Finally, this report calls for future research that involve data merges among multiple institutions.

Introduction: Purpose of this Second Report

As noted in my previous report, transfer students are difficult to study since by definition they are geographically mobile and take meandering paths through high schools and into postsecondary institutions. Many students take lengthy periods of time with multiple stops and re-starts. To face these challenges, many researchers have turned to administrative data to track students over several years while at the same time providing population-level coverage.

My first study linked high quality data to cover an entire population of students from Canada's most trafficked educational pathway - that between the Toronto District School Board (TDSB) and the University of Toronto (UofT). It tracked cohorts of students for 8-18 years, thereby capturing many that dropped out and later re-entered high school, took gap years between high school and postsecondary, and entered, exited and re-entered higher education. It used a record of students' previous institution to detect transfer students. It improved upon the use of credit transfer flags on student transcripts to detect transfer, since that method neglects other varieties of transfer students, such as those who did not receive transfer credits, those from universities outside of Ontario and those from various colleges.

This new study improves further on those methods, while examining a different slice of students in the UofT-TDSB pathway. It uses students' previous institution to detect a variety of transfer students, while also containing the transfer flag and a measure of the number of transfer credits awarded by the University of Toronto. However, the new study design captures a different segment of the student population and thus finds some different trends in processes of transfer. The following sections describe this study's research questions, data and major findings.

Research Questions:

This report addresses several related questions: 1) What is the overall proportion of transfer students among undergraduates in the TDSB-UofT pathway? 2) From which institutions do they transfer into UofT? 3) Do transfer and direct entry students differ in their demographics and high school academic profiles? 4) How many transfer students are awarded some credits at UofT for previous course work, and how many credits did they receive? 5) Do transfer and direct entry students differ in their academic outcomes at UofT, and 6) Do transfer credits awarded influence those outcomes?

Data and Methods:

Data Sources: As in the previous report, the dataset used in this current study come from an extended partnership between the TDSB, Canada's largest public school board, and UofT, Canada's largest university (see Brown, Davies and Chakraborty, 2019, and Brown, 2022 for details). It integrates several data sources: student records at both institutions, census data, and a survey of student demographics and attitudes. It utilizes a longitudinal cohort design, capturing all students in 6 consecutive grade 12 cohorts, and smaller numbers in 4 other cohorts.

Data Matching and Merging:

As in the previous dataset, students who were captured in the matching process shared the same starting point – enrolling in grade 12 in a TDSB school – and a common destination – undergraduate enrolment at UofT. The initial matching process captured 56,484 students. All of those students were once in grade 12 in TDSB, mainly between 2006 and 2011, and also had student records at UofT, mainly between 2007 and 2012. Among those matches, 33,669 (59.6%) were applicants only and never enrolled in UofT. Another 2,707 (4.8%) attended UofT only in noncredit certificate or transitional programs. Another 1,925 students (3.4%) enrolled in UofT only as graduate students. Finally, 18,183 (32.2% of all matches) enrolled as undergraduates at U of T. This report focuses only on the latter group.

The first sizable cohort initially entered UofT in the fall of 2007 - only 0.4% entered UofT prior to the fall of 2007. Most of those entrants in were in grade 12 in the fall of 2006. After the fall of 2013, only 2.7% of the population had not yet entered UofT.

Analytic Sample:

This study examines 18,183 former TDSB grade 12 students who entered UofT as degree-seeking undergraduates. Almost 95% of that group initially entered UofT between 2006 and 2011. Only 0.5% of all students entered UofT in September 2006 or earlier.   The first sizeable cohort began grade 12 in the fall of 2006, most of whom entered UofT in the fall of 2007. The last sizeable cohort was in grade 12 in the fall of 2011, most of whom initially entered UofT in the fall of 2012. About 6% of those students entered UofT between January 2013 and September 2020.

While most TDSB and UofT student records are nearly 100% complete with 2 exceptions (discussed in the next paragraph), TDSB demographic variables have sizeable rates of missing data since they were derived from a different data source - the TDSB student census. That survey had a good response rate overall, but those rates were lower for some questions, particularly those that asked students about their parents' occupation and education. Those items had about 70% valid cases. Fortunately, there is little reason to believe that such non-response could confound analysis of transfer students.

The dataset had two key sources of missing data that could have potentially influenced the identification of transfer students. First, 338 students (1.9%) had missing data on the main variable used to identify transfer students – student's previous institution prior to applying to UofT. Thus, about 2% of the population have unknown transfer status, and are therefore not included in any analyses. Second, the cohort identifier variable had a substantial amount of missing data (3,751 cases, representing 20.6% of all undergraduates). The latter could be important for analyzing transfer students since transfer can be a protracted process that requires some years, and since later cohorts were tracked for shorter periods of time than were earlier cohorts. Cohorts can affect analyses of transfers students in 2 ways. First, some would-be transfer students may not have yet emerged among new cohorts if they require further time to complete their transfer process, and so some transfer students may remain undetected in later cohorts. Second, since later cohorts have had less time to complete their studies, they are likelier to have

not graduated within the timelines of the data collection. Having missing data on the cohort identifier could therefore add uncertainty to any analyses in which cohort provides a key source of variation. Fortunately, it is doubtful that either source of missingness have had large impacts on the analyses. As discussed in my first report, it is very doubtful that many, if any, students with missing data for their "latest institution" were transfer students. A series of analyses suggest very strongly that those students took unconventional paths from high school into UofT, often moving through adult education centers and entering transitional year programs, rather than transferring from other postsecondary institutions. And, in contrast to the first report's TDSB Grade 9 cohort design, students with missing data on their previous institution in the TDSB Grade 12 cohorts had almost identical entrance dates into UofT compared to those with recorded previous institutions, thus suggesting no particular tendency for those with missing data to be in earlier or later cohorts. See Appendix 1 for further discussion of these missing data.

Figure 1 shows that while mean levels of transfer status are lower in later cohorts, their confidence intervals overlaps, and thus there are not statistically significant trends across cohorts in transfer status. Among the 6 main sizeable cohorts, transfer rates were 1.6, 1.8, 1.2, 1.7, 1.1, and 0.9. Thus, unlike the previous Grade 9 linkage, student cohort played a small role in the current Grade 12 linkage. Its 3 earliest cohorts (students in grade 12 during the falls of 2003, 2004 and 2005) and its latest cohort (in grade 12 in 2012) had very small numbers and thus had limited impacts on pooled results. Thus, the newer cohorts did have lower transfer rates, but it is difficult to ascertain whether those differences reflect "age effects" – in which students in earlier cohorts simply have more time to engage in transfer – or "cohort effects" - in which newer cohorts of students transfer at lower rates. In any event, the study's timeframe followed the newest cohort for over 9 years after it entered grade 12, and so it is likely that very few more of its students would have transferred afterwards, and only small number would have graduated.[i]

Measures:

The analyses in this report drew on 5 groups of variables:

a) High School academic records: Key variables include average high school grades, days absent, whether a student had ever been suspended in high school, whether they ever dropped out of high school, and whether they were listed as being gifted or having special needs.

b) Student Demographics: All measured in high school, key variables include gender, self-identified race, country of birth, language spoken at home, sexual orientation, parental education and parental occupation

c) Student's previous institution: This variable was recorded by UofT; I coded these institutions as a secondary school or as a postsecondary institution, and in turn coded the latter into the following categories: Ontario university, Ontario community college, other Canadian university, international university, private career college. Due to very small numbers in the latter category, no formal analyses were conducted for former students of private career colleges.

d) UofT enrolment records: The following variables were used in analyses: the year students initially entered UofT, whether they were awarded transfer credits, and how many credits they were awarded.

e) UofT student outcomes: Four student outcomes were examined: graduation status by fall of 2020, whether they entered a STEM field of study, their cumulative grade point average (CGPA), and their credits earned at UofT. The latter was combined with transfer credits awarded to create a measure of total credits earned.

