Student Aid and University Persistence

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Highlights

The Study

This paper deals with the relationship between student financial aid and persistence. It begins by reviewing the relevant literature, including studies of how students finance their education and the various factors (both financial and non-financial) that have been found to affect persistence. The second part of the paper consists of a retrospective study on education persistence. This study sought to determine whether student financial aid was related to persistence. Private sources of financing were not examined.

Six universities participated: four from Ontario, one from Quebec and one from British Columbia. These institutions provided student aid and enrolment data for 13,280 students who entered three-, four- or five-year undergraduate degree programs in 1997 or 1998. Students in the study had to be in their first degree program with no prior post-secondary experience. The sample included both full-time and part-time students. Foreign students were excluded.

We tracked students for five years following the beginning of their studies, to see whether they persisted at the same institution. We used two measures of persistence:

- *Completion*: Whether or not a degree was completed by the end of the tracking period.

- *Progress toward completion*: The proportion of the number of credits required for the degree that were earned by the end of the tracking period.

The Findings

Persistence Status at End of Tracking Period

By the end of the five-year tracking period, 51% of the students had completed a degree, 17% were continuing their studies (and had not yet earned a degree) and 32% had left the institution without earning a degree. Some 44% of all "leavers" left prior to the second year of study.

The majority of students had earned a high proportion of the number of credits required for their program — an average of 77%. A few (2%) had earned no credits, while almost half had completed 100% or more of the credits required.

"Continuers" consisted of two groups: those studying at a slower rate and those who had earned credits that didn't count toward their degree. Almost 40% of continuers had earned 100% or more of the number of credits required by the end of the fifth year of the tracking period, yet they had not completed the degree. Just over 10% of continuers had earned less than half of the credits needed, even though they had started the program five years earlier.

Student Financial Aid

Over half the students had received financial aid: a government student loan, a grant or both. Overall, 40% had received a student loan, while 38% had received a grant. The aid recipients had received $13,802 on average, but the amount of financial aid received over the tracking period varied from a low of $15 to a high of $138,376. Amounts of aid were far from equal, even among graduates. Graduates who had received loan aid had accumulated an average student loan debt of $17,135. However, loan debt ranged from $103 to $135,076.

Among the 1,669 students who received only grants, the amount of aid ranged from $15 to $36,700, with an average of $3,461. For the 1,944 loan-only recipients, aid ranged from $123 to $90,516, with an average of $14,857 in accumulated loan debt. The 3,368 students who received both grant and loan aid had the largest variation, from a low of $581 to a high of $138,376, with an average of $13,802 in total aid. Among these students, those who received more loan aid also tended to receive more grant aid.

Standardized Measure of Aid

Persistence was positively related to the amount of total aid received. The more aid dollars a student received, the more required credits were earned, on average, and the greater the likelihood of completing a degree. This positive relation may only reflect the fact that the longer someone spends in school the more aid dollars they can receive, all else being equal. To correct for this distortion, aid amounts were standardized by dividing by the number of years completed.

These standardized amounts are referred to as *annualized* aid, because the standardization converts the total amount of aid into the amount that would have been received to complete one year of the program on a full-time basis. For example, a student who had taken two years to complete two years of the program while receiving $12,000 in financial aid would have received $6,000 in annualized aid. A student who had taken four years to complete the same two years of the program, and had also received

$12,000 in financial aid, would also have annualized aid of $6,000. Standardizing by years of program ensures that the resulting amounts are independent of the length of the program, the amount of time spent in school, and full-time or part-time status.

The 6,981 aid recipients had received, on average, $5,081 in annualized aid. For those who had received loans, the average annualized loan was $5,558, and for those who had received grants, the average annualized grant was $1,181.

Persistence and Student Aid

Overall, there was a negative relationship between persistence and annualized aid. This was true for each measure of persistence used: earning a degree, percentage of the required credits earned and length of program completed. However, the relationship depended on the type of aid received. For grant-only recipients, there was no relationship between any measure of persistence and annualized aid. For recipients of loan aid, however, persistence declined as annualized aid levels increased. This pattern occurred for both the loan-only and grant-plus-loan groups, for each measure of persistence. However, those who received grant plus loan aid persisted better than those who received only loan aid: they had completed more of their programs, earned more credits and were more likely to have earned a degree.

Regression modelling showed that the amount of annualized aid received and the type of aid received were both needed to predict persistence. Persistence was highest for those who received both grants and loans, especially if the annualized amount was under $3,000. As annualized aid increased, the percentage of required credits earned by this group declined from 101% to 72%, and the percentage who completed a degree decreased from 79% to 38%. Persistence was lowest for those who received loans only, especially those with annualized aid of $3,000 or more. As the amount of annualized aid received by loan-only recipients increased, the percentage of required credits earned declined from 91% to 44%, and the percentage who completed a degree decreased from 59% to 8%.

The persistence results of the grant-only group fell between that of the grant-plus-loan group and that of the loan-only group. Students in the grant-only group had earned, on average, 92% of the credits required, with 69% having completed a degree. Students with no aid had made more modest progress, having earned an average of 71% of required credits, with 47% having completed a degree. These results are slightly below the persistence levels of loan-only recipients with annualized aid amounts under $3,000.

Summary and Conclusions

This study demonstrates that averages can be misleading when describing student aid. In the current system, students can accumulate over $100,000 in student loan debt by the time they complete their first degree. The average debt of the graduates in this study was only $17,135, which may be a reasonable amount to repay, even with interest added. However, graduates at the upper end of the range are incurring debt that cannot be repaid without undue hardship.

This study also shows that the persistence of students in undergraduate degree programs can be related to the type and amount of financial aid received. At the institutions included in this study, the higher the amount of annualized aid received, the lower the level of persistence — although this relationship varied according to the type of aid received.

The paper concludes by discussing the possible causes of the persistence patterns and their policy implications. Family income and academic preparedness are ruled out. Instead, debt aversion and unmet need are seen as more plausible factors.

Debt aversion may underlie the negative association between persistence and annualized aid. The group with the lowest level of persistence had the highest amount of debt for the amount of program they had completed. Students who received a combination of grant and loan aid had accumulated less debt for the same level of assistance received, which may explain their higher level of persistence. As debt increases, persistence declines, perhaps because students who already have debt are trying to avoid accumulating more.

Another possible explanation for the negative association between persistence and amount of annualized aid is unmet need. Annualized aid is related to total aid, which is determined by the student's assessed financial need. The higher the assessed need, the higher the amount of assistance received — unless aid limits are reached. Students with low assessed need will not be affected by assistance limits, but as assessed need increases, the possibility of reaching a limit increases. It is possible, therefore, that "unmet need" increases as annualized aid increases. If a student's unmet need is high enough, he or she may not have sufficient resources to stay in school, or may work more and study at a slower rate. Both these strategies would negatively affect persistence.

Although unmet need may explain the negative association between persistence and annualized aid, it does not explain the positive association with receiving a grant. It may be that both unmet need and debt aversion affect persistence. If students receive some of their assistance in the form of grant aid, their accumulated debt at the end of studies will be lower. Hence, the positive effect of receiving grant aid in addition to loan aid may be due to debt reduction. However, if unmet need is high, having some of the assistance in the form of grant aid still leaves the student either needing to work too much, or needing to take time off to work. This would explain the negative relation between annualized aid and persistence for all loan recipients, whether or not they also received grant aid.

The higher the amount of annualized aid, the higher the cost to complete one year of the program and the higher the cost to complete the entire program. The more costly it is to complete a degree — for the student aid program, in terms of providing aid, or for the student, in terms of accumulated debt — the slower is the rate of progress toward completion. However, this association does not establish causation. Students may take longer due to higher costs, or they may incur higher costs because they are taking longer to complete their degree. It is possible that both types of students exist. Students who take longer to complete incur higher costs for themselves, and can cost a student assistance program more.

We need more research to understand the strategies students use to stay in school, as well as the factors that influence their decisions. By learning how students decide whether to stay in school and by understanding the financial consequences of their decisions, we can improve financial aid programs. Ultimately, we should be able to ensure that all qualified students can have access to post-secondary education and can complete their programs in a timely manner.

Introduction

This paper deals with the relationship between student financial aid and persistence. The purpose of student aid is to assist students with financial need to pursue their post-secondary education. To understand the effectiveness of financial assistance and to inform future policy in this area, a better understanding is needed of the relationship between financial aid and persistence.

The paper begins by reviewing the relevant literature, including studies of how students finance their education as well as research on the various factors (both financial and non-financial) that have been found to affect persistence.

The second part of the paper consists of a retrospective study on education persistence. This study sought to determine whether student financial aid was related to persistence of university students in undergraduate degree programs in Canada. Private sources of financing were not examined.

Review of the Relevant Literature

Financing Post-Secondary Education

Students draw on a variety of sources to finance their post-secondary education. Government student loans are only one of many sources used. Employment has consistently been reported to be one of the most common sources. Others include: non-repayable support from family; non-repayable support such as grants, bursaries, scholarships and work-study aid; as well as borrowing through credit cards and private loans.

Comparing current patterns of post-secondary student financing with those of 40 years ago (when the Canada Student Loans program began), Cervenan and Usher (2004) found some notable changes. Whereas students in 1965 received 29% of their income from their families and only 18% from government sources, students in 2004 received only 15% of their income from their families and 31% from government. While employment remained a stable source of income (representing about 36% of students' income), the timing of the employment had shifted. Whereas in 1965 only 10% of income was derived from employment during the study term, by 2004, this had grown to represent 23% of students' income.

Findings on the rate of borrowing have varied from study to study, depending on the methods used. For instance, based on the 2000 *Youth in Transition Survey* (YITS), which surveyed 18- to 20-year-olds, Bowlby (2002) found that 29% of youth with some post-secondary education had borrowed from government student loan programs. Using the *Post-Secondary Education Participation Survey* (PEPS), Barr-Telford et al. (2003) found that 26% of full-time students aged 18 to 24 in the 2001–02 school year had a government student loan.[1]

EKOS (2003), using a different methodology and no age restrictions, found that the method of financing education varied somewhat by age for the same school year (2001–02). Overall, 32% of students surveyed used government student loans that year. Employment was the primary source of income, contributing 40% of total annual income, on average. Government student aid was the second most common source, making up 20% of the total, on average (student loans and non-repayable government aid made up 15% and 5% of students' income, respectively). When only students who received student aid were considered, employment constituted 26% of total income, while student aid contributed 43%. As students get older, they tend to receive less support from family and borrow more; this may explain why student loans made a greater contribution in the EKOS study than in PEPS.

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1   The age group was 17 to 24 in Quebec.

The average amount borrowed per year from all government sources has increased considerably over the last two decades, from approximately $3,000 in 1980 to just under $8,000 in 1998 (Junor & Usher, 2002).[2] Although the amount borrowed has increased, its share of total income appears to have decreased in recent years. In 1995, student loans made up more than half of students' total revenue (56% for public college first-year students, 58% for private college first-year students and 59% for university first-year students) (Evaluation and Data Development, 1997). This is considerably higher than the 43% from all government student aid[3] reported in 2001–02.[4] Students may be borrowing more than they did previously, but student loans are making up a smaller portion of their total income.

By borrowing more, students are accumulating more debt. The amount of student loan debt accumulated by the time of graduation increased considerably from the early 1980s to the mid-1990s, although the proportion of graduates who had borrowed increased only slightly (Finnie, 2002). Among those who earned a bachelor's degree in 1982, 45% of men and 39% of women had borrowed. This rose to 47% for men and 44% for women who graduated in 1995. The average amount of debt at graduation rose from $6,070 for men and $5,650 for women in 1982 to $13,390 and $13,840, respectively, in 1995.[5] Although the incidence of borrowing has not changed since the mid-1990s, those who graduated in 2000 owed considerably more than their 1995 counterparts, with an average debt of $19,500 (Allen & Vaillancourt, 2004). On average, those who earned a bachelor's degree in 2000 owed 30% more (in 2000 constant dollars) than 1995 graduates and 70% more than 1990 graduates.

One measure of the impact of debt on graduates is the debt-to-earnings ratio, which is the amount owed at graduation divided by the annual rate of pay.[6] For graduates with a bachelor's degree, this ratio increased from 0.14 for men and 0.17 for women in 1982 to 0.38 and 0.51, respectively, in 1995 (Finnie, 2002). This ratio can only be calculated for those who have graduated and have jobs. It excludes unemployed graduates; it also excludes students who did not complete their studies. (While the latter students can be expected to have incurred less debt, they can also be expected to have lower earnings and a higher potential for unemployment than those with a university degree (Canadian Education Statistics Council, 2003).)

In addition to starting with more debt, 1995 graduates were taking longer to repay their loans than were 1990 graduates. Five years after graduation, 1995 graduates had reduced their debt by an average of 34%, while 1990 graduates had reduced their debt by 41%. As a result of the higher initial debt levels and the slower rate of repayment, 1995 graduates who had borrowed had 49% more debt five years after graduation than did their 1990 counterparts (Canadian Education Statistics Council, 2003).

Another impact of the rising levels of debt is the increase in student loan defaults. From 1980 to 1990, the default rate for Canada Student Loans rose from 9% to 17%. The cost to the federal government of student loan defaults due to bankruptcy rose from $30 million in 1990–91 to $70 million in 1996–97 (Schwartz, 1999).

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2   The amounts do not include student borrowing in the Northwest Territories, Nunavut or Quebec, since these jurisdictions do not participate in the CSLP.

3   EKOS (2003) reports that among those who received student aid in 2001–02, 43% of their income was from aid. This includes government student loans and bursaries.

4   It should be noted that the two studies used different methodologies. The 1995 data were based on full-time students in their first year of study, whereas the more recent data are based on students in any year of study, whether studying full-time or part-time.

5   These figures are given in constant 1997 dollars.

6   The annual rate of pay is based on the job held at the time of the interview, two years after graduation.

Persistence

Persistence can be defined in terms of credential completion or progress toward completion. Progress can be measured in terms of years completed or the transition from one year to the next.[7] One of the only Canadian sources of post-secondary completion rates is the *School Leavers Follow-up* survey (SLF), which surveyed a sample of young people in 1991 (when they were 18 to 20 years old) and again in 1995 (Gilbert & Frank, 1998). This study found that students often take longer than the standard time to complete their program. Only 43% of the university graduates in the follow-up survey had earned their degree within four years of completing high school. About one-third did so in five years and 23% completed in six years or longer. Of those who had completed other post-secondary studies, such as a college diploma or certificate, 64% had completed within four years, 15% within five years and 21% took six years or longer to complete.

The SLF also found that about 30% of high school graduates who had pursued some post-secondary education were still students in 1995. Since members of this group were then between 22 and 24 years of age, the authors suggested that 29 may be a more appropriate age cut-off for estimating post-secondary completion. One implication of these findings is that students' progress must be tracked for a number of years to get an accurate measure of completion and the factors that might affect persistence and completion.

Factors Influencing Persistence

Most of the studies that have tracked students' progress over a period of time are American. Persistence is measured in various ways, such as institutional attrition from one year to the next, institutional retention until completion, or system persistence in terms of year-to-year retention or completion. Typically, regression analysis is used to determine which factors are related to persistence. Some studies include a combination of financial and non-financial factors, while other studies include just one or the other.

Non-Financial Factors

Researchers have devoted considerable attention to the relationship between various non-financial factors and persistence, especially in the United States. Their results are not always consistent, and may depend on the type of credential sought (degree, diploma or certificate), the aspect of persistence being examined and the methodology used.[8] Despite these differences, a number of patterns emerge: persistence can be related to students' demographic characteristics, their family backgrounds and academic preparation, as well as certain institutional characteristics.

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7 Years completed is the total numbers of years a student completed during a specified period, whether or not any time was taken off. Transition from one year to the next measures whether or not a students continued into the next year. Its focus is only on the transition from one year to the next, not on the total amount of time in school.

8 For a review and critique of the research on retention and attrition, see Grayson & Grayson (2003).

With respect to demographic characteristics, persistence is generally somewhat higher for females, for younger students, and for those who are white or Asian (Berkner et al., 2002; Butlin, 2000; Fenske, Porter & DuBrock, 1999; Heller, 2003; Grayson & Grayson, 2003; Looker & Lowe, 2001; Reynolds & Weagley, 2003; Thiessen, 2001). Other student attributes that have been shown to be positively associated with persistence include: attending full-time; living at home; not having dependants; not being from a rural environment; not delaying the start of post-secondary studies; not changing institutions; and not working extensively during school (Berkner et al., 2002; Choy, 2002; Cofer & Somers, 2001; Grayson & Grayson, 2003; Heller, 2003; Looker and Lowe, 2001).

There is also evidence to suggest that different factors may affect persistence at different points in a student's education. In particular, factors that influence students to leave after the first year may be different from those that affect students later on (Choy, 2002; Grayson & Grayson, 2003). A longitudinal study in the United States found that 16% of first-year students did not proceed directly to their second year, although 64% of these students eventually returned within six years of starting. Those who did not return during the six-year study period were more likely to be older, to be married, to have children and to be working full-time while enrolled. Those who "stopped out" but later returned were more likely to have studied full-time and had more contact with faculty and other students (Choy, 2002).

Another factor positively associated with persistence is better academic preparation (Berkner et al., 2002; Butlin, 2000; Choy, 2002; Cofer & Somers, 2001; Grayson & Grayson, 2003; Heller, 2003; Looker & Lowe, 2001; Reynolds & Weagley, 2003; Thiessen, 2001). Motivation to complete a degree or diploma can also play a role (Cofer & Somers, 2001; Grayson & Grayson, 2003; Heller, 2003; Looker & Lowe, 2001). Some researchers have hypothesized factors representing students' social and academic integration and have shown that better integration is positively associated with persistence (Grayson & Grayson, 2003).

The size and type of institution has been found to make a difference (Berkner et al., 2002; Choy, 2002; Grayson & Grayson, 2003) as has the program of study or credential (Butlin, 2000; Fenske et al., 1999; Grayson & Grayson, 2003). Some studies have also found that parents' characteristics make a difference: persistence can be positively associated with parents' education level and with family income (Berkner et al., 2002; Butlin, 2000; Choy, 2002; Grayson & Grayson, 2003; Heller, 2003; Reynolds & Weagley, 2003).

Financial Factors

The purpose of the Canada Student Loans Program is to help students with demonstrated financial need pursue and complete their post-secondary education. Although we know little about the impact of student aid on persistence, especially in Canada, some research suggests a possible relationship.

In the YITS, Bowlby (2002) found that persistence was somewhat related to how students financed their education. Leavers were somewhat less likely than graduates and continuers to have received a student loan, grant or scholarship. They were also less likely than continuers and somewhat more likely than graduates to have received money that they did not have to repay. However, since this study only surveyed 18- to 20-year-olds, it was too early to tell what level of education these respondents would eventually achieve; some may have "stopped out" and returned later, as has been found in other studies (Berkner et al., 2002; Choy, 2002).

Some studies have found that post-secondary leavers often cite finances as a reason for stopping (Barr-Telford et al., 2003; Grayson & Grayson, 2003; Reynolds & Weagley, 2003). Using the YITS data, Junor and Usher (2002) found that young people who felt they would not be able to obtain as much education as they wanted cited finances more than any other reason. Among those who felt there were barriers to getting all the education they wanted, 36% of post-secondary leavers cited financial barriers, compared to 30% of graduates and 28% of continuers.[9] Using data from the PEPS, Barr-Telford et al. (2003) found

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9   These percentages are based on analysis of YITS data presented by Junor and Usher (2002).

that half of those who left without completing stated that they did so because the institution or program was a poor fit for them, while 29% cited financial reasons (Barr-Telford et al., 2003).

The fact that students cite financial reasons for leaving does not tell us the nature of their financial problems. Nor does it tell us how student assistance might affect completion. Unfortunately, the effects of finances on persistence have not been studied as extensively as have non-financial factors. When they have been studied, the results have been inconsistent (Grayson & Grayson, 2003). Some of these inconsistencies may be due to different ways of measuring persistence. They may also be due to the inclusion of different financial factors (e.g., loans vs. grants, size vs. receipt of grant or loan, merit-based vs. need-based, total assistance and accumulated debt) in different studies.

Inconsistencies may also arise because some of the factors that influence persistence are correlated or are related to some unknown underlying factor. The factors that appear to influence persistence may therefore depend on which ones are included in the study. For instance, Heller (2003) found that the effect on persistence of demographic variables such as age and race depended on what other variables were included in the regression model. Generally, the effect of some demographic variables tended to decline, or disappear, as academic and financial aid variables were added.

The *Canadian Survey of Borrowers* examined the persistence of full-time first-year students who borrowed in 1995 (Evaluation and Data Development, 1997). This study found no relationship between persistence and financial factors such as proportion of income from student loans and borrowers' satisfaction with the amount of assistance received. However, this study only looked at completion of the first year and continuation into the second year. Since many first-year students stop out and return later, this study cannot be taken as evidence that financial factors have no effect on persistence.

In their longitudinal study of University of Missouri students, Reynolds and Weagley found that completion was positively associated with parental income and the receipt of work-study aid, although it was negatively associated with receipt of student loans (Reynolds & Weagley, 2003). Grants, whether merit-based or need-based, had no effect. Fenske et al. (1999) also found that loans had a negative effect on year-to-year persistence, although they found that grants had a positive effect.

While Heller (2003) found that academic factors were the best predictors of students' persistence or degree attainment within six years of entering post-secondary education, he also found that grants had positive effects. The size of grants (both need-based and non-need-based) was positively related to persistence and degree attainment. When grants were included in the model, academic variables had less of an effect on persistence. This study did not examine the effect of student loans.

In their review of research on the effects of financial factors, Grayson and Grayson (2003) found mixed results. One study they reviewed found that the amount of assistance had a positive effect on persistence. Another found that persistence was somewhat higher for students who borrowed than for those who did not. However, other research found that it was not the receipt of financial aid that mattered but whether the assistance met the students' needs.

We know from Hemingway's (2003) assessment of Canada's student aid need assessment policies that the financial needs of students cannot always be met. Hemingway concluded that certain policies leave some students with unmet need, by imposing maximums for some types of expenses or by limiting the amount of assistance available. Hemingway suggests that unmet need could have a negative effect on academic performance and on persistence.

Unmet need may be important in explaining some of the inconsistent findings on the effects of financial factors on persistence. If student assistance, combined with other resources, is enough to allow students to focus on their studies, the assistance may have a positive impact on persistence. But if there is not enough assistance, students may have to work too much, which can have a detrimental effect on their rate of progress.

EKOS (2003) found some possible support for this notion: students who needed to work more than 10 hours per week during school reported that they would complete their studies sooner if they did not need to work. This suggests that if student assistance is too low, students may progress more slowly because they take a reduced course load in order to work. Although no research has systematically examined the effect of unmet need on persistence, some research suggests that unmet need is a factor.

In their study of within-year retention of two-year college students, Cofer and Somers (2001) found that the size of current year grants and current year student loans had a positive effect on retention. At high levels of debt, however, the amount of accumulated debt was negatively associated with persistence. For the 1996 cohort, low debt levels were positively associated with persistence, but this was not the case for the 1993 cohort. Cofer and Somers speculated that unmet need may explain this: more loan assistance was available to the later cohort, so these students presumably had less unmet need than did the earlier cohort. Debt levels only affected persistence when unmet need is low.

McElroy (2004) also proposed unmet need to explain why grants were positively associated with persistence only when levels of unmet need were low. She suggested that if a student's financial needs are being met, accumulated debt may factor into his or her decision to continue; hence, grants can have a positive effect on persistence by reducing debt. But if assistance for the current year is insufficient to meet the student's needs, his or her level of accumulated debt will not affect the decision to continue.

The bulk of the research examining the effects of student assistance on persistence suggests that grants, both need-based and merit-based, are positively associated with persistence. The effects of loans and accumulated debt, however, are unclear. Most of the research on this topic is American; post-secondary education is funded differently in Canada. Policy implications of the effects of student aid on persistence should therefore be based on Canadian research.

The Study

Purpose

This study looks at education persistence retrospectively. In particular, it examines whether public student financial aid is related to the persistence of students who began undergraduate degree programs at six universities in Canada between 1997 and 1998. Private sources of financing, such as bank loans and credit cards, were not examined.

There were two phases to this research. First, we conducted an assessment to determine whether such a study was feasible. The study required financial aid data and persistence information for the same group of students. Initially, 20 universities expressed an interest in participating, but many were unable to do so because they lacked the necessary financial aid data.

Since academic preparation has been shown to be positively associated with persistence, we originally wanted to address this factor as well. Unfortunately, most participating institutions were not able to supply entrance averages, so this factor could not be included.

Methodology

Six universities participated in the study: four from Ontario, one from Quebec and one from British Columbia. These institutions provided data on provincial and institutional aid[10] for 13,280 students who entered three-, four-, or five-year undergraduate degree programs in 1997 or 1998. To be included in the study cohort, students had to be in their first degree program with no prior post-secondary experience. The sample included both full-time and part-time students. Foreign students were excluded.

We tracked students for the five years following the beginning of their studies, to determine how far they progressed. We used two measures of persistence:

- *Completion*: Whether or not a degree was completed by the end of the tracking period.

- *Progress toward completion*: The proportion of the number of credits required for the degree that were earned by the end of the tracking period.

We received the following administrative data for 13,280 students:

- Total amount of financial aid received since entry.

- Total amount of student loans received since entry.

- Total number of credits completed since entry.

- Whether or not the student earned the degree.

- The last academic year in which the student was enrolled.

- Gender.

Appendix A provides the actual request for data that was sent to the participating institutions.

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10   Different institutions collected different types of financial aid data. All provided data on need-based aid; some also included data on merit-based aid.

Limitations

Although our data came from six universities across Canada, only three provinces were represented. Since student aid programs vary among the provinces and territories, our findings may not apply to the jurisdictions not represented. In addition, since the participating institutions may not be representative of the universities in their respective provinces, we cannot generalize our findings to all universities in the three participating provinces.

All of the students in the study were working toward university degrees. Our findings may not apply to students working toward other credentials. Different credentials attract different kinds of students and come with different price tags. Such factors could have a bearing on any relationship between student aid and persistence.

This study tracks progress over a five-year period. A longer tracking period would have produced higher persistence levels; we know from the SLF that 23% of students took more than five years to complete a university degree (Gilbert & Frank, 1998). However, a longer tracking period might not have changed the overall relationship between persistence and financial aid.

Another limitation of this study is that it examined only institutional persistence. It is likely that some students who dropped out continued their studies at another institution. However, research has shown that those who change institutions have lower rates of completion (Berkner et al., 2002; Choy, 2002). This suggests that it is important to consider the factors that cause students to leave their first institution.

Persistence may also depend on other financial factors beyond those considered in this study. These could include the income of the student's family, whether or not the student is dependent on his or her family for financial support, and whether or not the assistance received is sufficient to meet the student's needs. Non-financial factors, such as academic preparation prior to university and academic performance during university, might also play a role. These factors were beyond the scope of this research. Indeed, at this time a retrospective study probably could not include these additional variables, as the data is not likely available. This study is intended only as a starting point to begin to understand how financial aid may affect persistence.

Profile

Institutions

The six participating institutions represented three different regions of Canada, although four of the six were from Ontario. Over half the students were from Ontario; 29% were from Quebec and 12% were from British Columbia. Table 1 provides basic information about each participating institution. Institutions varied in size and type, although only small- to moderate-sized universities participated. In terms of the categorization system used in the *Maclean's Guide To Canadian Universities* (primarily under-graduate, medical/doctoral, and comprehensive), all three types of university were represented: 59% of the students were from comprehensive universities, 22% from primarily undergraduate universities, and 20% from medical/doctoral universities. Of course, these six schools cannot be considered a representative sample of all Canadian universities.

Table 1 — Participating Institutions by Region, Type and Size

Region	Institution	Maclean's Category*	Study Cohort Size	
			Number	% of Total
British Columbia	Simon Fraser University	Comprehensive	1,659	13%
Ontario	Brock University	Primarily Undergraduate	1,744	13%
	Carleton University	Comprehensive	2,237	17%
	Lakehead University	Primarily Undergraduate	1,143	9%
	University of Ottawa	Medical/Doctoral	2,591	20%
Quebec	Concordia University	Comprehensive	3,906	29%
All			13,280	100%

* Based on *Maclean's Guide To Canadian Universities*

Study Cohort

Just over half of the students in the study cohort (54%) were female. The overall median age at entry[11] was 19; it was 22 in the last year of enrolment. A higher proportion of females than of males were under the age of 20 at entry (see Figure 1). Detailed descriptive information about each institution's cohort is provided in Appendix B.

About 3% of the students were in five-year programs, while more than half (56%) were in four-year programs and the rest (41%) were in three-year programs. As shown in Table 2, females were more likely than males to take shorter programs. Younger students were more likely than older students to be in longer programs. Of students entering five-year programs, 70% were under 19 years of age, compared to 41% entering four-year programs and 16% entering three-year programs.

Figure 1 — Age Distribution by Gender
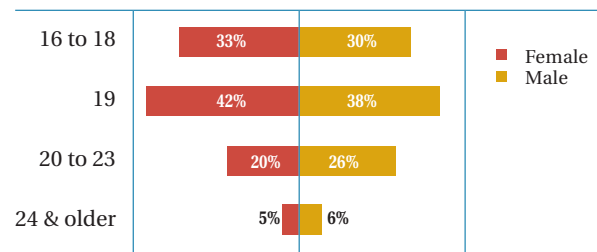
Table 2 — Gender and Age Distribution by Program Length

	3 Year	4 Year	5 Year	All
% Female	58%	51%	48%	54%
Age 16–18	16%	41%	72%	31%
19	43%	40%	11%	40%
20–23	36%	14%	10%	23%
24+	6%	5%	8%	5%
All	**41%**	**56%**	**3%**	

11   Age at entry was based on calendar age as of August of the year the student entered the institution. Hence, someone born in August 1980 who entered in 1998 would be 18, while someone born in September 1980 would be 17 at entry.

Persistence

Persistence Status at End of Tracking Period

Figure 2 shows the status of students at the end of the five-year tracking period, using the following classification:

- *Completers*: degree earned, at any time during the tracking period.

- *Continuers*: degree not earned, but still a student in the last year of tracking period.

- *First-year leavers*: did not earn more than one year's worth of credits and were not enrolled at the institution in the last year of the tracking period. These are students who studied for the equivalent of one year or less in terms of credits earned.

- *Other leavers*: earned more than one year's worth of credits, but did not earn a degree and were not enrolled in the final year of the tracking period. These students studied for more than a year, but had not earned a degree and were not studying at the end of the tracking period.

Figure 2 — Persistence Status at End of Tracking Period
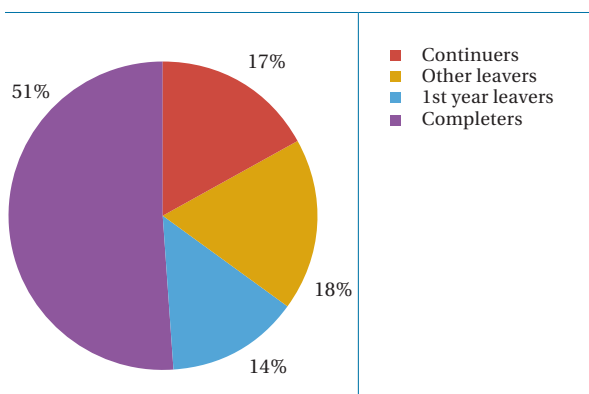
In their review of retention and attrition rates, Grayson and Grayson (2003) found that completion and drop-out rates vary considerably across institutions and programs of study. However, the five-year completion rate of 51% for the 1997–98 cohort in this study appears to be typical. Grayson and Grayson report that the six-year completion rate for the 1994 cohort from the Consortium for Student Retention Data Exchange[12] was 54% and that the five-year completion rate for the 1985 cohort of Canadian university students was 58%.

Of the entire study cohort, 17% were continuers — that is, they had not earned a degree but were enrolled at the end of the tracking period. Previous research has shown that rates of degree completion continue to increase for a number of years after the expected date of completion (based on program length). We would expect, therefore, that the percentage of students who complete their degree will continue to increase after the five-year tracking period.

Of the study cohort, 14% did not proceed to the second year of study, and an additional 18% left in a later year. These attrition rates appear to be somewhat lower than those reported by Grayson and Grayson, especially for first-year leavers. Grayson and Grayson reported figures for first-year leavers between 20 and 25%. Some leavers undoubtedly went to other institutions, but other research (Berkner et al., 2002; Choy, 2002) suggests that their rate of completion will be lower than that of students who do not change institutions.

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12   Based on 405 American colleges and universities, plus McGill University and the University of Toronto.