Data Quality: **Setting, Coverage, Design, Varieties of Transfer**

 This study's focus on a single board-university pathway makes its findings difficult to generalize to other kinds of pathways, particularly rural ones. Further, it tracks only transfers *into* UofT, and currently cannot track transfers *out* of UofT. Otherwise, these data have several strengths for examining transfer students.

 First, the TDSB-UofT pathway provides a strategic setting. On the one hand, it is embedded in a region with rich and dense postsecondary options. TDSB graduates who remain in the city can easily commute to 10 postsecondary campuses by car or public transit, and could transfer across those institutions without moving residence. UofT's 3 campuses can be easily accessed by car or public transit to students residing in the central city as well as to the east or west. The university's menu of hundreds of undergraduate programs may serve as a lure to would-be transfer students. Conversely, UofT is more selective than most Canadian universities, and thereby may discourage in-transfers (and perhaps also encourage out-transfers). Second, since these data are population-level, they offer sufficient numbers to sort students into multiple sub-groups, including types of transfer students. Third, its longitudinal cohort design captures an array of students who might be otherwise lost in studies with shorter timelines, such as those who not proceed directly through high school, do not directly enter higher education, and do not proceed directly through university. Fourth, by identifying students' previous institution before entering UofT, these data capture transfers beyond those from Ontario universities, who are often lost if one relies only on transfer flags. Fifth, its focus on a single board-university pathway provides restricts ranges on a range of unmeasured variables that could confound studies that pool students from multiple boards and universities. For instance, Ontario school boards differ in their proximity to higher education institutions, and universities vary in their stature, selectivity and menus of programs and majors. Both boards and universities vary in their local economic opportunities and job markets. Each of these variables could influence students' decisions to transfer, and influence their success at university. Data that pooled students from a variety of boards and university would be therefore 'noisy' for the purpose of comparing attributes of transfer and direct entry students, and in particular could confound regional differences in opportunities to engage in commuting-distance transfer. While data that pool students across numerous board-university pathways can offer greater breadth and potential generalizability, our setting removes a series of potential confounders that might influence students' propensity to transfer.

Findings:
The major findings reported below are organized into six sections.

Research Question 1: What is the overall proportion of transfer students?

Table 1 shows that 279 undergraduates in the TDSB-UofT pathway transferred from another institution, representing 1.6% of all students. This rate is less that that detected in the previous TDSB-UofT Grade 9 cohort, which uncovered a rate of 4.5%. This lower rate is most likely a product of the different cohort designs used in the previous and current studies, and is discussed further at the end of this report. In brief, the current study included only students who were in the TDSB in grade 12, and thereby eliminated those students who left TDSB between the beginning of grade 9 and grade 12, which were included in the previous study. Many of those excluded students likely moved out of Toronto during high school, initially enrolled in another institution, and later moved back to UofT to be captured by that study's cohort design (the latter being the basis of inclusion into these data sets; see Appendix 3 for a further discussion of research methods and designs that estimate varying numbers of transfer students).

Table 1 also shows that among those 279 transfer students, 122 (44%) came from another Ontario university. The next largest source of transfers were Ontario community colleges (28%). Another 16% came from Canadian universities in other provinces. A further 10% came from international universities. The remaining 3% transferred from private career colleges. In total, about 70% of transfers were from universities and about 30% from community or private career colleges.

Research Question 2: From which postsecondary institutions do students transfer into UofT?

From which postsecondary institutions do former TDSB students transfer into UofT? Most of those institutions are in the City of Toronto and its surrounding Southern Ontario region. Table 2 shows that among the 122 transfers from Ontario universities, the largest numbers were from two nearby institutions: York University (20 students) and Ryerson University (20). The next largest numbers were from institutions in Southwestern Ontario: Guelph (15) and Western (12). Sizeable numbers also transferred from universities in Eastern Ontario: Queens (10), and Ottawa (6). Overall, about 1/3 of all transfers from Ontario universities came from Toronto-based institutions.

Among the 44 students (16% of all) transferring from universities in other provinces, the largest numbers were from Dalhousie (12) and Kings College University (8). The 10% of transfers from international universities were mostly from the United States, while some came from institutions in Europe, the Middle East and Asia. Those students took complex paths into UofT, moving from the TDSB to another country only to return to Toronto. Finally, among the 78 transfers from Ontario community colleges (28% of all transfers), almost all came from Toronto-based institutions, with the largest numbers from George Brown (19), Seneca (18), Humber (18) and Centennial (15).

Overall, the majority of former TDSB students who transferred into UofT came from Ontario institutions, with most entering from nearby universities and colleges. Only a quarter were from institutions beyond provincial borders.

Research Question 3: Do transfer and direct entry students differ by demographic and academic profiles?

Table 3 compares transfer and direct entry students' demographics and high school academic records. Columns 2 and 3 show that transfers in aggregate were significantly likelier than direct entry students to be female, Canadian born, speak English at home, self-identify as white, have professional parents, self-identify as a sexual minority and come from non-two parent families. Academically, transfers had less stellar high school track records than their direct entry peers, having lower average grades, higher rates of suspension, worse attendance records, and larger proportions who dropped out of high school at some point. As one illustration of these academic patterns, Figure 2 shows that the probability of becoming a transfer student steadily falls among those with higher secondary school grades.

Multivariate logistic regression models that predict transfer status (not shown, available upon request) showed that lower high school grades and having been suspended in high school had statistically significant associations with becoming a transfer student; in addition, females, students from higher income neighborhoods, as well as those who self-identified as White and as sexual minorities were likelier to transfer into UofT. The variable with the largest impact in these multivariate models were high school grades. However, there were some important differences between categories of transfer students. Most notably, transfers from Ontario community colleges tended to have humbler academic records from high school, having the highest rates of suspension and special needs and lowest grades among all student groups.

In sum, transfer students had less conventional academic profiles compared to direct entry students, and community college transfers had the most challenged academic records.

Research Question 4: How many transfer students were awarded some credits at UofT for previous course work, and how many credits did they receive?

A key attribute of this new TDSB-UofT dataset is its inclusion of flags denoting whether or not UofT awarded each student a transfer credit, and if so, the number of credits awarded. Before proceeding further, two things about those credits should be noted. First, transfer credits are awarded not only to students from another postsecondary institution, but also to high school graduates, particularly those from International Baccalaureate and Advanced Placement programs. Second, not all transfers from postsecondary institutions are awarded credits; those decisions are usually made by host institutions on a case by case basis.

Among the 18,183 undergraduates in the TDSB-UofT pathway, 13% of those whose previous institution was a secondary school were awarded credits, with mean 0.5 credits per student. Conversely, 84% of students whose previous institution was a college or university were awarded credits, with mean of 4.1 credits per student. Table 2 shows that the vast majority of transfers from Canadian universities received credits, and that they were awarded the most credits. About 92% of transfers from Ontario universities received credits for a mean of 4.7 per student; the corresponding figures for transfers from other Canadian universities were 95% and 5.8%. Transfers from international universities and Ontario community colleges had lower figures (78% and 3.9, and 76% and 2.6%, respectively). It should be noted that none of the 8 transfers from private career colleges were awarded any transfer credits. Almost all students from Ontario

or other Canadian universities were awarded transfer credits. But there was more variation among students from transferring from Ontario Community Colleges: most of those institutions had 67% to 87% of their former students receiving credits, and they received fewer credits on average than did transfers from universities.

Research Question 5: Do transfer and direct entry students have different academic outcomes?

To answer this question, I examined five academic outcomes at the University of Toronto: cumulative grade point average, credits accumulated at UofT, total credits accumulated, whether students entered a STEM field of study, and whether or not they graduated by the spring of 2021. The ensuing analysis places particular emphasis on graduation, since it is considered to be a core indicator of student success among policy makers.

Table 4 displays bivariate statistics for these outcomes by transfer status. It shows that for two of the five outcomes, transfer students in aggregate fared similarly or better than did direct entry students. Transfers had higher (though not statistically significant) final cumulative grade point averages (CGPAs; compare columns 2 and 3 across the top row). Transfers from Canadian universities in other provinces had the highest CGPAs, followed by those from Ontario universities (the latter CGPA was statistically significantly higher than that for direct entry students). Among sub-groups of transfer students, only those from Ontario community colleges had lower CGPAs than direct entry students (though that difference was not statistically significant). The next row shows that all subgroups of transfer students earned statistically significantly fewer credits at UofT. However, credit accumulation at an institution is an ambiguous measure of student success because it conflates 2 processes. On the one hand, some transfer students may acquire fewer credits at UofT simply because they were already granted credits for courses taken at their previous institution. On the other hand, some transfers may acquire fewer credits at UofT due to academic struggles. To check for this, another outcome was created: "total credits" combines credits earned at UofT with those awarded through transfer. The row for that outcome shows that only transfers from Ontario community college earned fewer total credits than did direct entry students. Transfer students' academic fortunes thus varied. Transfers from universities generally had slightly better grades than direct entry students and earned comparable numbers of total credits. The higher-than-average GPAs of university transfers may be products of taking upper-level courses (e.g., 3rd or 4th year) at UofT in later years. Those courses tend to grant higher grades than do lower level courses, as do non-STEM courses, which transfers have a greater tendency to take (described further below). But transfers from Ontario community colleges appear to earn significantly fewer credits, and somewhat lower grades than do direct entry students.

Table 4 also displays statistics for two other outcomes at UofT: declaring a STEM field as one's final field of study, and graduation status by Sept 2021. Beginning with fields of study, the table shows that whereas 46% of direct entry students entered STEM fields, only 26% of transfers did so. Disaggregating those results (see columns 4-7) shows that transfers from Ontario

universities, other Canadian universities and especially Ontario community colleges each entered STEM fields at statistically significantly lower rates than did direct entry students.

Table 4 shows that at the bivariate level, transfer students in aggregate had lower average graduation rates within the study's time window. Whereas 78% of direct entry students graduated, only 70% of transfers in aggregate graduated a gap of 8%. But disaggregating those results across subgroups reveals an important distinction. Transfers from Ontario universities and other Canadian universities graduated at slightly *higher* rates than direct entry students. Among university transfers, only those from international universities had lower graduation rates than direct entry students (7.7% lower, not statistically significant). However, the graduation rate for transfers from Ontario community colleges was 15% lower, a statistically significant difference. Indeed, only slightly more than half of community college transfers graduated within the timelines of the study.

To further unpack these differences, I ran multivariate models that predicted graduation with covariates for demographics and high school academics. Table 5 and Figures 3 and 4 summarize predicted probabilities of graduating derived from logistic regression models that contain academic and demographic variables as well as measures of transfer credits awarded. The first column displays the raw rates for each subgroup unadjusted by any covariates. The second column displays predicted rates adjusted by average values across all students for all demographic and academic variables, while the next column adjusts those predictions using covariate means that are specific to each group. There is an important conceptual difference between those sets of predictions: the first set is based on imagining what a subgroup's graduation rate would be if they had demographic and academic profiles typical of *all* students, while, the second set is based on the typical profile of their own subgroup. The next 2 columns repeat that process while adding numbers of transfer credits awarded.

Table 5 shows that graduation rates would be predicted to rise among all groups if each had academic and demographic profiles that were typical of all students in the TDSB-UofT pathway. Importantly, the predicted graduation rate would rise markedly among transfers from Ontario community colleges, from 53% to 76%. In other words, if transfers from those colleges had the same demographic and academic characteristics as all other students, their graduation rate would increase by 23%. Since academic variables are stronger predictors of graduation than are demographic variables, this prediction suggests that the problems facing transfers from Ontario community colleges in UofT are largely due to their less than average academic preparation. But on the other hand, the prediction suggests that even with comparable demographics and academics, community college transfers would have graduation rates 6% less than direct entry students, and 8% less than their counterparts from universities. Thus, these models suggest that transfers from colleges face additional hurdles when attempting to graduate from UofT.

To further illustrate the importance of prior academic preparation for graduating from university, Figures 3 and 4 compare probabilities of graduating across different levels of students' high school average grades. They show that students' graduation rates rise steadily with higher school grades, though transfers from community colleges still suffer lower graduation rates than other students with similar grades.

These analyses have several implications for understanding graduation gaps between transfers and direct entry students. First, those gaps were largely limited to community college transfers. Transfer from universities had UofT outcomes that were comparable to direct entry students except from their lesser propensity to enter STEM fields of study at UofT. But college transfers also earned significantly fewer total credits and had markedly worse graduation rates. Second, those gaps were partly functions of community college students' pre-existing demographic characteristics and high school academic track records. Those students' predicted graduation rates rose significantly when they were based on having 'average' characteristics of all students. Third, regardless of the estimation approach used, community college transfers had worse UofT outcomes than other students. In other words, those gaps cannot be traced solely to their demographics and high school academics profiles. Finally, receiving transfer credits boosted UofT outcomes among all students, direct entry and transfer students alike. Models show that predicted graduation gaps between community college transfers and all other students would be smaller at higher levels of awarded transfer credits.

Research Question 6: Do transfer credits influence outcomes?

In a series of ordinary least squares, Poisson regression and logistic regression models not shown, the awarding of transfer credits tended to significantly improve most university outcomes among all students, whether direct entry or transfers. Controlling for high school grade averages and whether having dropped out of high schools, students with higher numbers of transfer credits had higher graduation rates, higher CGPAs, and total credits (transfer credits did not boost rates of entry into STEM fields).