Table 3 shows that persistence status varied by gender and age. Females were more likely than males to be completers (57% vs. 44%), and males were more likely than females to be leavers (36% vs. 29%). Students under 20 were more likely than older students to be completers and less likely to be leavers. This age difference was apparent despite the fact that older students were much more likely to be in shorter programs.

Table 3 — Persistence Status by Gender and Age Distributions

	Completers	Continuers	All Leavers	1st-Year Leavers	Other Leavers
Female	57%	14%	29%	13%	16%
Male	44%	20%	36%	15%	21%
Age 16–18	51%	23%	26%	11%	15%
19	62%	12%	27%	11%	15%
20–23	40%	17%	43%	19%	24%
24+	22%	16%	62%	27%	35%
All	**51%**	**17%**	**32%**	**14%**	**18%**

As one would expect, persistence did vary according to the length of the program of study. As shown in Figure 3, just over half the students in three- and four-year programs (52%) were completers, while the majority (63%) of students in five-year programs were continuers. This difference is likely the result of having only five years to track progress, as students in three- and four-year programs had more time to complete their programs. Regardless of program length, leavers were a minority, although there were almost twice as many leavers from three- and four-year programs as from five-year programs. There were fewer first-year leavers than leavers from other years, but for each type of leaver, the percentage declined with program length.

Persistence status also varied by age at the time of entry, as shown in Figure 4. The persistence pattern was similar for three- and four-year programs. There were more completers under 20 than 20 and over, while there were more leavers in the 20 and over age group. For five-year programs, the majority of students under 20 were continuers, while the majority of students 20 and over were leavers.

Figure 3 — Persistence Status by Program Length
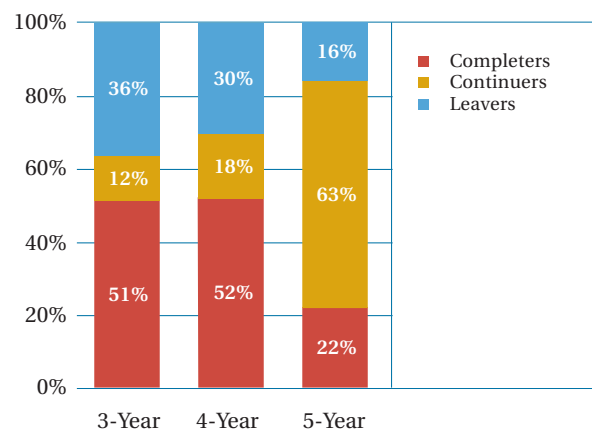
Figure 4 — Persistence Status by Program Length for Students Over and Under 20*
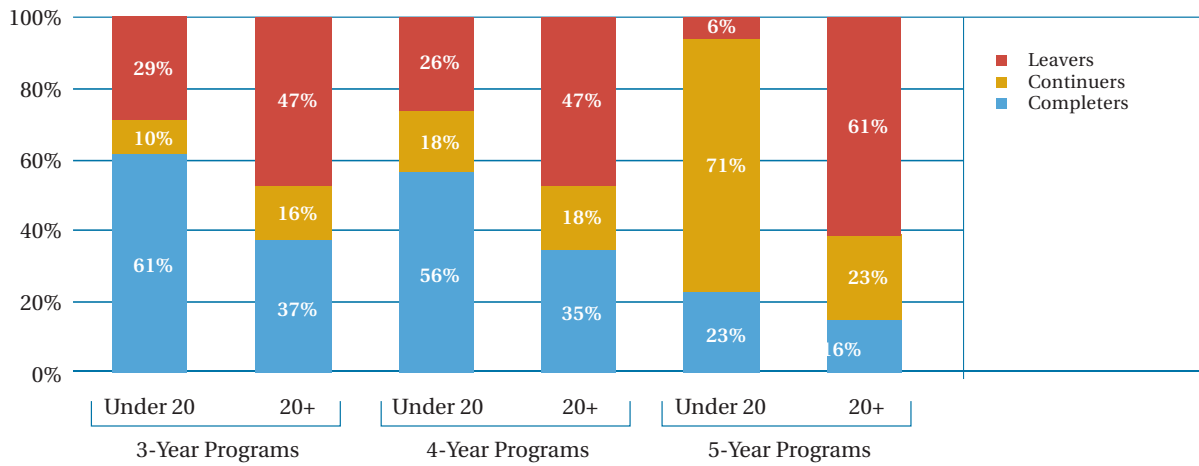
* Age groups are based on the age at the beginning of the program.

Degree Completion

Figure 5 shows the distribution of the last year of enrolment for degree completers and non-completers. Leavers are non-completers whose last year was either the first, second, third or fourth year of the tracking period. A non-completer whose last year was the fifth is a continuer. The vast majority of completers earned their degrees in the fourth or fifth year of the tracking period (46% and 42%, respectively). The two largest groups of non-completers are the first-year leavers (29%) and the continuers (34%).

Figure 6 shows the cumulative rate of completion by program length and the tracking year in which the degree was completed. Overall, progress in three-year programs was the slowest. Of the 5,491 students in three-year programs, only 11% had completed by the end of the third year of the tracking period. By the end of the fifth year, a total of 51% had completed. Students in four-year programs tended to complete at a faster rate. Of the 7,429 students enrolled, 23% had completed by the end of the fourth year and 52% had completed by the end of the fifth year. Progress was similar for the 360 students enrolled in five-year programs; 22% had completed by the end of the fifth year.

Figure 5 — Distribution of Students by Last Year Enrolled and Degree Completion
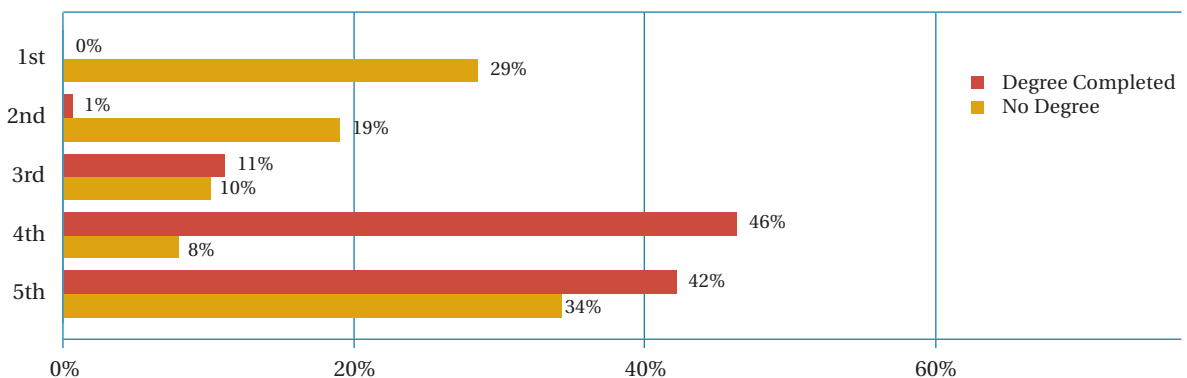
Figure 6 — Cumulative Rate of Degree Completion by Year of Completion
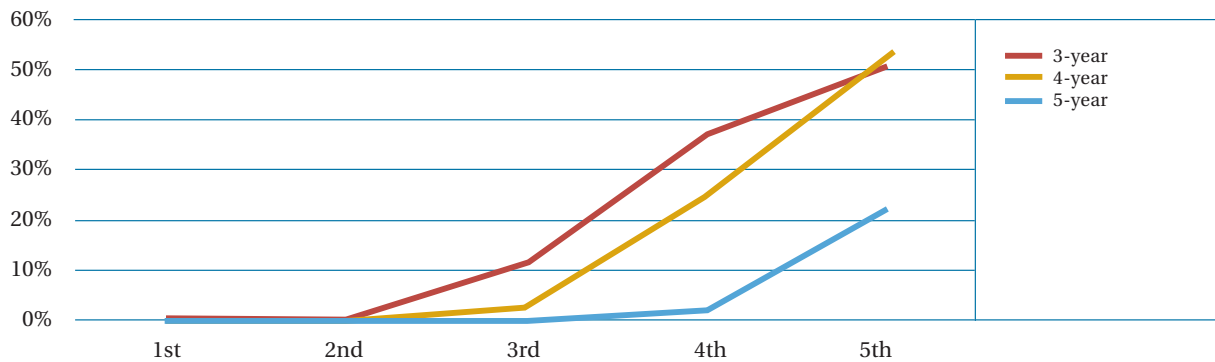
Progress Toward Completion

Persistence can also be measured in terms of credits earned, as a reflection of the progress made toward completing the degree. Since different institutions use different credit systems,[13] the number of credits earned cannot be used as the measure of progress. Instead, progress is measured by expressing credits earned as a percentage of the total number of credits required for the degree. Thus, credits are standardized using the number required for the degree as the base. On average, students had earned a high proportion of the number of credits required for their degree (on average, 77% of required credits had been earned). Females had earned 80%, on average, while males had earned 73%. Overall, 2% of the cohort had earned no credits.

These percentages should not be interpreted as direct indicators of progress toward completion, however, since degree programs require more than just a certain number of credits. Degree programs also require certain types of credits, (by program year, subject area, etc.). Students can therefore earn credits that don't count toward the degree. If a students changes programs, some of the credits he or she previously earned may not count toward the degree now being sought. For these reasons, students can earn more than 100% of the credits required without actually earning the degree.

Overall, almost half — 49% of students — completed 100 to 197% of the number of credits required for their degree. As shown in Figure 7, of those who had not earned a degree, 14% had completed at least 100% of the total credits required. Of those who had earned a degree, 84% had completed at least 100% of the credits required for their designated program and 17% had completed less than 100%. This latter group may have received credits for learning prior to entry into the program.

Continuers comprised two groups of students: those studying slowly and those who had earned credits that didn't count toward their degree. This is evident in Figure 8, which shows the distribution of credits earned for continuers in three-, four- and five-year programs. Overall, almost 40% of continuers had earned at least 100% of the credits required, but had not earned a degree. Of the continuers in three-year programs, about 40% had already earned at least 100% of the credits required. The proportion is only slightly lower for continuers from four- and five-year programs, at 37% and 36%, respectively.

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13   For example, some institutions require 20 credits for a four-year degree program, while others require 110, 120, or 130 credits.

Figure 7 — Distribution of Students by Percentage of Required Credits Earned and Degree Completion
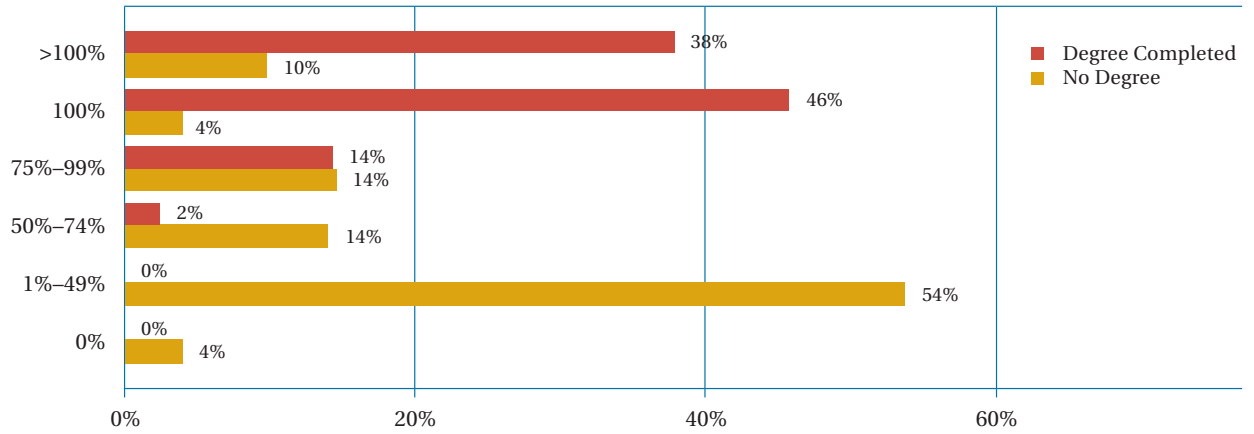
Figure 8 — Distribution of Percentage of Credits Earned by Continuers
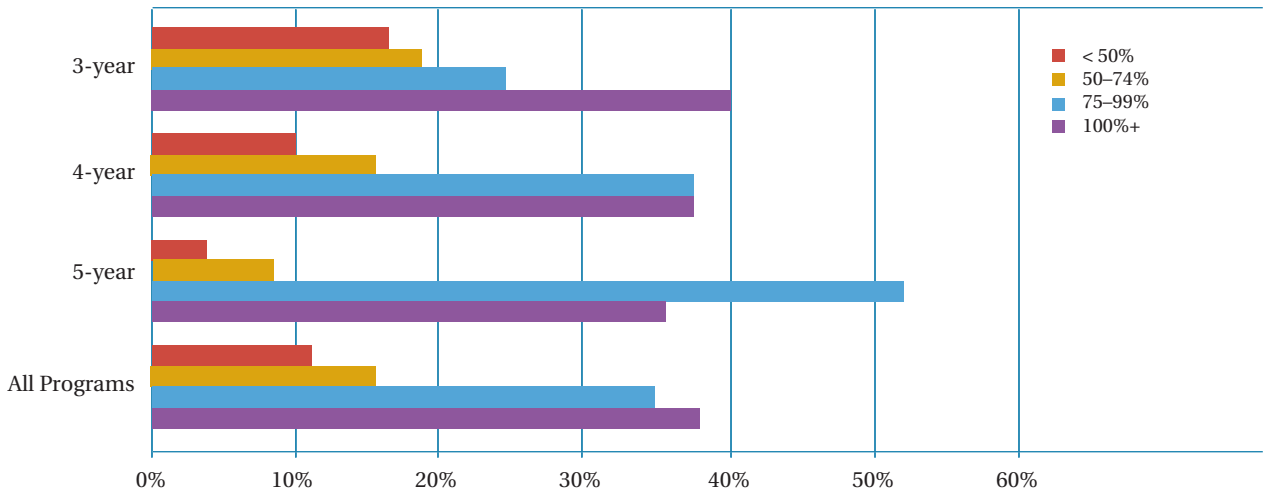
It is likely that some of those studying more slowly were not taking full-time course loads each year, and others were taking time off between years. Students who had earned credits that did not count toward their degree could either have been changing programs or taking courses that did not meet their program requirements.

Program Length Completed

Since students can study on a full-time or part-time basis, the percentage of credits earned was used to estimate the number of years of the program each student had completed. For example, a student in a four-year program who had completed 50% of the credits required would be deemed to have completed two years of his or her program.[14]

Figure 9 shows the average length of program completed as a function of the length of the program.[15] Although students in three-year programs had an additional two years to complete all three years, on average only 2.28 years had been completed, representing 76% of the length of the program. Students in four-year programs had completed 3.08 years, on average, or 77% of the program length. Students in five-year programs showed faster progress, having completed an average of 4.15 years, or 83% of the program length.

Figure 9 — Years of Program Completed by Program Length

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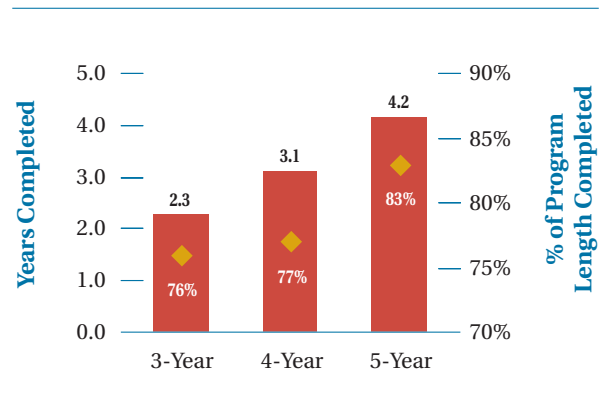
14   This is only an approximation, as we do not know whether all credits earned count toward the degree requirements.

15   Program length completed is equal to the percentage of credits completed multiplied by program length.

Student Financial Aid

Distribution of Financial Aid Dolɪlars

The students in the study cohort received a total of $78,918,661 in loans and $17,432,080 in grants over the five-year tracking period. This includes both governmental and institutional aid. Some 82% of the total amount of aid came in the form of loans. Appendix C provides an overview of the types of financial aid programs available in the three provinces participating in this study. The five most common types of aid available to undergraduate students that are administered through provincial student aid programs are:

- Canada Student Loans: Repayable loans to eligible full-time post-secondary students, funded by the federal government. Loans are interest-free for up to six months after a student ceases post-secondary studies. Generally, the Canada Student Loan makes up 60% of the total loan amount received.