The final analyses in this report examine impacts of transfer credits on graduation from two different angles. First, the final column of Table 5 adds a measure of transfer credits awarded based on the mean for all students, most of whom are direct entry students. Since that mean number of transfer credits awarded is actually substantially less than the average among postsecondary transfer students, the predicted graduation rate actually declines for all subgroups of transfer students, while remaining the same for direct entry students. This finding illustrates that being awarded larger numbers of transfer credits boosts graduation rates for transfers from postsecondary institutions, since those students' predicted rates decline if they are granted far fewer credits. Second, models were run that predicted graduation rates for community college transfers and all other students at different levels of transfer credits awarded. Figure 6 shows sizeable gaps in predicted graduation rates between community college transfers and other students when both groups are awarded zero transfer credits; the predicted gap is about 30%. However, at 6 and 12 credits awarded, those gaps shrink to about 20% and 10%, respectively. Indeed, the predicted graduation rate for community college transfers rises by about 25% if they awarded credits rise from 0 to 12, all other covariates held at their mean. Overall, these various analyses strongly suggest that being awarded higher numbers of transfer credits can improve university outcomes for transfer students, and could help those from community colleges narrow gaps between themselves and their peers.

Summary and Discussion

This study reports 6 major findings:

1) About 1.6% of undergrads in the TDSB-UofT pathway were transfer students from other postsecondary institutions. Almost 44% of those transfers were from Ontario universities, 28% were from Ontario Community Colleges, and the remaining 28% were from other Canadian universities, international universities and private career colleges

2) Transfers were largely local; about 1/3 of university transfers were from institutions in Toronto and most of the remainder were in Southern Ontario; almost all community college transfers were from Toronto-based institutions

3) In aggregate, transfer students differed significantly from direct entry students on an array of demographic measures, and had somewhat worse high school academic records, the latter most pronounced among transfers from Ontario community colleges

4) Almost all transfer students from Ontario universities and other Canadian universities were awarded transfer credits at UofT; most transfers from Ontario community colleges also received credits, though fewer than average compared to their university counterparts

5) Outcomes at UofT among transfers from universities were similar to direct entry students except that the former had significantly lower rates of entering STEM fields; transfers from Ontario community colleges also had significantly worse outcomes in total credits earned and graduation rates; only slightly more than half of college transfers graduated. Multivariate analyses suggest that community college transfers' markedly lower graduation rates at UofT were partly due to their humbler high school academic records.

6) The awarding of transfer credits improved university outcomes among all students; prediction models suggested that higher numbers of transfer credits would narrow graduation gaps between community college transfers and other students.

Discussion: Comparing Findings Across Data Sets

A new source of information provided in the current study were flags for whether or not students received transfer credits at UofT, along with a measure of the number of credits awarded. The flag showed that 84% of postsecondary transfers were awarded such credits, while 13% of direct entry students received them. Many of the latter received credits for International Baccalaureate courses and Advanced Placement courses. Both groups of students – postsecondary transfers and direct entry – enjoyed boosts when awarded transfer credits. Controlling for high school grades, both direct entry and transfer students who were awarded transfer credits had higher CGPAs and graduation rates. Importantly, multivariate models suggested greater numbers of credits awarded could narrow graduation gaps between transfers from Ontario community colleges and all other students. Thus, the new study confirmed the previous study's speculation that transfer student outcomes were likely hindered if they were not awarded sufficient credits for their course work completed at their previous institutions.

This current study also shared several broad findings with the previous TDSB-UofT study. Both found that most postsecondary transfers into UofT came from local institutions. Both detected broadly similar proportions of transfers from Ontario universities and community

colleges, and from institutions in other provinces and countries. They found similar demographic and academic differences between transfer and direct entry students, and that transfer students were less likely than others to enter STEM fields at UofT. Further, both studies showed that pre-existing high school academic records accounted for much of the graduation gap between transfer students and direct entry students.

However, the current study uncovered several patterns that differed from those in the previous study. The new Grade 12 TDSB-UofT data linkage detected markedly lower rates of postsecondary transfers. Further, transfers from universities did not have outcomes at UofT that were significantly worse than those of direct entry students, with the exception of the former's lower propensities to enter STEM fields of study. Otherwise, among postsecondary transfers, only those from Ontario community colleges had significantly worse outcomes at UofT. But those students did face challenges, particularly in terms of graduation. Only about half of community college transfers managed to graduate from UofT within the time window of the study, which tracked the oldest cohort 14 years after beginning grade 12, and the youngest cohort 9 years.

The likeliest explanation for these different findings lies in their cohort designs. The previous data set included students in TDSB schools in Grade 9, and retained any who eventually entered UofT within the time frame of the study. The current data set included students in TDSB schools in Grade 12, and similarly retained any student who eventually entered UofT. But those different cohort designs generate somewhat different compositions of students. The Grade 9 cohorts were somewhat larger than the Grade 12 cohorts, partly because the latter excluded any students who dropped out of school before Grade 12. But the Grade 9 cohort also tracked students for 3 additional years, and by doing so, retained students who left TDSB between the beginning of grades 9 and 12 yet eventually attended UofT. The Grade 12 data cohort also retained students who left TDSB, but only those who left between the outset of Grade 12 and entry into UofT, which comprised a considerably smaller number of students.

These different cohort designs generated important impacts on two patterns of results: those involving proportions of transfer students, and those involving various gaps between transfer and direct entry students. The Grade 9 cohort design had more students who were *geographically mobile*, capturing considerably large numbers who left TDSB during high school yet later returned to Toronto to attend UofT. Those mobile students had 2 further characteristics: on average, they had less conventional academic profiles than did direct entry students, including lower average marks and test scores in grade 9. Second, on average they were likelier to become postsecondary transfer students. The latter is likely a consequence of their geographical movements: many moved out of Toronto during high school to attend another board but eventually moved back to the city to attend UofT. In the interim, many attended a different postsecondary institution before electing to transfer to UofT. The combination of those attributes – having somewhat weaker academic profiles, coupled with geographic mobility – created a larger population of transfer students, one with many students with unconventional high school

academic profiles. As a result, the previous study had larger proportions of transfer students, and larger proportions of those students with academic challenges.

Combining findings from the two studies, we can revise some conclusions regarding transfer students. Rather than concluding that transfers face academic hurdles across the board, as did the previous study, it now appears that such challenges tend to be a) largely limited to transfers from Ontario community colleges, and b) those with histories of additional geographic mobility. Further, we can now conclude that c) being awarded transfer credits boosts student outcomes at university, and in particular can help those from community colleges narrow graduation gaps between themselves and other students.

Both datasets suggested that community college transfers face deeper social and academic challenges than do direct entry students. All transfers incur financial and social costs when they move residences, experience strains from losing old peer networks, and encounter stress as they cope with UofT's competitive environment. Many transfer students travel along meandering routes before entering UofT, some leaving TDSB for another school board or a private school, and all changing institution after secondary school, often taking longer times to complete their studies in both high school and university.

But community college transfers experience these strains while also often lacking the same academic preparation for university enjoyed by their peers. Many of their challenges stem from receiving insufficient credit for previous work. But many also stem from their complex life transitions. Indeed, transfer status itself may be a symptom of underlying instabilities in some students' lives. These ideas should not be exaggerated; the majority of community college transfers had good high school academic records and more than half managed to complete their degrees. This implies that two broad types of college transfer students exist. About half are able to remain 'on-track' after transferring, particularly when they can leverage credits granted from their previous institutions. But the other half become 'off-track' and fail to graduate. They enter UofT already with fewer academic resources than others, and are granted fewer transfer credits than their university counterparts. They swim upstream within the TDSB-UofT pathway and are at risk of being left behind.

Conclusion: Implications for Policy and Future Research

The above findings and discussions have implications for policy on transfer students in at least 2 areas, and also have key implications for future research on those students.

A first policy implication involves awarding credits. Since awarding transfer credits is associated with better outcomes among all categories of transfer students, universities should strive to develop mechanisms that might award more such credits while retaining their academic integrity. Currently, each institution has its own credit-awarding procedures, but more could be done to systematize their efforts in ways that might grant more credits to deserving students. A second implication speaks to academic supports for transfer students. Since high school track

records are important predictors of university outcomes, and since transfer students tend to have worse track records on average than direct entry students, universities may wish to also provide transfer students (and other students too) with extra academic supports, such as remedial programs, mentoring, etc.

In terms of implications for future research, this study further highlights the need for multi-institution data sharing agreements. The TDSB-UofT cohorts can track only transfers into UofT. However, two-way flows of transfers could be potentially tracked in future data-sharing projects involving multiple institutions. Currently most institutional data remain unlinked and siloed between institutions. But as the capacity to link administrative data grows, and as new studies illustrate the benefits of linked data, a new phase of research could track two-way flows of transfers if multiple institutions share their data with one another. The agreements and approvals by legal teams and Ethics Review Boards at TDSB, UofT and Ontario's Privacy Commission developed by this project could serve as templates for future partnerships. In lieu of a centralized provincial data base, a multi-institution cooperative project is likely the best bet for advancing research on student transfer in Ontario.

Table 1: Categories of Transfer Students and Credits Awarded (valid n=17,838)

| From…	N	Valid % of Analytic Sample	% of All PSE Transfers	% Awarded Transfer Credits	Mean Credits Awarded
Ontario Universities	122	0.68	43.73	91.8	4.68
Other Canadian Universities	44	0.25	15.77	95.5	5.84
International Universities	27	0.15	9.68	77.8	3.93
Ontario Community Colleges	78	0.44	27.96	75.6	2.57
Private Career Colleges	8	0.04	2.87	0	0
Total PSE Institutions	279	1.56	100	83.87	4.07

Table 2: Institutions of Postsecondary Transfers into UofT

Institutional Category	% Awarded Transfer Credits	Mean # of Transfer Credits Awarded	Number of Transfers into UofT
Ontario Universities	91.8	4.68	122
York	85.0	4.80	20
Ryerson	90.0	4.07	20
Waterloo	100	3.25	4
Western	92.0	6.74	12
McMaster	100	5.00	4
Guelph	100	4.03	15
Queens	100	5.35	10
UOIT	100	6.0	2
Ottawa	83.0	4.42	6
Laurier	100	5.40	5
Carleton	100	6.00	4
Trent	75.0	3.88	4
Brock	100	4.50	4
OCADU	100	3.83	3
Windsor	100	5.50	2
Algoma	100	8.00	1

Laurentian	100	4.00	1
Sacred Heart College	0.00	0.00	1
Lakehead	100	4.00	1
Nipissing	0.00	0.00	1
Toronto Baptist Seminary	100	3.00	1
Unrecorded Ontario University	100	1.00	1
Other Canadian Universities			
McGill	100	7.67	3
Dalhousie	100	6.50	12
Concordia	100	7.88	4
UBC	100	5.17	3
Kings University College	100	6.38	8
Simon Fraser	75.0	2.75	4
Victoria	100	5.25	2
New Brunswick	100	3.75	2
Kwantlen Polytechnical University, Mt. Allison, Okanagan U College, Bishops, Luther College, St. Francis Xavier	100		1 each (total = 6)
Ontario Community Colleges			

Centennial	87.0	1.97	15
George Brown	74.0	2.61	19
Seneca	67.0	2.22	18
Humber	72.0	3.18	18
Sheridan	75	2.75	4
Durham	100	4.00	2
Fanshawe	100	2.00	1
Mohawk	100	3.00	1

Figure 1: Rates of Postsecondary Transfer by cohort (with 95% CIs)
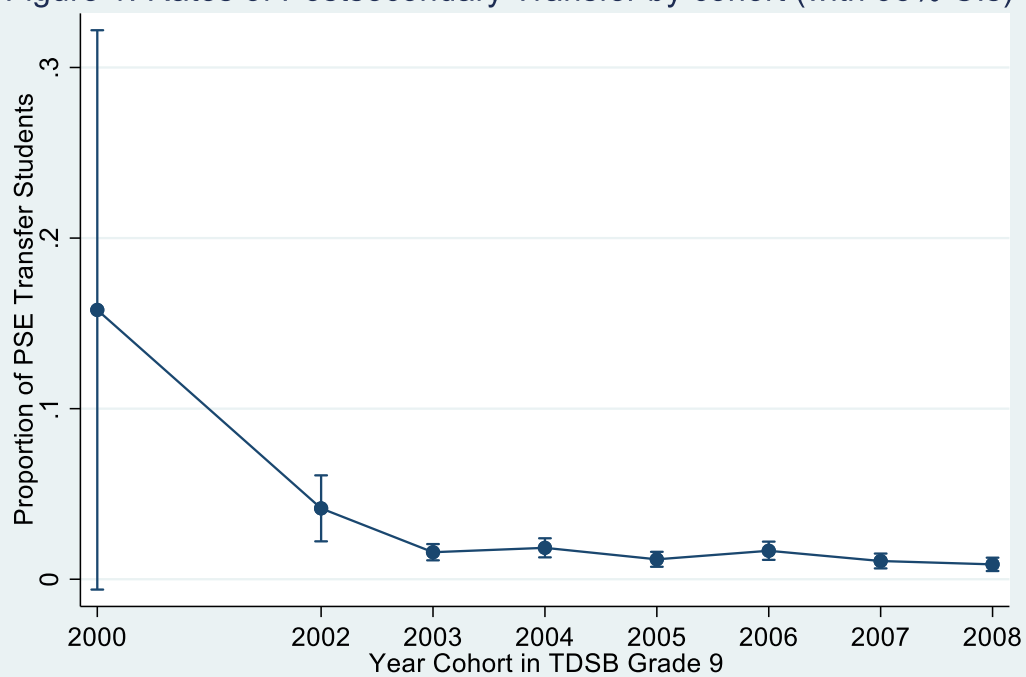
Table 3: Demographics and High School Academics of Undergraduate Transfers into UofT (n=17,838)

	Direct Entry (n=17,559)	All Transfers (n=279)	Ontario University (n=122)	Ontario C. College (n=78)	Other Can University (n=44)	International University (n=27)
Female	.560	.627*	.639	.564	.682	.556
English language	.274	.561***	.521***	.533***	.872***	.458*
Age in G9	14.01	13.99	14.01	14.0	14.0	14.0
White	.240	.549***	.500***	.519***	.828***	.429
Pro Parent	.344	.435*	.344	.341	.793*	.800*
Parent with Univ	.590	.605	.658	.442*	.871***	.571
2 Parent Family	.827	.766*	.848	.745	.621*	.788*
Sexual Majority	.940	.862***	.773**	.902	.958	1.00
Born in Canada	.475	.645***	.639***	.654**	.909***	.296
Cohort	2005.3	2004.8***	2004.9	2004.3***	2004.9	2004.6
Ever Suspended	.065	.125***	.101	.167***	.114	.074
Average Grades	79.6	74.0***	76.6**	69.3***	75.9**	78.0
Absenteeism	2.50	4.61***	4.72***	3.86**	5.97***	4.88
Special Need	.028	.047	.041	.0902**	.000	.000
Ever Drop out HS	.012	.043***	.025	.038*	.000	.087***