- Provincial student loans: Repayable loans to eligible full-time post-secondary students, funded by the provincial government. Loans are interest-free for up to six months after a student ceases post-secondary studies.

- Canada Millennium Scholarship Foundation bursaries: Non-repayable bursaries in the form of grants or loan remissions from the Canada Millennium Scholarship Foundation. Millennium bursaries are given to eligible undergraduates with assessed need above a specified threshold who have completed at least one year of full-time post-secondary studies.

- Canada Study Grants: Non-repayable financial assistance for specific students, funded by the government of Canada. The largest group of recipients consists of students with wholly dependent children or other relatives. Canada Study Grants are also available to students with disabilities, high-need part-time students and women in certain doctoral studies.

- Provincial grants: Non-repayable grants or loan remissions for students with annual debt or assessed need above a specified threshold, funded by the provincial government.

In addition to these awards, students may have access to non-repayable institutional aid such as:

- Need-based bursaries: Although these are usually awarded on the basis of financial need, there may be other criteria as well.

- Work-study aid: Institutions may provide some students with part-time on-campus jobs during the study term. Work-study jobs are designed to provide financial assistance and employment experience to students in high financial need.

- Merit scholarships (including one-time entrance awards, renewable entrance awards and in-course awards): While most scholarships are based on academic merit, some are based on athletic or extracurricular merit, and some include a combination of academic and non-academic criteria.

Figure 10 shows the distribution of governmental and institutional aid dollars for 2000–01, based on data reported by Junor and Usher (2002). The federal and provincial aid is for all credentials and was provided by the federal and provincial student aid programs. The institutional data is based on a survey of undergraduate merit and need-based awards conducted by the Canada Millennium Scholarship Foundation.

Figure 10 — Distribution of Governmental and Institutional Aid Dollars, 2000-01
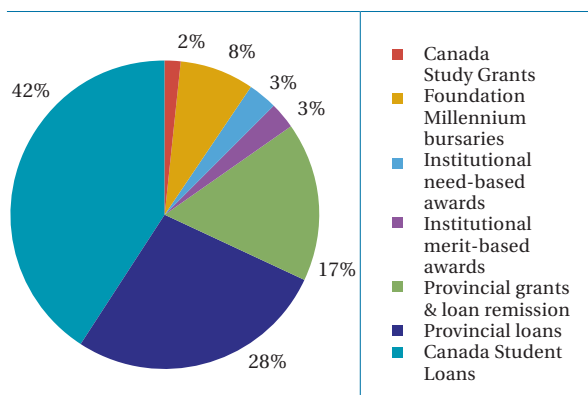
Of the governmental and institutional assistance awarded in 2000–01, 68% was in the form of loans. The rest consisted of non-repayable aid. Institutional awards constituted 5% of the total amount of aid dollars awarded; 95% of institutional funds were awarded by universities. Merit-based awards represented just under 3% of all aid, or 9% of non-repayable aid.

Although the data in Figure 10 provide context, they are not directly applicable to this study. Figure 10 represents all aid provided in 2000–01, while this study is concerned with the cumulative amount of aid students received over a five-year period. Figure 10 also includes all types of institutions and credentials, whereas all of the students in the study cohort were university students working toward bachelor's degrees. They were likely to have higher costs, and hence more assistance, than those in certificate and diploma programs.

Eligibility requirements and award programs also change over time. Figure 10 only covers 2000–01, while the study cohort spanned the period from 1997–98 to 2003–04. Eligibility for some forms of non-repayable aid also depends on the year of study: the Foundation's millennium bursaries, for instance, are not available for students in their first year of post-secondary studies. Many institutional merit scholarships, on the other hand, are entrance scholarships; of the funds awarded as entrance scholarships in 2000–01, 61% could not be renewed.

Although we don't know what proportion of the aid awarded to the study cohort was for merit, the data in Figure 10, suggest that merit awards represent a very small proportion of all aid dollars (under 3%) and a small proportion of non-repayable aid (about 9%). For the rest of the report the term grant is used to refer to all non-repayable aid. This includes a small amount of merit aid.

Recipients of Student Financial Aid

Over half (53%) of the students in the study cohort had received financial aid: a government student loan, a grant or both. Figure 11 shows the distribution of students by the type of financial aid received. Overall, 40% had received a student loan and 38% had received a grant. The incidence of borrowing is in the range of that found in other studies. For instance, EKOS (2003: pg. 103) found that 46% of university students surveyed in 2001–02 had borrowed at some point during their post-secondary studies.[16] Based on data from the National Graduates Survey, Allen and

Vaillancourt (2004) reported that 45% of 2000 graduates with a bachelor's degree had borrowed, which is comparable to 40% of university graduates in this study. The higher rate of borrowing for the 2000 graduates may be due to the fact that 57% had had some prior post-secondary education, whereas all the students in the study cohort had had no prior education before entering the bachelor's program.

Table 4 shows the type of aid received by gender and age. Females were slightly more likely than males to have received both forms of financial aid. Some 39% of males and 41% of females had borrowed; some 36% of males and 40% of females had received grants. The likelihood of receiving grant-only aid decreased with age, while the likelihood of receiving both grants and loans increased. Those 24 and older were the most likely to have received some type of aid, and those aged 20 to 23 were the least likely. The likelihood of receiving loan aid increased with age. The relationship between age and grant aid was curvilinear. Those 20 to 23 were less likely to have received grant aid than were either younger or older students. The linear relationship of age with loan aid and the curvilinear relationship with grant aid is similar to that reported by EKOS (2003: pgs. 61–65).

Figure 11 — Student Financial Aid Recipients
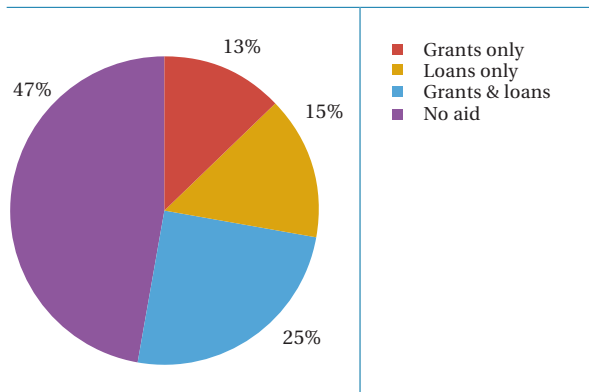
Table 4 — Type of Student Financial Aid Received by Gender and Age

	Grant Only	Loan + Grant	Loan Only	No Aid	Any Grant	Any Loan
Female	13%	27%	15%	46%	40%	41%
Male	12%	24%	15%	49%	36%	39%
Age 16–18	17%	22%	16%	45%	39%	38%
19	16%	26%	11%	47%	41%	37%
20–23	4%	25%	19%	52%	29%	44%
24+	2%	39%	16%	43%	41%	55%
All	**13%**	**25%**	**15%**	**47%**	**38%**	**40%**

16   EKOS did not report total incidence of receiving grant aid since starting post-secondary studies.

Amount and Type of Aid Received

Students who had received some aid had received, on average, $13,802 over the tracking period. This average does not provide a clear picture, however, as the amount of aid received by each student varied from two to six figures. The amount of aid received in a given year is determined by the student's assessed need, which is the difference between his or her expenses and resources (including, if applicable, the expected contribution of parents or spouse). The total amount of aid received over the tracking period will be determined by the assessed need of the student each year, the maximum award limits and the number of years in which the student receives aid. Hence, part of the variation in aid received is due to differences in assessed need and part is due to differences in the number of years in which the student was enrolled and received aid. To avoid giving a misleading impression, averages should be accompanied by information on the distribution of the amount of aid received.

Total aid received over the tracking period ranged from a low of $15 to a high of $138,376. Just over half of aid recipients (53%) received less than $10,000 in aid. About a fifth (21%) received aid between $10,000 and $19,999, and another quarter (24%) received aid between $20,000 and $49,999. Only 2% received aid of $50,000 or more. (Details are provided in Table B.2 in Appendix B.)

Figure 12 shows the distribution of the amount of aid received by the type of aid. For the 1,669 students who received only grants, the amount of grant aid ranged from $15 to $36,700, with an average of $3,461. Total loans for the 1,944 who received only loans ranged from $123 to $90,516, with an average of $14,857 in accumulated loans. The 3,368 recipients of combined loan and grant aid had the largest range in total aid received, from a low of $581 to a high of $138,376,[17] with an average of $13,802.

Figure 12 — Distribution of Aid Recipients by Type and Total Amount of Aid
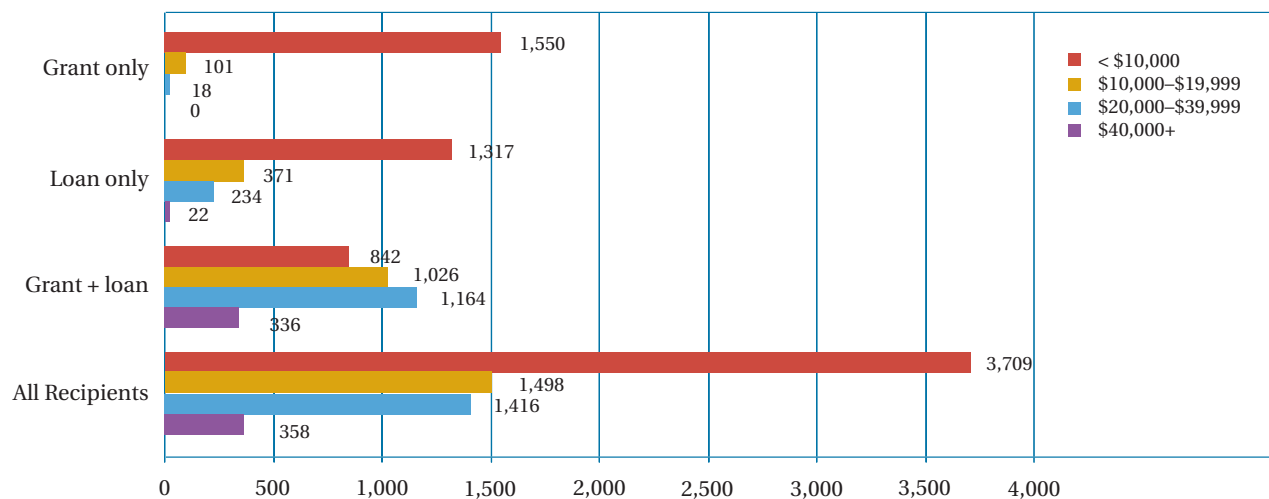
17   Two Ontario students in the study cohort each received more than $100,000 in total aid over the course of the five years. One had received $138,376, of which $135,076 was loan aid, and the other had received $121,180, of which $120,180 was loan aid. Although these amounts may seem implausible, McElroy (2004) reported accumulated student loans for B.C. undergraduate students up to $100,320. The maximum lifetime combined Canada-Ontario student loan limit is currently $170,000. This is based on 340 weeks of study at $500 per week—the maximum amount available for someone with dependants. It is likely that these two students had dependants, and were enrolled in programs that were at or near 52 weeks per year.

Most of the recipients of very small amounts of aid received all of this in the form of grant aid: 90% of the 992 students who received aid of $1,500 or less received only grants. On the other hand, almost all (96%) of the 127 recipients of high amounts of aid ($50,000 or more) received a combination of grant and loan aid.

Table 5 shows the average amount of grant, loan and total aid received by gender and age (medians are in Appendix B). There were few differences between females and males; females had somewhat higher amounts of loan aid than males, but amounts of grant aid were similar. Students who were 24 or older at entry had, on average, more grant aid and somewhat more loan aid than younger students. This age difference may be because older students are more likely to have dependants, and hence higher assessed needs, which increases the aid for which they are eligible. Some grants, such as the Foundation's millennium bursaries (which represent 25% of grant aid awarded in 2000–01), are only available to high-need students Some grants are specifically for students with dependants, such as the Canada Study Grant for students with dependants.

The amount of aid received increased with the number of years in school, as is shown in Figure 13. This would be expected, since the more time a student spends in school, the more aid he or she can accumulate.

Table 5 — Average Total Student Financial Aid by Gender and Age at Entry

	Grants		Student Loans		Total Aid	
	No.	Mean	No.	Mean	No.	Mean
Females	2,829	$3,431	2,935	$15,095	3,866	$13,971
Males	2,208	$3,499	2,377	$14,562	3,115	$13,592
Age 16–18	1,642	$3,434	1,586	$15,575	2,295	$13,220
Age 19	2,210	$2,680	1,984	$14,183	2,816	$12,096
Age 20–23	888	$3,861	1,342	$14,456	1,456	$15,679
Age 24+	297	$8,221	400	$16,693	414	$22,027
Total	**5,037**	**$3,461**	**5,312**	**$14,857**	**6,981**	**$13,802**

Figure 13 — Number of Years Completed by Amount of Financial Aid Received
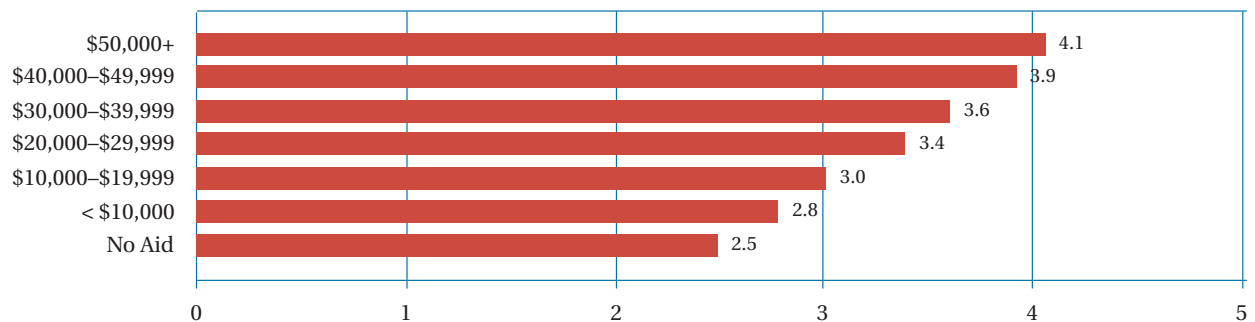
Loan Recipients

Figure 14 compares the distribution of total loan aid received by the study cohort with that received by the members of the Class of 2000 surveyed in the National Graduates Survey (Allen & Vaillancourt, 2004). As mentioned, the incidence of borrowing was somewhat higher for the 2000 graduates, perhaps because this group includes students who already had some post-secondary experience before enrolling in a bachelor's program. Despite this differ-ence, study cohort graduates and 2000 graduates had similar distributions of student loan debt. The most notable difference is that fewer study cohort gradu-ates had accumulated loans between $10,000 and $25,000, and more had no loans. Compared with the entire study cohort, study cohort graduates were more likely to have accumulated loans of $25,000 or more, and less likely to have loans under $10,000.

Grant Recipients

Of the grant recipients, some received *only* grant aid, while others received both loan and grant aid. Those who had received only grant aid represented one-third of all grant recipients. Grant-only recipients tended to receive smaller grants, on average ($3,027), than did those who received both loans and grants ($3,676).

Figure 14 — Distribution of Total Loan Aid for Cohort Graduates and 2000 Graduates

For recipients of both loan and grant aid, the average amount of total grant aid tended to increase with the total amount of loan aid. This is illustrated in Figure 15, which also shows the average total grant for the grant-only group. This relationship would be expected, since eligibility for loans and need-based grants depends on the same measure: assessed need. (More detailed results are provided in Appendix B.)