Neighb. Income	5.72	6.70***	6.81***	6.08	8.38***	5.48
Gifted	.037	.032	.025	.051	.023	.037
Special Needs	.034	.048**	.041	.086***	.040	.000

NOTE: * denotes 2 tailed t-test p<.05, ** p<.01, ***p<.001; Mann-Whitney tests were also run and replicated the results above.
NOTE: 2nd column t-tests compare to all other students, including other categories of transfers
NOTE: sample sizes for some demographic variables are smaller due to survey non-response
NOTE: due to their small numbers, no statistics included for 8 transfer students from private career colleges

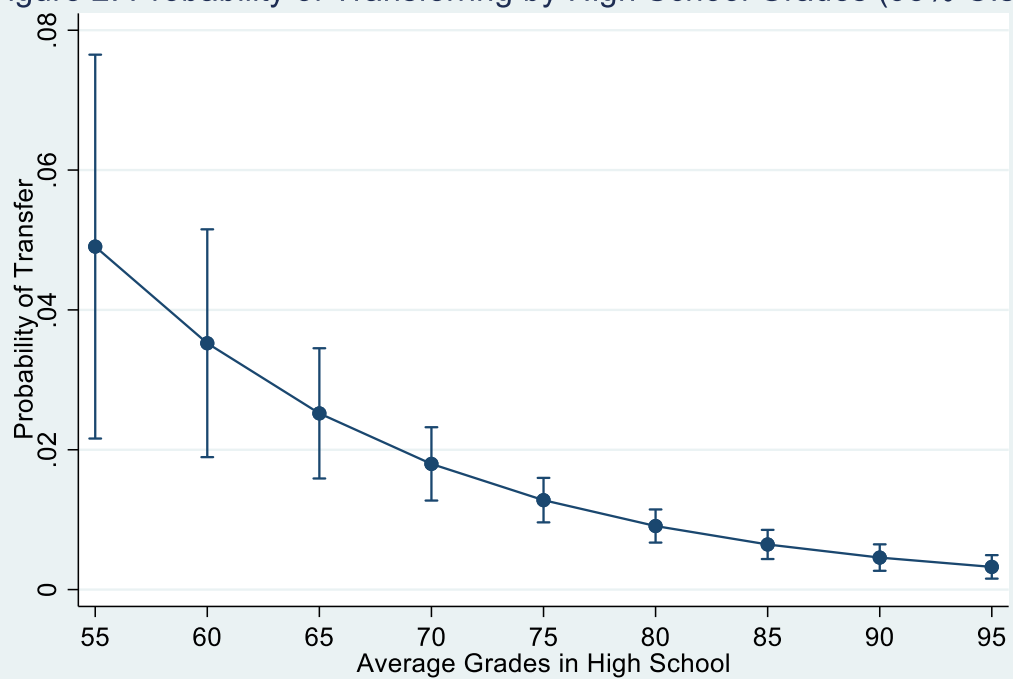Figure 2: Probability of Transferring by High School Grades (95% CIs)

Table 4: UofT Outcomes by Types of Transfer Students

	Non-Transfers (n=17,559)	All Transfers (n=279)	Ontario University (n=122)	Ontario Community College (n=78)	Canadian University (n=44)	International University (n=27)
Final GPA	2.63	2.69	2.79*	2.48	2.87	2.69
Total Credits at UofT	18.1	14.1***	14.4***	13.3***	13.4***	15.3*
Total Credits Including Awarded Transfers	18.5	18.1	19.1	15.9**	19.2	19.2
Graduation Rate	.778	.703**	.787	.526***	.795	.704
STEM	.463	.264***	.262***	.171***	.182***	.630

NOTE: All comparisons are between transfer categories and all other students
NOTE: * denotes 2 tailed t-test p<.05, ** p<.01, ***p<.001
NOTE: Due to their small numbers, no statistics are included for 8 transfer students from private career colleges.

Figure 3: Probability of Graduating by Transfer Status, with controls
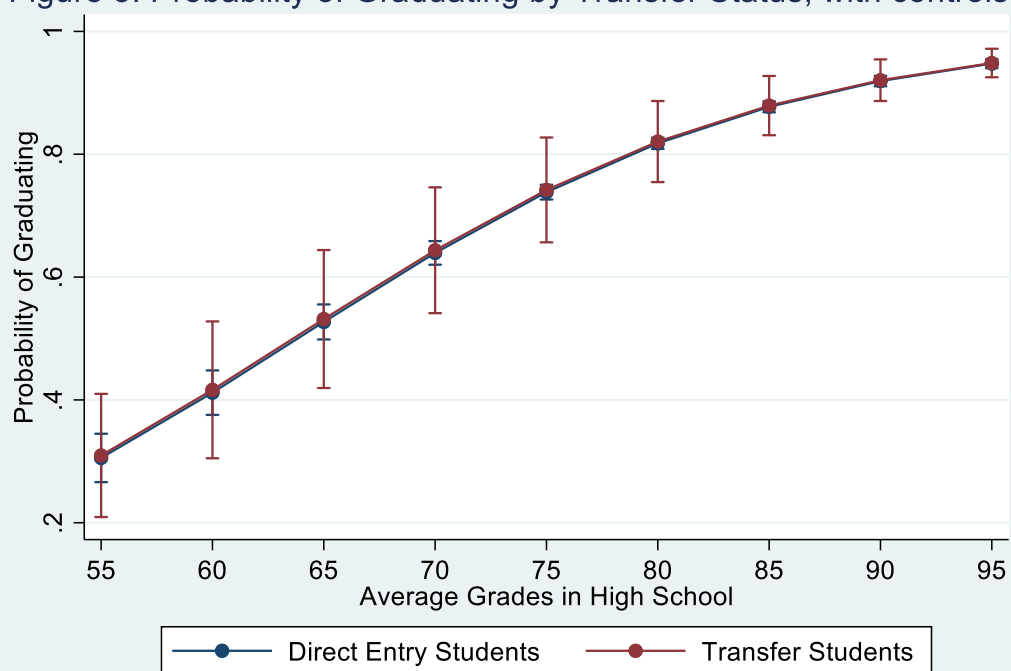
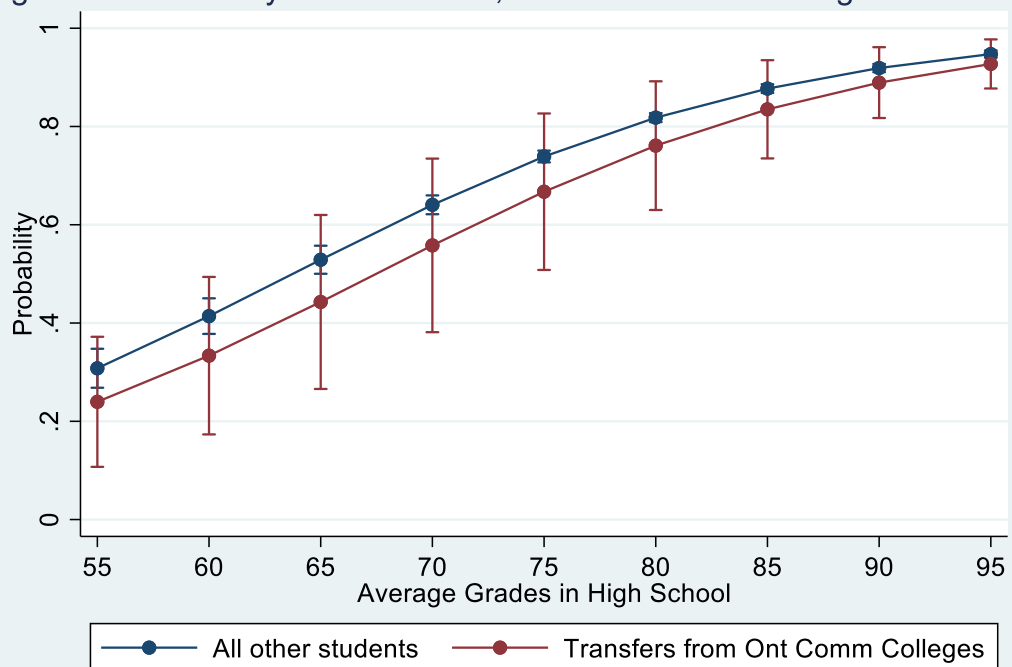Figure 4: Probability of Graduation, Ontario Comm. College Transfers

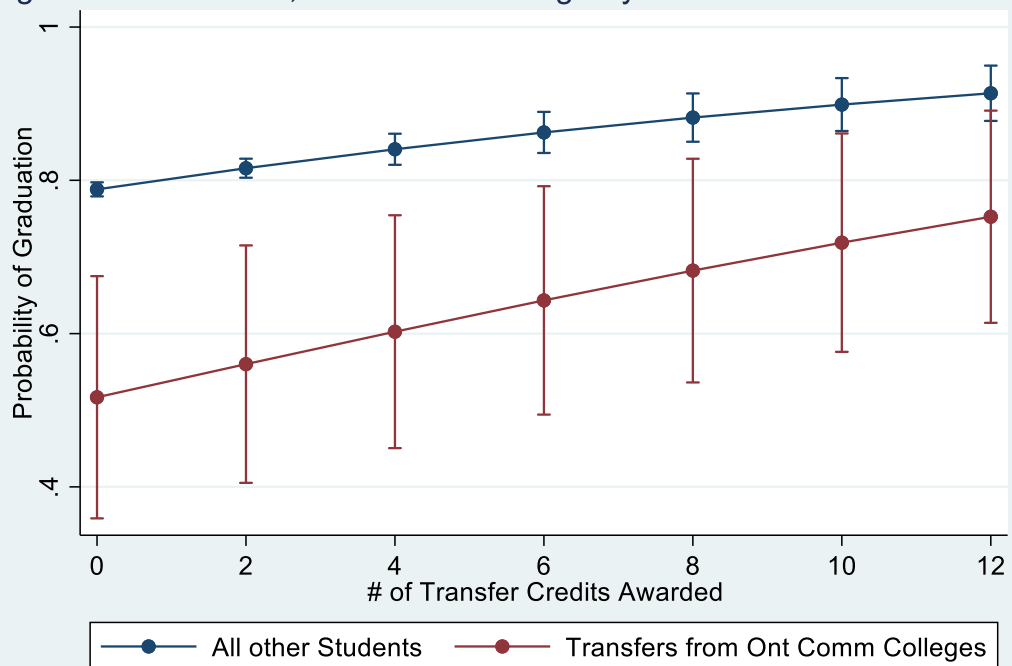Figure 5: Grad rates, Ont Comm College by Transfer Credits Awarded

Table 5: Predicted Probabilities of Graduation from UofT

	Raw Rate	Predicted with Sample Means of Demographics & HS Academics	Predicted with Group-Specific Means of Demographics & HS Academics	Add Transfer Credits Awarded, Sample Means	Add Transfer Credits Awarded, Group Means
Direct Entry	.78	.82	.82	.82	.82
All Transfers	.70	.82	.74	.78	.75
Ontario Universities	.79	.84	.85	.82	.85
Other Can. Universities	.80	.84	.84	.76	.82
Ont. Comm Colleges	.53	.76	.53	.75	.53
International Universities	.70	.87	.84	.81	.84

NOTES: All statistics are based on all cohorts. Predicted probabilities are derived from logistic regression models. Probabilities in first column are not based on any controls for any covariates. Those in the second and third columns are based on student demographics (gender, age, white/non-white, parents who are professionals, parents who went to university, two-parent families, student sexual identity, nativity and neighborhood income) and high school academics (average grades, whether ever suspended, gifted and special needs statuses, whether ever dropped out of high school). Predictions in the fourth column add controls for transfer credits awarded.

NOTE: All comparisons are between transfer categories and all other students: * denotes 2 tailed t-test p<.05, ** p<.01, ***p<.001

NOTE: Due to small numbers, no statistics are included for 8 transfer students from private career colleges

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Appendix 1: Missing Data Analyses on Previous Institution and Cohort Variables

The main variable used in this study to identify transfer student was "latest_institution," recorded by the University of Toronto. This string variable lists either the high school or postsecondary institution that students attended prior to entering the University of Toronto. I coded each institution for whether it was a high school or postsecondary institution, deeming the latter to be transfer students. However, about 2% of the analytic sample had missing information on that variable. Since OUAC normally codes automatically the school of direct applicants from TDSB, those with missing data on that variable are likely not immediate entry students.

To investigate further, I conducted a missing data analysis by creating a dummy indicator of whether students had missing information on that variable, and used that indicator in a series of cross-tabulations and logistic regressions to detect whether patterns of missingness were related to students' high school academic profiles, demographics, and university outcomes.

Demographically, students with missing data were equally proportioned by gender, but were likelier to self-identify as White and to be born in Canada. The starkest differences between missing cases and all other students were their high school academic records: students with missing data for their prior institution had far lower average grades, higher suspension rates, and greater likelihoods of having dropped out of high school. Logistic regression models confirmed these bivariate patterns, illustrating starkly differing academic profiles of missing data students versus all others. Investigating further, I also compared missing data and transfer students on the same variables above. The profiles of missing data students were significantly different from those of transfers. These empirical patterns make it highly unlikely that missing data students were actually unidentified transfer students. Instead, most appear to be non-traditional or mature students who had difficult high school careers, eventually entered UofT through meandering paths, and then continued to encounter academic difficulties. Those students likely left TDSB full-time studies without graduating, and eventually completed their diploma requirements in another format such as e-learning, night school, adult education, etc., before applying to UofT. Those alternate formats might not have been recorded by UofT. Many might have entered UofT through alternative programs like its Transitional Year Program (TYP). Thus, missing data on previous institution appears to be an indicator of academic marginality, rather than being correlated with postsecondary transfer. Thus, we can treat our findings on transfer students with confidence.

A second variable with missing data that could potentially impact analyses was the cohort variable. As mentioned above, that variable had 20% missing values. Fortunately, their patterns of missingness were largely unassociated with other major variables such as graduation rates. Those rates for the major 6 cohorts were, in chronological order, 77%, 78%, 80%, 79%, 78%, and 78%, suggesting no clear negative nor linear relationship between cohort and graduation, despite the plausibility that earlier cohorts should have higher graduation rates given their greater time to complete degrees. Students with missing values for cohort did have lower graduation rates than the average, 74% compared to 78%. Their CGPAs were also slightly lower, 2.51 versus 2.66, as were their credits earned, 17.2 versus 18.0. Conversely, STEM enrolments were actually higher among missing data students: 50% versus 44% for all other students. The main source of those

missing data was that they also had missing data on another key TDSB measures, students'
average high school grades.