Figure 15 — Average Total Grant Aid for Those Who Received Both Loan and Grant Aid
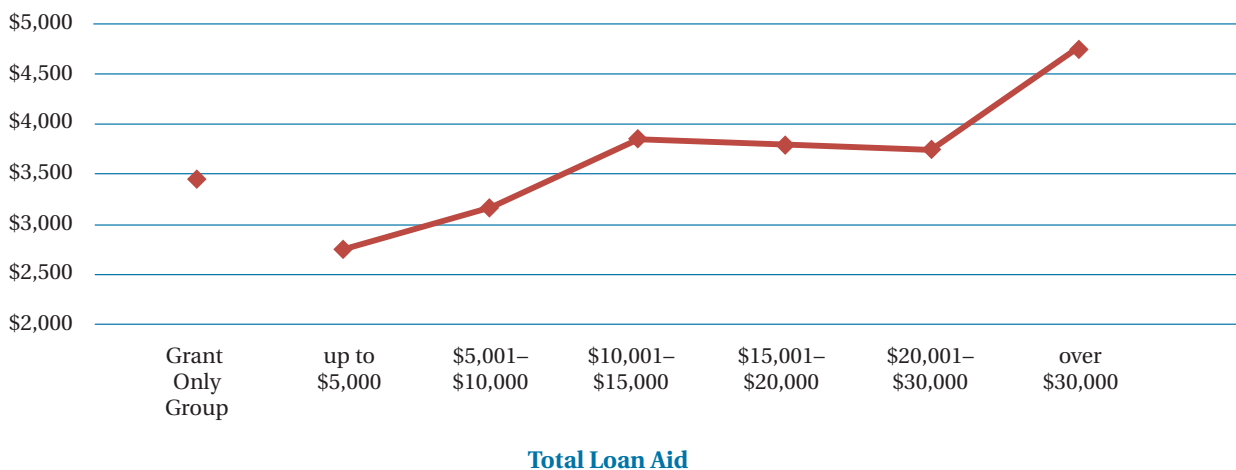
Total Aid Received by Completers, Continuers and Leavers

The type and amount of financial aid received varied somewhat with the students' persistence status at the end of the tracking period, as is shown in Table 6. Completers and continuers were both more likely than leavers to have received grant aid. Of all groups, first-year leavers were the least likely to have received aid, especially grant aid. Among those who received aid, leavers received the smallest average amount of aid — which is to be expected, since they had less time to receive it.

Figure 16 shows the distribution of type of aid received: Figure 17 shows the amount of total aid received. Completers were the least likely to have received loan-only aid and the most likely to have received grant aid, either with or without loan aid. Continuers and leavers received similar amounts of loan-only aid, but continuers were more likely than leavers to have received grant aid. The distribution of amount of total aid received was similar for completers and continuers, but leavers were less likely than others to receive aid above $10,000.

Table 6 — Financial Aid Received by Completers, Continuers and Leavers

	Grant Aid		Loan Aid		All Aid	
	%	Mean	%	Mean	%	Mean
Completers	46%	$3,619	40%	$17,135	57%	$14,930
Continuers	37%	$4,192	43%	$16,888	55%	$16,172
All Leavers	25%	$2,448	39%	$9,975	45%	$10,022
1st-Year Leavers	18%	$1,902	33%	$6,090	39%	$6,060
Other Leavers	31%	$2,685	43%	$12,310	49%	$12,454

Means are based on only those in the sub-group who received the type of aid.

Figure 16 — Distribution of Type of Aid Received by Completers, Continuers and Leavers
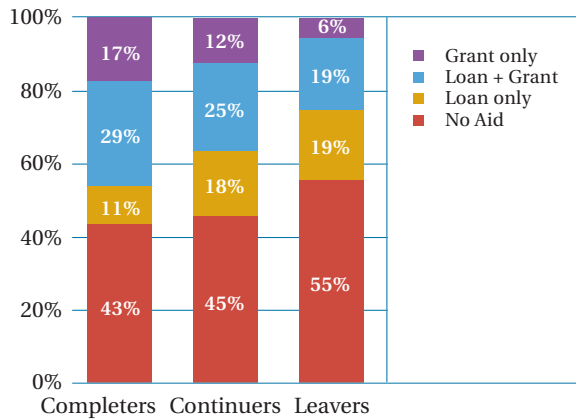
Figure 17 — Distribution of Amount of Total Aid Received by Completers, Continuers and Leavers
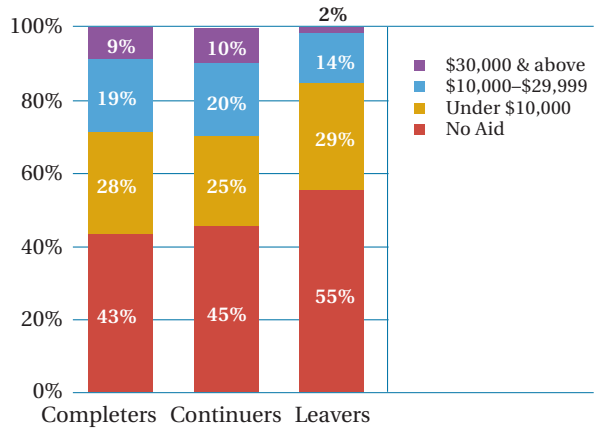
Standardized Measures of Student Financial Aid

Since students who spend longer in school have more time to receive aid, they will have received more aid, on average, than students who spent less time in school. This relationship is illustrated in Figure 13. Hence, a standardized measure of aid is needed to remove this spurious association between amount of financial aid received and persistence. For this research, aid amounts were standardized by dividing the amount of aid received by the number of years completed to give the amount of aid received for each year completed. This was done for grant, loan, and combined aid received.

These standardized amounts are referred to as *annualized* aid, because the standardization converts the total amount of aid into the amount that would have been received to complete one year of the program on a full-time basis. Standardizing by years of program completed ensures that the results are independent of the length of the program, the amount of time spent in school, and whether the student studied on a full-time or part-time basis. Full details of the standardization method are provided in Appendix D.

For example, a student who had taken two years to complete two years of the program while receiving $12,000 in financial aid would have received $6,000 in annualized aid. A student who had completed four years of a program, and had received $24,000 in financial aid, would also have annualized aid of $6,000.

Table 7 shows the average annualized amounts of grant, loan and total aid for all recipients, as well as by gender and age. The 6,981 students who had received aid had received, on average, $5,081 in annualized aid. For those who had received loans, the average annualized loan was $5,558, and for those who had received grants, the average annualized grant was $1,181.

To place these annualized amounts in context, consider that the average student loan for the academic year 2000–01 was $7,590 for full-time students, and that the maximum loan for a 34-week program (the usual number of weeks of study for one year of a degree program) was $9,350 for students without dependants. Males and females received similar amounts of annualized aid. Older students — those aged 20 and older at entry — tended to have higher annualized grant and loan amounts.

Table 7 — Average Annualized Aid by Gender and Age at Entry

	Annualized Grants		Annualized Loans		Annualized Aid	
	No.	**Mean**	**No.**	**Mean**	**No.**	**Mean**
Females	2,829	$1,158	2,935	$5,505	3,866	$5,027
Males	2,208	$1,209	2,377	$5,623	3,115	$5,148
Age 16–18	1,642	$974	1,586	$5,234	2,295	$4,314
Age 19	2,210	$807	1,984	$5,101	2,816	$4,228
Age 20–23	888	$1,525	1,342	$5,933	1,456	$6,399
Age 24+	297	$4,070	400	$7,851	414	$10,505
Total	**5,037**	**$1,181**	**5,312**	**$5,558**	**6,981**	**$5,081**

See Tables B.3, B.4 and B.5 in Appendix B for further details.

Annualized amounts should not be interpreted as the actual aid received each year. A student could, for instance, receive the maximum loan each year by taking 60% of a full course load. At this rate, it would take the student five years to complete a three-year program. A student receiving $9,350 in loan aid each calendar year would have accumulated $46,750 in loan aid. However, since the student only completed three program years, the annualized loan would be $15,583. A student who took only three years to complete the same three-year program and received $9,350 in loans each calendar year would have an annualized loan of $9,350. Annualized amounts reflect the aid required to complete one year of study on a full-time equivalency basis. The difference in the annualized aid received by the two students reflects the additional cost of studying at a slower pace.

Table 8 shows the amounts of annualized aid that went to recipients of grant-only, loan-only and grant-plus-loan aid. Those who had received both loan and grant aid had higher amounts of annualized grant aid, on average, than did those who had received only grant aid. This would be expected for need-based grants, since many need-based grants are based on assessed need, which is also the basis for loans (and, as discussed earlier, many grants are only available to students with high levels of need, who will have received larger loans than students with lower levels of need). The grant-plus-loan aid group had higher levels of annualized loan aid than had the loan-only group. With its higher annualized loan aid and higher annualized grant aid, the grant-plus-loan group had annualized aid that was, on average, $2,637 higher than the annualized aid of the loan-only group.

Loan Recipients

The study cohort includes two groups who received loan aid: the loan-only group and the grant-plus-loan group. Table 9 shows the average amount of annualized total aid and annualized loan aid received by each group, broken into categories.

For recipients of annualized aid under $3,000, the two groups had similar levels of annualized total aid. However, grant-plus-loan recipients who received annualized aid in the $3,000 to $9,999 range received $526 more in annualized aid, on average, than did loan-only recipients in this range. On the other hand, loan-only recipients of annualized aid of $10,000 and above received $1,267 more in annualized aid than did grant-plus-loan recipients.

The loan-only group had higher levels of annualized loan aid than did the grant-plus-loan group for every amount of annualized total aid. The difference tended to increase as the amount of annualized total aid increased; it was greatest for recipients of $10,000 or more in annualized aid. In this group, loan-only recipients had $3,896 more, on average, in annualized loan aid than did the grant-plus-loan group. In other words, as the amount of annualized aid increased, the amount of accumulated annualized loan aid received by the loan-only group increased at a faster rate. Loan-only recipients of $10,000 or more in annualized aid had annualized loan aid of $15,241, on average, compared to only $622 for loan-only recipients of annualized aid under $1,000.

Table 8 —Average Annualized Aid by Type of Aid Received

	Grant-Only Recipients	Grant + Loan Recipients	Loan-Only Recipients	All Aid Recipients
Number of Students	1,669	3,368	1,944	6,981
Average Annualized Grant Aid	$877	$1,331	–	$852
Average Annualized Loan Aid	–	$6,036	$4,730	$4,229
Average Annualized Total Aid	$877	$7,367	$4,730	$5,081

See Table B.2 in Appendix B for medians and ranges.

Table 9 — Average Annualized Total Aid and Annualized Loan Aid Received by Loan Recipients

| | Average Annualized Total Aid | | Average Annualized Loan Aid | |
Annualized Aid	Grant + Loan Recipients	Loan-Only Recipients	Grant + Loan Recipients	Loan-Only Recipients
Aid under $1,000	$686	$622	$442	$622
$1,000–$1,999	$1,516	$1,462	$1,077	$1,462
$2,000–$2,999	$2,501	$2,489	$1,927	$2,489
$3,000–$9,999	$6,334	$5,809	$5,272	$5,809
$10,000+	$13,975	$15,241	$11,345	$15,241

Annualized Grant and Loan Aid

Annualized grant amounts tended to increase as the annualized loan amount increased. This correlation is illustrated in Figure 18, which also shows the average annualized grant amount for the grant-only group. This relationship is similar to that between total grant aid and total loan aid, previously depicted in Figure 15.

Annualized Aid Received by Completers, Continuers and Leavers

Different persistence groups received different amounts of total aid. They also received different amounts of annualized aid. However, since annualized aid eliminates differences due to the amount of time spent in school, annualized aid produced a different pattern.

Figure 18 — Annualized Grant Aid by Amount of Annualized Loan Aid
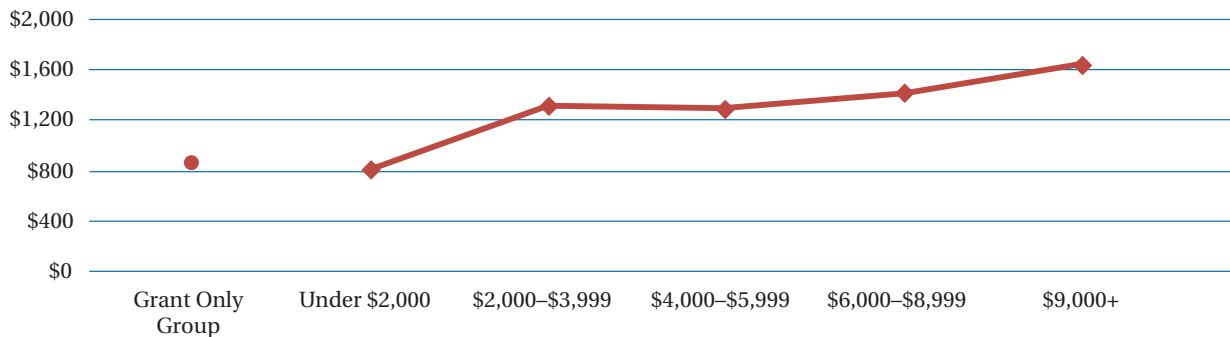
Figure 19 compares the four groups in terms of the amount of annualized grant and loan aid received. In other words, it shows the amount of aid each group received for completing one year of a program on a full-time equivalency basis. Of those who received loan aid, completers and continuers had lower amounts of annualized loan aid than had leavers. Non-first-year leavers had the highest amounts of annualized loan aid of all four groups. The graph also shows the amount of annualized grant aid. Although completers and continuers were more likely to receive grant aid than were leavers, of those who received grant aid, leavers received higher amounts of annualized grant aid, on average, than did completers and continuers.

Figure 19 — Mean Annualized Loan and Annualized Grant by Persistence Status
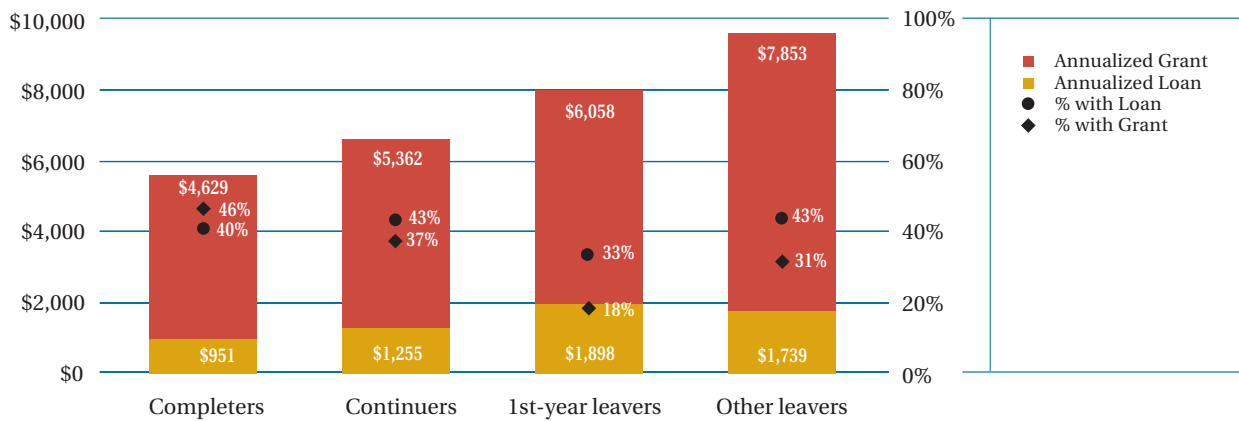
Averages are based exclusively on those in the group who received that type of aid.

Persistence and Student Financial Aid

Persistence, Total Aid and Annualized Aid

Persistence is positively related to the amount of total aid received. The more aid dollars a student received, the more required credits were earned, on average, and the greater the likelihood of completing a degree. However, this positive relationship may only reflect the fact that the longer someone spends in school the more aid dollars they can receive, all else being equal. When aid amounts are annualized, the relationship between persistence and annualized aid is negative.

The percentage of required credits earned and the likelihood of completing a degree declined as annualized aid increased. Figure 20 illustrates this for required credits earned. Figure 21 shows the relationship for degree completion. Since annualized aid removes the association between persistence and number of years in school, it is used in all subsequent analyses.

Figure 20 — Percentage of Required Credits Earned in Relation to Total Aid and Annualized Aid
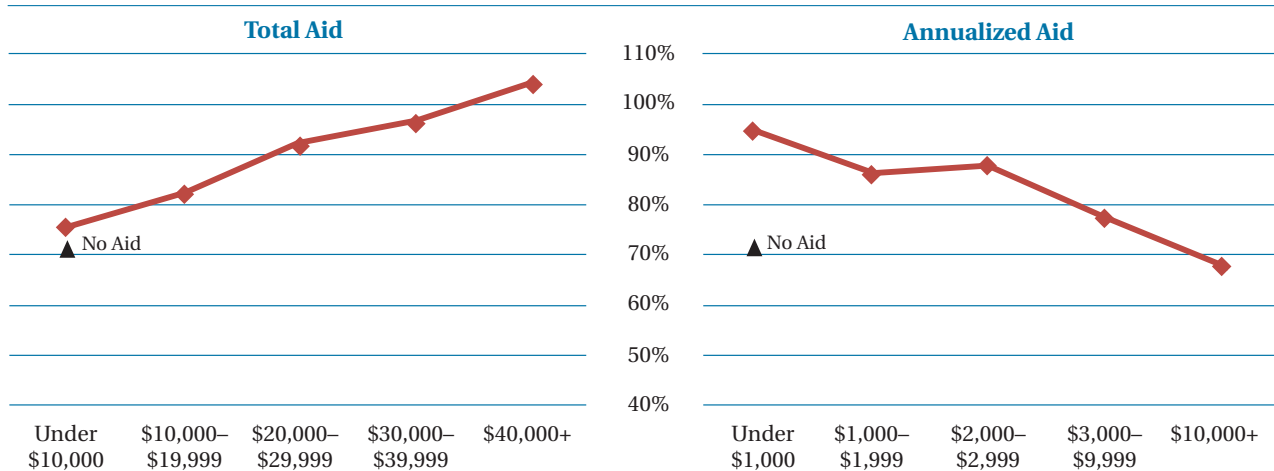
Figure 21 — Degree Completion in Relation to Total Aid and Annualized Aid
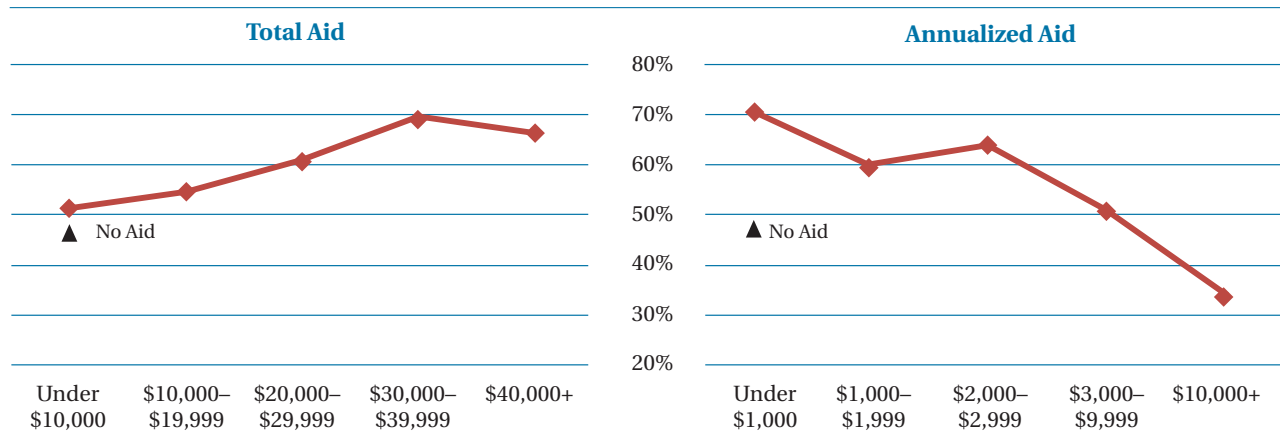
The Relationship Between Annualized Aid and Persistence

To determine whether student aid may have an impact on persistence, we examined the relationship between persistence and the amount of annualized aid received. The graphs in Figure 22 illustrate the relationship between two measures of persistence (progress and completion) and annualized aid for recipients of different types of aid (grant-only, loan-only or grant-plus-loan). For comparison, both graphs also show the results for students who had received no aid.

To graph the results, annualized aid was grouped into five categories. The groupings were determined to yield a sufficient number of observations for each combination of annualized aid and type of aid. (The annualized aid categories and the number of students in each group, as well as the mean and median amounts of annualized aid, are shown in Table B.7 in Appendix B.)

There was no relationship between any measure of persistence and annualized aid for grant-only recipients. However, for recipients of loan aid, persistence declined as annualized aid levels increased. This was true for both the loan-only and grant-plus-loan groups, for any measure of persistence used: earning

a degree (completion), percentage of the required credits earned (progress) or length of program completed. However, persistence was higher for those who also received grant aid than for those who received only loan aid. That is, the persistence of students with loans *and* grants was better: they had completed more of their programs, had earned more credits and were more likely to have earned a degree than were those with similar aid levels who had received only loan aid.

Persistence was highest for those who had received both loan and grant aid, especially if the annualized amount was under $3,000. As annualized aid increased, the percentage of required credits earned by this group declined from 101% to 72%, and the percentage who completed a degree decreased from 79% to 38%. Persistence was lowest for those who received loan-only aid, especially those with annualized loan aid of $3,000 or more. As the amount of annualized aid received by loan-only recipients increased, the average percentage of required credits earned declined from 91% to 44% and the percentage of recipients who had completed a degree decreased from 59% to 8%.

Figure 22 — Persistence by Amount of Annualized Aid and Type of Aid
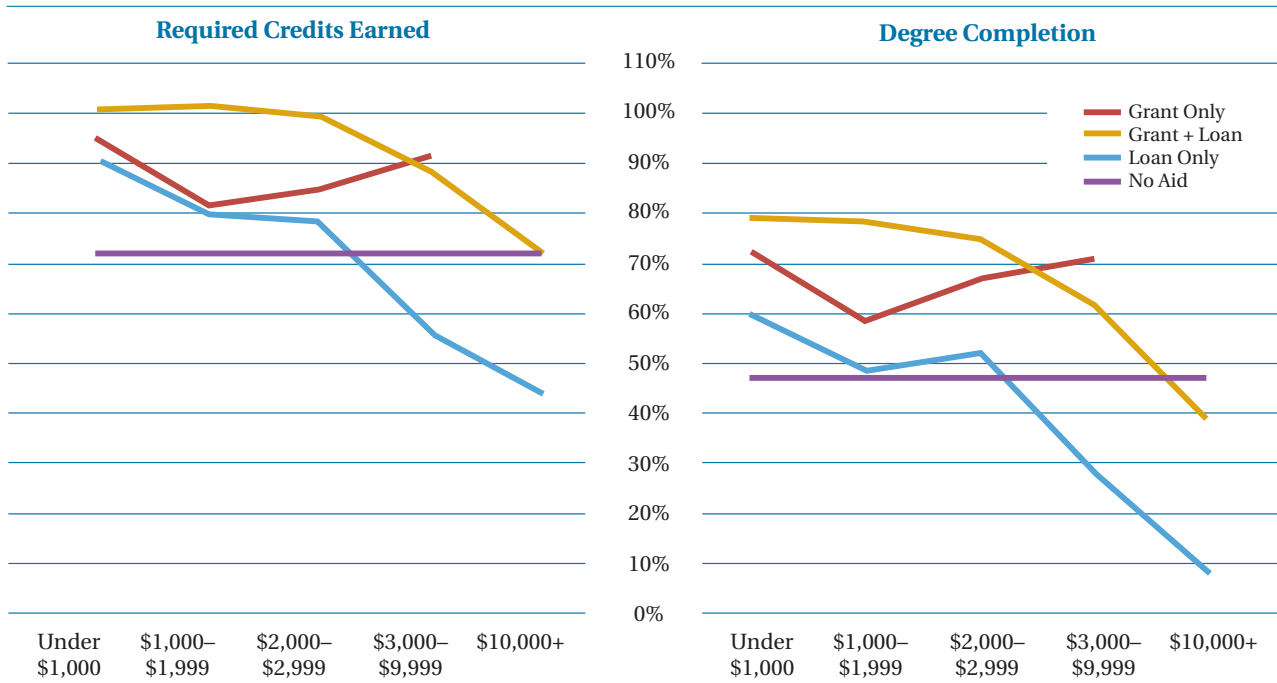
No recipients of grant-only aid had annualized aid of $10,000 or above.

Details are provided in Table B.8 in Appendix B.

The persistence results of the grant-only group fell between that of the grant-plus-loan group and the loan-only group. Students in the grant-only group had earned, on average, 92% of the credits required, with 69% having completed a degree.

Students with no aid had made more modest progress, having earned an average of 71% of required credits; 47% had completed a degree. These results are slightly below the persistence levels of loan-only recipients with annualized aid amounts under $3,000.

Predictors of Persistence

One way to measure the relationship between persistence and financial aid is to determine how well persistence can be predicted using the various aid variables. In this study we used regression modelling to identify the best predictors of progress (i.e., percentage of required credits completed). Since degree completion is a dichotomous variable, we used logistic regression to identify the best predictors of completion.

As the review of the research on retention and attrition has shown, many factors affect persistence, including psychological traits. Given the limited number of variables available in this study, it is not possible to develop a full model to predict persistence. The purpose of the modelling in this study is simply to compare the predictive power of the variables available.

We developed models to predict persistence using the variables available for this data. The non-financial variables were gender, age at entry and program length.[18] The financial variables were the type of aid received (none, loan-only, grant-only, loan plus grant) and the amount of annualized aid received.[19] Categorical variables were coded as indicator variables in the model. (See Appendix E for information on the coding used.) The interaction of aid type by annualized aid was also included as a possible predictor.

Figure 23 compares the actual progress results with the predictions made by the model. This model accounts for 13 percent of the variation in progress. All variables in the model are significant. However, although the overall interaction effect of aid type by annualized aid is significant, the specific interaction for the grant-only group is not significant. This means that the slope of the line relating progress to aid is the same for the grant-only and loan-plus-grant groups (the reference group). The slope of the line for the loan-only group is somewhat steeper, that is, as aid increases, progress decreases at a somewhat faster rate for the loan-only group than for the other two.

The means of the actual and predicted measures of persistence, as well as regression results for predicting progress and completion are presented in Appendix E.

The model predicts the no aid and grant-plus-loan groups very well. For the grant-only group the model smoothes out the variations over annualized aid and predicts a slight decline with aid, which is not evident in the observed data. For the loan-only group, however, the model tends to predict lower values of progress than are actually observed in the data, especially at higher levels of annualized aid.

This model only explains 13% of the variation in progress, which means that 87% is unexplained. Obviously there is more to predicting persistence than the few variables available in this study. None the less, this analysis does demonstrate that the amount and type of aid is related to persistence. Persistence declines for those with high levels of annualized aid, and persistence is best with both grant and loan aid combined.

The logistic model to predict degree completion (using the same variables) shows similar results, predicting the no aid and grant-plus-loan groups very well. It also smoothes out the variation for the grant-only group, predicting a decline that is not in the observed data. However, the completion model does not have the same problem of under predicting for the loan-only group. This model predicts the loan-only results much better than does the model for progress. Figure 24 compares the actual completion results with the predictions made by the model.

This model accounts for 14 percent of the variation in completion. All variables in the model are significant, except for the interaction with annualized aid for the grant-only group. This model correctly predicts degree completion for 70% of those who did complete. However it correctly predicts failure to complete a degree for only 58% of those who did not complete. Overall, the predictions are correct 64% of the time.

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18   Although there are three different program lengths, only 3% of the students were enrolled in five-year programs. So only two groups were used for regression purposes: three years and four or more years.

19   Technically there are two other financial variables, annualized loan and annualized grant. We cannot include both of these in the model, since loan plus grant equals aid. This means we can completely predict one predictor, which makes one of them redundant. In addition, all three variables have a value of 0 for the no aid group. The result is that aid is highly related to each of the other two. Two highly related variables cause problems of multicollinearity in the model. Hence only annualized aid is used in any model.

Figure 23 Actual and Predicted Progress
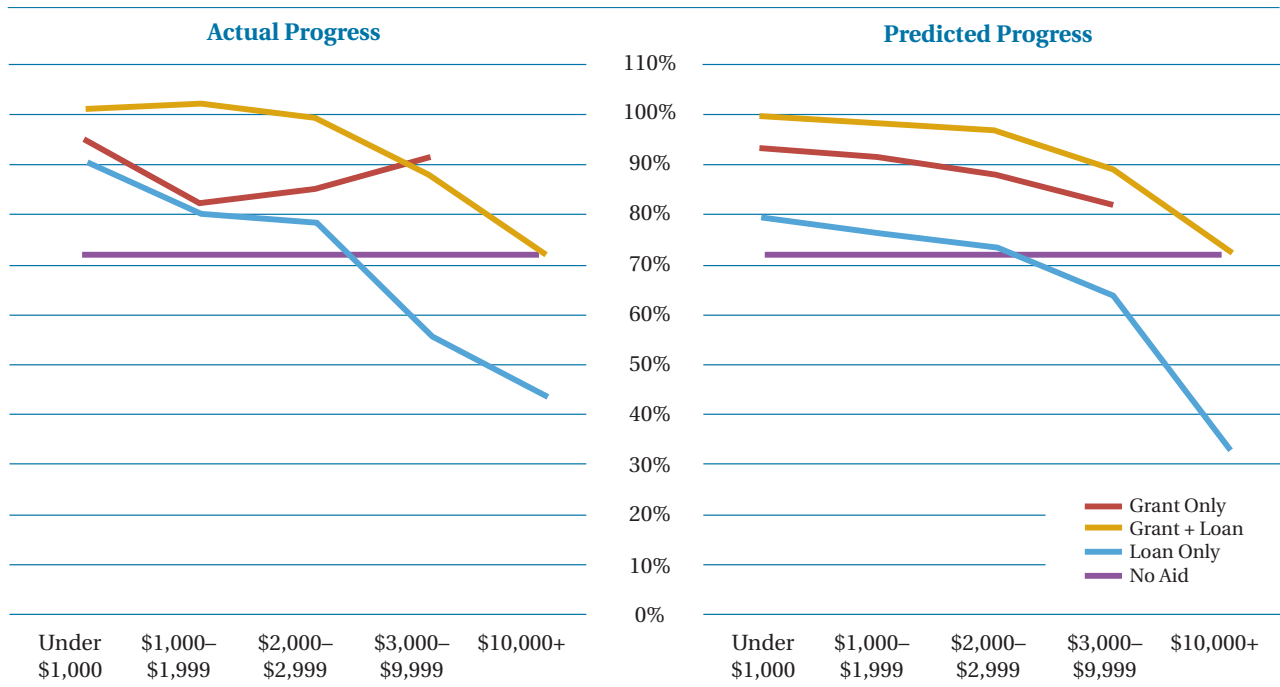
Figure 24 — Actual and Predicted Completion
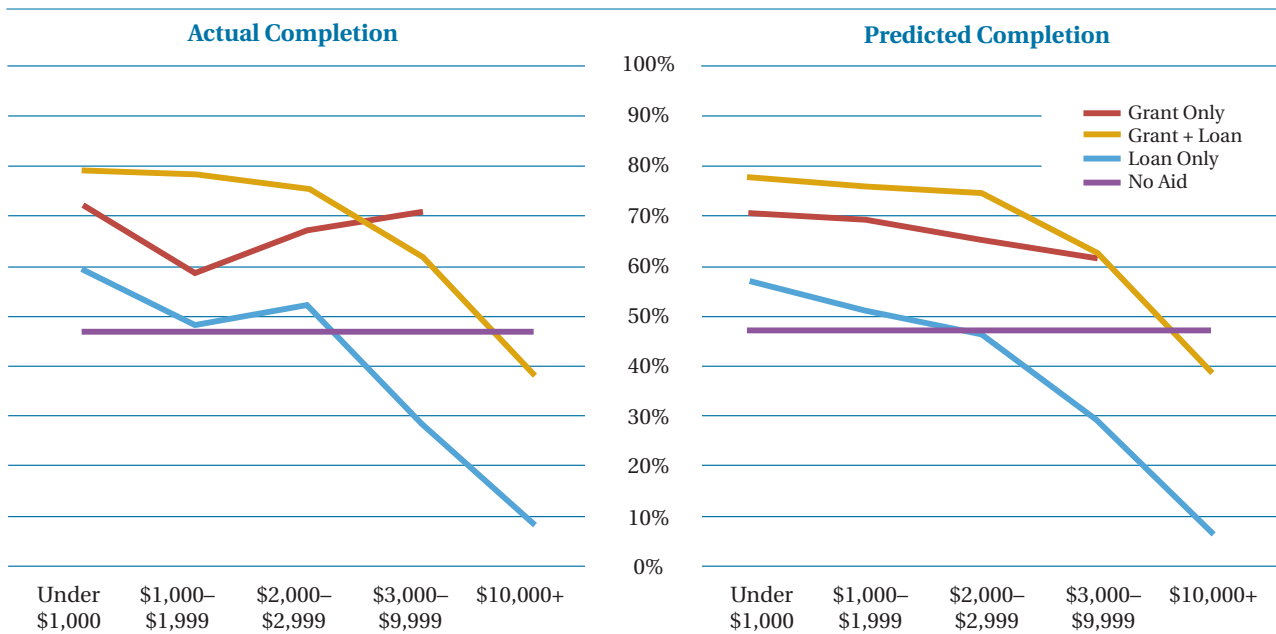
Aid Recipients

Two of the important predictors, type of aid and amount of annualized aid received, apply only to aid recipients. Its is not surprising then that there is so much unexplained variation in persistence. However, when the no-aid group is omitted when generating a model to predict progress, the predictive power of the model increases by 5 percent. There was a similar increase in the predictive power of the model predicting completion.