Appendix #2: The Impacts of Extra Credits and High School Stream

By request, some extra analyses were conducted to explore two additional issues. First, I
examined whether or not transfer students were likelier than direct entry students to gain extra
credits beyond the 20 typically needed for a bachelor's degree. I also probed whether attaining
such extra credits had any impact on graduation rates from UofT. Second, I explored whether
transfer students were likelier than direct entry students to be placed in the applied stream in
high school stream, and if so, whether that might account for community college transfers' lower
graduation rates. As detailed below, findings from these extra analyses have two implications.
First, having to attain extra credits led to only negligible reductions in UofT graduation rates;
virtually all students who attained at least 20 total credits graduated from UofT, including transfer
students. Thus, any policy aimed at boosting graduation rates should prioritize helping students
reach 20 total credits more than focusing on reducing needs for extra credits. Second, while
transfers from Ontario community colleges were likelier than all other students to have been in
applied streams during high school, the strongest predictor of their lesser tendency to graduate
from UofT was their lower high school grades. Being slightly more likely to be in applied high
school streams was part of a larger pattern in which transfers from Ontario community colleges
had somewhat humbler academic track records compared to their peers, which in turn explained
their lower graduation rates from UofT. But high school grades was a stronger predictor of
university graduation status than was high school stream.   These two sets of findings are detailed
further below.

1) Did attaining 'extra' credits differ by transfer status? Did doing so influence academic outcomes
at UofT?

The term "extra credits" refers to those credits earned beyond the standard 20 credit
benchmark typically needed for a bachelor's degree. To answer these questions, I conducted an
additional line of analysis using the dataset's separate measures for a) the number of credits
earned by completing UofT courses, and b) the number of transfer credits earned for courses
taken elsewhere. Using them, I created a new 'total credits' variable by adding credits earned at
UofT to the number of transfer credits awarded. I then proceeded to conduct several analyses. I
first examined proportions of undergraduates that were granted transfer credits versus those who
attained standard UofT credits, and then examined total credits earned. Those analyses were
followed by an analysis of students with more than 20 total credits, which in turn was followed an
examination of links between those variables and a pivotal UofT outcome – graduation.

a) Proportions of Transfer Credits and Standard UofT credits.

As discussed in the main report, transfer students on average earned fewer regular credits
at UofT compared to direct entry students, approximately 14 to 18. Being granted transfer credits
helps transfer students avoid having to repeat courses, which largely accounts for their fewer

UofT credits. Almost 15% of undergraduates in the TDSB-UofT pathway were granted some transfer credits. Among transfer students, 84% received some transfer credits. However, only 9% of all undergraduates that were granted transfer credits were transfers from other postsecondary institutions. The vast majority of students granted transfer credits were direct entry students who received credits for taking courses in programs like Advanced Placement (AP) and International Baccalaureate (IB).

b) Total Credits Earned:

      Combining transfer credits and those earned from UofT courses, the median student earned 20 total credits, among both direct entry and transfer students. Transfers had slightly lower mean total credits than direct entry students because a few more transfer students earned 15 or fewer credits. That mean difference in total credits earned between all transfer and direct entry students was not statistically significant, however. But transfers from Ontario Community Colleges did earn 2.5 fewer total credits than other students, a difference that was statistically significant ($p<.001$). Indeed, 42% of transfers from Ontario community colleges earned fewer than 20 total credits; 27% earned exactly 20 credits, and the remaining 31% earned more than 20 credits.

c) Earning Extra Credits at UofT:

      About 45% of all students in the TDSB-UofT pathway earned more than 20 total credits. Most of those students earned only slightly more than 20 credits; only 25% earned 21.5 credits or more. Among the 2,682 students who did receive transfer credits, 2,215 (83%) eventually earned 20 or more total credits. Among those same 2,682 students, 467 (17%) did not attain 20 credits in total. In general, students who attained 20+ total credits received larger numbers of transfer credits. But transfer students were not more likely to earn extra total credits compared to their direct entry peers.

d) Extra Credits and UofT Outcomes:

      Earning extra credits did not seem to harm graduation rates. Almost all students who earned 20 or more total credits eventually graduated from UofT. Approximately 99% of students who earned exactly 20 total credits graduated from UofT; the corresponding figure for those who earned more than 20 was 98.3%. Among transfer students, the graduation rates for students who earned exactly 20 credits versus those with more than 20 credits were 97.4% and 95.3%, respectively. Thus, a case could be made that having to earn extra credits slightly lowered transfer students' chances of graduation, though it did so by only a negligible amount (note that among direct entry students those rates were 99.5% and 98.4%, respectively).

      Graduation rates among Ontario community college transfers for those who earned exactly 20 credits, and those who earned more, were 95.2% and 87.5%, respectively. Again, a case could be made that earning extra credits lowered chances of graduation among college transfers, but it did so by a negligible amount, less than 5%. Overall, the data suggest overwhelmingly that any strategy for boosting university graduation rates should focus on ways to help students earn 20

credits in total. Less than 0.3% of students who failed to earn 20 total credits graduated from UofT; none of the 75 transfer students who earned less than 20 total credits managed to graduate.

2) The Impact of High School Stream:

The TDSB-UofT data set identifies which stream students were in during grade 9, though it does not identify their stream in later grades. Transfer students were significantly less likely to be in the academic stream in grade 9 than were direct entry students: 88% versus 93% (p<.001). However, that difference was mainly generated by transfers from Ontario community colleges and international universities. About 95% of transfers from Canadian universities were in academic streams in early high school, compared to only 80% of transfers from Ontario community colleges (p<.000) and only 63% from international universities (p<.000). These differences reinforce a key pattern: transfers from community colleges had humbler academic records from high school compared to direct entry students and transfers from universities; that in turn explains their worse outcomes at UofT. Logistic regression models show that the lesser tendency of college transfers to graduate from UofT was partly mediated by their high school stream, but also that their lower graduation rates were otherwise largely explained by high school grades.

Thus, transfers from community colleges were not only less likely to be in the academic stream in grade 9, they also had lower average high school grades. Their stream placements came with other academic problems such as a greater likelihood to have dropped out of high school. Nevertheless, these patterns should be viewed within a larger context: most transfers from community colleges had solid academic records in high school. But because a disproportionately large number of college transfers experienced some academic difficulties during high school, many of them continued to face challenges after transferring to UofT.

ENDNOTES:

[i] Rates of additional graduations tend to fall after six years from entering university. Data from British Columbia show long run cumulative transition rates for the 2002-2003 grade 12 cohort (one year older than our oldest cohort). That cohort had an immediate entry rate of 51%, a five-year cumulative entry rate of 72%, a ten-year cumulative rate of 78%, and a 15-year rate of 79.5% (Heslop, 2019). Thus, over fifteen years many more students from that cohort did eventually transition into higher education, but the rate of new transitions slowed dramatically after five years. We would expect a similar pattern for delayed entry into UofT and delayed graduation from UofT: extending the time window might capture more cumulative-entry and cumulative-graduation students, but with declining returns over time. Some of those additional students captured in cumulative rates would be transfers.