This still leaves over 80 percent of unexplained variation in predicting persistence for aid recipients. This suggests that most of the unexplained variation is due to factors that are beyond the scope of the project.

One way to test the importance of the aid variables is to remove the non-aid variables (age, gender and program length) from the model. This subset model accounts for 17% of the variation in progress for aid recipients. A subset model of only age, gender and program length only accounts for 4% of the variation in progress. For completion, the subset model with aid variables accounts for 17% of the variation while the subset model of only non-aid variables accounts for only 5%. Clearly, aid variables are much stronger predictors of persistence than are the non-aid variables in this study.

We know that most aid recipients in this study were receiving need-based aid because they received at least some of this aid in the form of student loans, which are always based on financial need. Loan recipients represent 76% of all aid recipients. Those who received only grants could be recipients of need-based or merit-based aid. (We were not able to separate need-based and merit-based grants, because we lacked information about the rationale for awarding the grants.) As presented previously in Figure 11, less than 3% of all government and institutional aid is merit-based. Given this, it is likely that most of the grant aid that loan recipients received was also need-based.

Using the original predictors, a model was generated on just the loan recipient data — those with and without grants. There was little change from the aid recipients model for either measure of persistence, progress or completion. The predictive power of the model increased by less than one percent and the coefficients were almost identical. Hence when we only include students with need-based aid the predictors of persistence remain the same. Persistence declines as amount of annualized aid increases, and is higher if some of the aid is a non-repayable grant.

Excluding Quebec

Since the post-secondary system in Quebec is so different from that in the rest of the country,[20] it is important to determine whether the inclusion of Quebec in the model makes a difference in predicting persistence. This was done by using the original predictors on the data excluding Quebec.

Figure 25 shows the results for progress, comparing this model to the model generated from all the data, originally shown in Figure 23, except that the means of the predicted values shown in Figure 25 are only for Ontario and BC. Whether or not Quebec is included in the data used to generate the model makes little difference. There is a slight decrease in the variation explained by the model excluding Quebec (from 13 to 11%). However, the means of the predicted values from both models are almost identical.

Figure 26 shows the same comparison for the completion measure. There is little change in the power of the model to predict completion when Quebec is excluded. Without Quebec, the model still accounts for 14% of the variation in completion, and predicts 64% of the cases correctly. The only change is that without Quebec there is a slight improvement in predicting completion for those who did complete (from 70% to 75%), and a slight decrease for those who did not complete (from 58% to 51%).

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20   Quebec students must receive a college diploma (a two-year program) before beginning university studies. As a result, compared to other jurisdictions university students in Quebec are generally older when they begin their university studies, and entering university is their second transition since completing high school.

The models compared in Figures 25 and 26 demonstrate that whether or not Quebec is included when generating the model makes no meaningful difference in the result. The pattern relating persistence and aid remains the same. Persistence declines as levels of annualized aid increase, and persistence is best when the aid consisted of both grants and loans.

Figure 25 – Predicted Progress for Ontario and British Columbia Based on the Original Model (generated from All Data) and the Model generated from the Data excluding Quebec
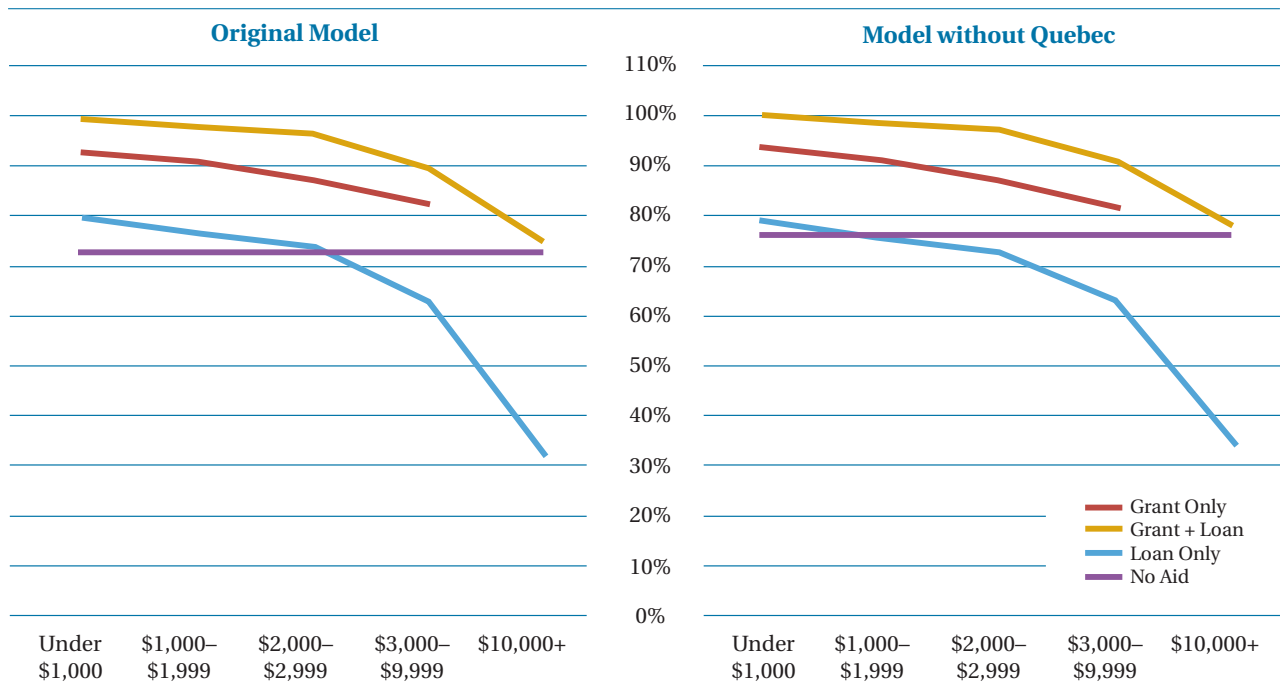
Figure 26 — Predicted Completion for Ontario and British Columbia Based on the Original Model (generated from All Data) and the Model generated from the Data excluding Quebec

Original Model

Model without Quebec

Grant Only
Grant + Loan
Loan Only
No Aid
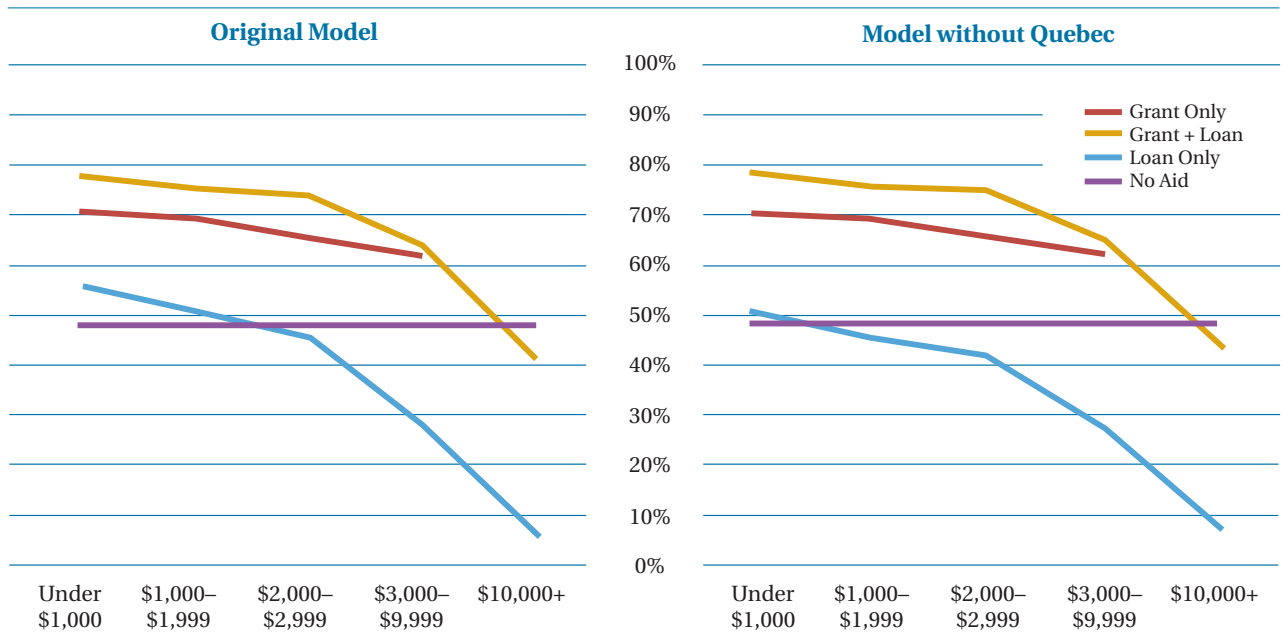
Summary and Conclusions

This study illustrates the variability in the amount and type of financial aid received by undergraduate university students. Just under half of all students in the study cohort received no financial aid; about 40% received loan aid, including 15% who received only loan aid; 38% received grant aid, including 13% who received only grant aid; overall, about a quarter received both grant and loan aid. Graduates in the study cohort who had received loan aid had accumulated student loan debt of $17,135, on average. However, loan debt ranged from a low of $103 to a high of $135,076. About 25% of the graduates with loan aid had accumulated debt above $25,600, including 1% with accumulated debt of $55,000 or more.

This study also shows that the persistence of students in undergraduate degree programs can be related to the type and amount of financial aid received. At the universities included in this study, the higher the amount of annualized aid received, the lower the level of persistence. However, receiving grant aid was positively associated with persistence. Those who received both grant and loan aid had higher levels of persistence than those who received the same annualized amount of aid, all in the form of a loan.

The group with the lowest level of persistence had the highest amount of annualized aid — $10,000 or more — in the form of loans only. These students had earned, on average, 44% of required credits; only 8% had completed a degree. In contrast, those who had received some of their aid in the form of a grant had considerably higher levels of persistence. With similar amounts of annualized aid, they had earned, on average, 72% of required credits; 38% had completed a degree.

Persistence was highest for those with the lowest amounts of annualized aid — under $1,000 — who had received some of this aid in the form of a grant. They had earned 100% of the required credits, on average; 79% of them had completed a degree. Loan-only recipients of annualized aid under $1,000 had somewhat lower levels of persistence — they had earned 91% of required credits, on average; 59% of them had completed a degree. The persistence of grant-only recipients of annualized aid under $1,000 fell between that of the grant-plus-loan recipients and that of the loan-only recipients. They had earned 95% of the required credits; 72% of them had completed a degree.

Students who received no aid had persistence levels that were similar to those of loan-only recipients with annualized aid under $3,000: they had earned, on average, 71% of required credits; 47% of them had completed a degree. The no-aid group may include students who are supported by their family as well as others who are paying their own way. It likely includes more part-time students than do the aid-recipient groups, since part-time students are less likely to be eligible for financial aid. Hence, the no-aid group's modest persistence may be a reflection of the mixed composition of this group rather than any single factor.

Annualized aid is related to total aid, so it captures all three variables: total aid, load aid, and grant aid, and is determined by the amount of the student's assessed financial need. The higher the assessed need, the higher the amount of assistance received — unless aid limits are reached. Hence, differences in annualized aid amounts reflect differences in levels of financial need.

Phrased in terms of need, then, this study suggests that the higher the level of assessed financial need, the slower the rate of progress and the lower the likelihood of completion within a set period of time. Family income could explain the negative association between annualized aid and persistence, with students from low-income families receiving more aid and having lower levels of persistence. Although there is some evidence of a positive association between persistence and family income level (Berkner et al., 2002; Grayson & Grayson, 2003; Heller, 2003; Reynolds and Weagley, 2003), assessed need is not directly related to family income.

In a recent paper, Usher (2004) demonstrated that assessed need and family income are not the same. He found that students from families with above-median incomes in 2001 were receiving just over 40% of the student loan dollars and a similar portion of need-based grant dollars.

This counterintuitive situation arises from the way assessed need is determined. Assessed need is the difference between allowable expenses and resources. Parental income is counted as a resource, but only if the student is classified as dependent[21] on parental support. For dependent students, assessed need declines as family income increases. But no parental contribution is expected for students who are classified as independent.[22] Usher found that only about 40% of Canada Student Loan recipients in 2001 were classified as dependent. Because parental income is not relevant for remaining 60% of recipients, the amount of assistance they receive does not reflect family income. Therefore, it is unlikely that family income can explain the negative association between annualized aid and persistence.

Students with high annualized aid tended to have high annualized loan aid. Students with higher annualized loan aid will have more debt than will those with lower annualized loan aid, if they continue to study under the same financial conditions. Debt may provide an explanation for the findings on persistence. As debt increases, persistence declines, perhaps because students who already owe money are trying to avoid owing more.

The group with the lowest level of persistence had the highest amount of debt for the amount of program they had completed. These were loan-only recipients with annualized aid of $10,000 and above; their average annualized loan aid was $15,241. Grant-plus-loan recipients who had the same amount of annualized aid — $10,000 and above — had higher persistence levels and lower levels of debt, with average annualized loan aid of $11,345.

Students who received a combination of grant and loan aid had accumulated less debt for the same level of assistance received, which may explain their higher levels of persistence. Compared to the loan-only group, recipients of grant-plus-loan aid had persistence levels that were about 30% higher, on average, for required credits earned and about 60% higher for degree completion.

Another possible explanation for the negative association between persistence and annualized aid is unmet need. Since a finite amount of assistance is available, aid authorities impose weekly limits and lifetime maximums. Students who reach these limits receive less assistance than they need. Students with low assessed need are not affected by these limits, but some of the students with high annualized aid may have been experiencing "unmet need." If unmet need is high enough, a student may not have sufficient resources to stay in school, or she or he may work more and study at a slower rate. We have no direct measure of unmet need in this study, but McElroy (2004) found that high levels of unmet need in the first year were associated with reduced likelihood of continuing into the second year.

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21 For student assistance purposes, students are classified as dependent unless they meet one of the following criteria: being married, having children, having spent two years in the labour market while not in school or having been out of secondary school for more than four years.

22 Other factors can affect assessed need as well. On the cost side of the equation, assessed need will be higher, all other factors being equal, for students with dependants, those who attend a more expensive program, and those who study away from home. On the resources side, assessed need is lower when students work during the school term.

Although unmet need may explain the negative association between persistence and annualized aid, it does not explain the positive association between persistence and receiving a grant. It may be that both unmet need and debt aversion contribute to the persistence patterns observed in this study. If a student receives some assistance in the form of grants, he or she will accumulate less debt. But if unmet need is high, these grants may still leave the student needing to work too much, or needing to take time off from school to work. This would explain why there is a negative relationship between annualized aid and persistence, both for those who received grant aid and for those who did not.

Some grants are based on merit; these are usually given for academic achievement. Since academic performance has been found to be related to persistence, the positive relationship between grants and persistence may be due to merit-based aid. Students with merit-based grants would be expected to have high levels of academic performance, which may have an impact on their persistence.

However, since merit aid forms only a small proportion of student assistance, it is unlikely to have a large effect in this study. Nor can academic performance explain the different persistence patterns of grant-only and grant-plus-loan recipients. For grant-only recipients, persistence was unrelated to the amount of annualized aid. However, for grant-plus-loan recipients, persistence declined as the amount of annualized aid increased. This difference, and the fact that almost all forms of need-based aid include loans,[23] may indicate that the grant-only group received merit-based aid. Academic performance may influence the persistence of grant-only recipients, but it cannot explain why persistence declines as annualized aid increases for grant-plus-loan recipients. Persistence for the grant-plus-loan group is better explained by debt aversion and unmet need, discussed above.

This study demonstrates that averages can be misleading when describing student aid. In the current system, students can accumulate over $100,000 in student loan debt by the time they complete their first degree. The average debt of the graduates in this study was only $17,135, which may be a reasonable amount to expect graduates to repay. However, graduates at the upper end of the range are incurring debt that cannot be repaid within a reasonable time without undue hardship. With interest, even a debt considerably below $100,000 may be an unreasonable burden for a new graduate.

This study also demonstrates the importance of the method used to measure student aid. Students who stay in school have more time to receive aid, so a spurious association arises between the amount of aid received and persistence. This association can be eliminated by standardizing aid according to program years completed.

The more it costs to complete a degree — for the student aid program, in terms of providing aid, or for the student, in terms of accumulated debt — the slower the rate of progress toward completion. However, this association does not establish causation. Students may take longer due to higher costs, or they may incur higher costs because they are taking longer to complete their degree. It is possible that both types of students exist. Students who take longer to complete incur higher costs for themselves and can cost the student assistance program more.

What are the policy implications of this research? If the negative association between persistence and annualized aid is due to debt aversion, then perhaps loan maximums need to be lower. But if the negative association is due to unmet need, reducing loans could reduce persistence by increasing unmet need. If the benefit of grants is due to debt reduction, then perhaps grants need to be distributed differently. Students with high accumulated debt could receive more grant dollars to keep their debt within a manageable range, while students with lower debt could get proportionally less grant aid. However, if grants have a motivational benefit, it may not matter who gets them. Students who receive grants may feel more of a commitment to their studies because of the support they are given.

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23   Most forms of need-based grant aid are only available to recipients of student loans.

Although this study suggests that debt matters, it does not explain why. Until we know why persistence declines as amount of annualized aid increases, or why receiving some grant aid is associated with higher levels of persistence, we cannot draw any conclusions for policy. However, we can suggest the types of questions that future research should address.

To fully understand the causes of persistence, we need to know how students weigh each factor when deciding whether or not to continue in school. The factors to consider include unmet need, family income and support, academic performance, as well as the perceived benefits of a post-secondary education. We need to know whether students are responding rationally to financial situations or whether they are underestimating their ability to repay loans. We also need to know whether some of the strategies students use to stay in school are counterproductive — resulting in high debt, low persistence or both.

We need either a longitudinal study tracking progress over time or a retrospective study following up both completers and leavers. This study should not only collect academic, financial and enrolment data; it should also ask students the reasons for their actions. Such a study would make it possible to determine how factors such as academic performance, family support, fear of debt and unmet need influence persistence.

With the right questions, we could understand the strategies students use to stay in school, such as changing to less expensive programs or institutions, studying at a slower rate to work more during school, stopping out to work for some time or dropping out altogether. By learning how students make their decisions about attending school and by understanding the consequences of these actions on persistence, we can improve the design of financial aid programs. Ultimately, we should be able to ensure that all those who are qualified can access post-secondary education and complete their program in a timely manner once they have begun.

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Appendix A: Data Request to Institutions

The purpose of this study is to determine whether education persistence is affected by public student debt. Specifically, this study will examine the impact of borrowing through government student financial aid programs on persistence of students in direct-entry university degree programs. Please refer to the attached report *Proposed Approach to Researching the Impact of Borrowing on Education Persistence* for additional information.

Cohort Definition

The purpose of the cohort definition is to ensure that borrowers and non-borrowers from the same institution are matched in terms of program length and entry year. Hence, within a given institution, the same cohort definition should be applied to both borrowers and non-borrowers. However, there is some flexibility so that institutions can select the most appropriate cohort (cohorts) given the specific characteristics of their programs.

Program Type

A cohort is defined as all the students who entered degree programs of a given length in a given year. There are three possible cohorts for inclusion in the study defined by program length: three-year, four-year, and five-year degree programs. All direct-entry degree programs that meet the length criteria should be included.

Tracking Period

There are two entry years that are possible, 1997–98 or 1998–99. Regardless of the program length, we are interested in learning what progress students made in the five years since entering the program. Therefore, if the entry year is 1997–98, we are interested in their progress up to and including 2001–02. If the entry year is 1998–99, we are interested in their progress up to and including 2002–03.

Institutions can use either entry year, but should not use both. If the later entry year is used (1998–99), the required data will need to be available for every year from the entry year up to and including 2002–03. Each institution can define school year in a manner consistent with their practices (entry in Fall, Winter, Spring, or Summer), provided the same definition is applied uniformly regardless of program length, year of entry, borrower status, etc.

To participate, an institution must include at least one of the cohorts in the table. The same entry and tracking period should be used for all cohorts submitted by an institution. The maximum number of cohorts that can be submitted is three.

Cohort	Program length	Year of Entry	Track to
A: 3-year program tracked for 5 years	3	1997–98	2001–02
or	3	1998–99	2002–03
B: 4-year program tracked for 5 years	4	1997–98	2001–02
or	4	1998–99	2002–03
C: 5-year program tracked for 5 years	5	1997–98	2001–02
or	5	1998–99	2002–03

Eligible Students

Students are eligible for inclusion in the cohort if, in addition to meeting the program length and entry year criteria, they also meet the following criteria:

- Students must be direct entry students in their first degree program. Direct entry is defined as students with no post-secondary experience prior to entering the program.

- Course load is not relevant. Both full and part-time students should be included.

- Students must not be foreign students. Foreign students will not be included.

- Current status is not relevant. In other words, students should be included even if they never earned any credits or have not yet completed the program. Students who have transferred to other programs should be included.

Data Submission

Data Required

The following data on each eligible student in the cohort is required:

- Total amount of financial aid received since entry to the end of the tracking period

- Total amount of student loans received since entry to the end of the tracking period

- Total number of credits received since entry to the end of the tracking period

- Whether or not the student earned the degree by the end of the tracking period

- The last academic year in which the student was enrolled

- Gender

- Birth date

Submission Format

Files should be in MS Access (97 or 2000), Excel, comma delimited text, or tab delimited text and may be compressed using WinZip or PkZip. Please be certain that the file contains column headers (field names). With the submission, also indicate which entry year was used. Additional information on the format for the data submission is provided in the attached EXCEL spreadsheet.

If you have questions about the requirements or the data format for the submission, please contact one of the members of the project team.

Appendix B: Detailed Results

Table B.1 — Comparisons by Institution

	Brock	Carleton	Lakehead	U. of Ottawa	Simon Fraser	Concordia	All
Number of students in cohort	1,744	2,237	1,143	2,591	1,659	3,906	13,280
Female	55%	46%	57%	60%	53%	53%	54%
Median age at entry	19	19	19	19	18	20	19
Program length distribution:							
3-year programs	53%	10%	31%	42%	0%	74%	41%
4-year programs	47%	90%	65%	58%	86%	24%	56%
5-year programs	0%	0%	3%	0%	14%	2%	3%
Received financial aid	67%	74%	69%	45%	53%	34%	53%
Received grant	66%	65%	56%	30%	24%	16%	38%
Received grant only	22%	31%	26%	2%	13%	0.1%	13%
Received student loan	45%	43%	43%	42%	40%	34%	40%
Received student loan only	2%	9%	13%	15%	28%	18%	15%
Average total financial aid	$12,823	$13,690	$15,581	$15,620	$14,414	$11,777	$13,802
Average total grant	$2,079	$4,071	$2,842	$1,211	$4,785	$7,127	$3,461
Average total student loan	$16,091	$17,563	$21,414	$15,658	$16,174	$8,494	$14,857
Average annualized financial aid	$4,839	$4,386	$5,490	$5,984	$4,414	$5,564	$5,081
Average annualized grant	$696	$1,164	$802	$394	$1,236	$3,438	$1,181
Average annualized loan	$6,202	$5,841	$7,808	$6,047	$5,095	$3,981	$5,558

Note: "Total" is the total loan, grant, or aid amount over the tracking period. "Annualized" is the amount of loan, grant, or aid for one year of the program completed on a full-time equivalency basis.

Table B.2 — Distribution of Aid Recipients by Amount and Type of Aid

Total Amount of Aid Received	Type of Aid Received			Total Recipients
	Grant only	Loan only	Grant + loan	
< $10,000	1,550	1,317	842	3,709
$10,000–$19,999	101	371	1,026	1,498
$20,000–$29,999	16	151	668	835
$30,000–$39,999	2	83	496	581
$40,000–$49,999	0	17	214	231
$50,000–$59,999	0	3	74	77
$60,000–$69,999	0	0	28	28
$70,000–$79,999	0	0	6	6
$80,000–$89,999	0	1	8	9
$90,000–$99,999	0	1	2	3
$100,000–$109,999	0	0	2	2
$110,000–$119,999	0	0	0	0
$120,000–$129,999	0	0	1	1
$130,000–$139,999	0	0	1	1
Any aid received	1,669	1,944	3,368	6,981

Table B.3 — Annualized Amount of Aid by Type of Aid Received

	Grant-only Recipients	Loan + Grant Recipients	Loan-only Recipients	All Aid Recipients
Number of students	1,669	3,368	1,944	6,981
Annualized Grant				
Minimum	$4	$9	–	$0
Maximum	$9,500	$37,692	–	$37,692
Average	$877	$1,331	–	$852
Annualized Loan				
Minimum	–	$27	$41	$0
Maximum	–	$44,357	$47,360	$47,360
Average	–	$6,036	$4,730	$4,229
Annualized Total Aid				
Minimum	$4	$142	$41	$4
Maximum	$9,500	$59,645	$47,360	$59,645
Average	$877	$7,367	$4,730	$5,081

Table B.4 — Total and Annualized Combined Loan and Grant Aid by Gender and Age at Entry

	No.	Total Combined Loan and Grant Aid				Annualized Combined Loan and Grant Aid			
		Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Females	3,866	$15	$121,180	$13,971	$9,350	$4	$59,645	$5,027	$3,791
Males	3,115	$40	$138,376	$13,592	$9,228	$8	$43,123	$5,148	$3,774
Age 16–18	2,295	$15	$89,419	$13,220	$9,150	$4	$33,914	$4,314	$3,200
Age 19	2,816	$40	$85,665	$12,096	$8,019	$8	$40,970	$4,228	$3,107
Age 20–23	1,456	$100	$138,376	$15,679	$10,370	$25	$43,123	$6,399	$5,113
Age 24+	414	$75	$121,180	$22,027	$16,946	$55	$59,645	$10,506	$8,930
Total	**6,981**	**$15**	**$138,376**	**$13,802**	**$9,350**	**$4**	**$59,645**	**$5,081**	**$3,776**

Note: "Total" refers to the total amount of loan aid received over the tracking period. "Annualized" is the amount of aid for one year of the program completed on a full-time equivalency basis.

Table B.5 — Total and Annualized Grant Aid by Gender and Age at Entry

	No.	Total Grant Aid				Annualized Grant Aid			
		Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Females	2,829	$15	$38,347	$3,431	$1,750	$4	$37,692	$1,158	$597
Males	2,208	$27	$30,371	$3,499	$1,793	$8	$25,252	$1,209	$654
Age 16–18	1,642	$15	$36,700	$3,434	$1,800	$4	$11,241	$974	$610
Age 19	2,210	$38	$25,305	$2,680	$1,500	$8	$8,562	$807	$508
Age 20–23	888	$27	$29,365	$3,861	$1,985	$23	$25,252	$1,525	$749
Age 24+	297	$32	$38,347	$8,221	$5,682	$11	$37,692	$4,070	$2,963
Total	**5,037**	**$15**	**$38,347**	**$3,461**	**$1,752**	**$4**	**$37,692**	**$1,181**	**$625**

Note: "Total" refers to the total amount of grant aid received over the tracking period. "Annualized" is the amount of grant aid for one year of the program completed on a full-time equivalency basis.

Table B.6 — Total and Annualized Loan Aid by Gender and Age at Entry

	No.	Total Loan Aid				Annualized Loan Aid			
		Minimum	**Maximum**	**Mean**	**Median**	**Minimum**	**Maximum**	**Mean**	**Median**
Females	2,935	$103	$120,180	$15,095	$11,201	$27	$47,360	$5,505	$4,553
Males	2,377	$123	$135,076	$14,562	$10,523	$37	$40,970	$5,623	$4,692
Age 16–18	1,586	$125	$82,739	$15,575	$12,356	$31	$33,914	$5,234	$4,472
Age 19	1,984	$103	$85,665	$14,183	$10,701	$27	$40,970	$5,101	$4,489
Age 20–23	1,342	$123	$135,076	$14,456	$9,780	$41	$34,454	$5,933	$4,678
Age 24+	400	$1,610	$120,180	$16,693	$11,180	$513	$47,360	$7,852	$5,795
Total	**5,312**	**$103**	**$135,076**	**$14,857**	**$10,926**	**$27**	**$47,360**	**$5,558**	**$4,615**

Note: "Total" refers to the total amount of grant aid received over the tracking period. "Annualized" is the amount of grant aid for one year of the program completed on a full-time equivalency basis.

Table B.7 — Number of Students, Mean and Median Annualized Aid Amounts by Annualized Aid Group and Type of Aid

	All Aid Recipients			Grant-only Recipients			Grant + Loan Recipients			Loan-only Recipients		
Annualized Aid	**Number**	**Mean**	**Median**	**Number**	**Mean**	**Median**	**Number**	**Mean**	**Median**	**Number**	**Mean**	**Median**
Aid under $1,000	1,537	$446	$395	1,217	$395	$338	104	$686	$697	216	$622	$658
$1,000–$1,999	803	$1,434	$1,418	264	$1,332	$1,265	213	$1,516	$1,515	326	$1,462	$1,444
$2,000–$2,999	634	$2,484	$2,470	99	$2,424	$2,442	264	$2,501	$2,487	271	$2,489	$2,463
$3,000–$9,999	3,066	$6,109	$5,913	89	$4,399	$4,009	1,988	$6,334	$6,173	989	$5,809	$5,610
$10,000+	941	$14,166	$12,135	0	–	–	799	$13,975	$12,033	142	$15,241	$12,608
No Aid	6,299	$0	$0									
All Students	**13,280**	**$2,671**	**$223**	**1,669**	**$877**	**$500**	**3,368**	**$7,367**	**$6,611**	**1,944**	**$4,730**	**$3,540**

Table B.7 — Number of Students, Mean and Median Annualized Aid Amounts by Annualized Aid Group and Type of Aid

	All Aid Recipients			Grant-only Recipients			Grant + Loan Recipients			Loan-only Recipients		
Annualized Aid	**Credits**	**Degree**	**Years**	**Credits**	**Degree**	**Years**	**Credits**	**Degree**	**Years**	**Credits**	**Degree**	**Years**
Aid under $1,000	95%	71%	3.6	95%	72%	3.6	101%	79%	3.8	91%	59%	3.3
$1,000–$1,999	86%	59%	3.2	81%	58%	3.2	102%	78%	3.8	80%	48%	2.9
$2,000–$2,999	88%	64%	3.2	84%	67%	3.3	98%	75%	3.7	78%	52%	2.7
$3,000–$9,999	77%	51%	2.8	91%	71%	3.6	87%	62%	3.2	56%	28%	2.1
$10,000+	68%	34%	2.5	–	–	–	72%	38%	2.6	44%	8%	1.7
No Aid	71%	47%	2.5									
All Students	**77%**	**51%**	**2.8**	**92%**	**69%**	**3.6**	**86%**	**59%**	**3.1**	**66%**	**37%**	**2.4**

Appendix C: Financial Assistance Available in British Columbia, Ontario and Quebec

Student Financial Assistance in British Columbia

Government-funded financial assistance in British Columbia consists of the following programs:

- **Canada Student Loans** and **British Columbia Student Loans** provided $466.5 million ($333.3 and $133.2 million respectively) to over 66,500 British Columbia students in 2002–03.

- **British Columbia Grants**, which were only available until the end of July 2004 to students in their second, third and fourth years of undergraduate study, replace a portion of B.C. Student Loans. In 2002–03, $80 million was awarded to over 26,000 students.

- **Canada Study Grants** are available to students with permanent disabilities, high-need part-time students, women in non-traditional doctoral studies and students with dependants. In 2002–03, British Columbia students received $21.4 million, with $16.9 million awarded to address the needs of more than 9,700 students with dependants.

- **British Columbia Nurses Education Bursaries** provide up to $2 million in bursary funding annually to qualified applicants who have great financial need. These bursaries range from $500 to $3,500 per academic year. In 2002–03, 540 students received the bursary.

- In addition, **Health Care Scholarships** provide up to $1 million in bursaries to 325 health care workers to retrain or upgrade their skills.

- **British Columbia Premier's Excellence Awards** are $5,000 scholarships given annually to the 15 top grade 12 students in each of the province's 15 college regions. Students must attend a British Columbia institution to be eligible for this award.

- The province also offers **Queen Elizabeth II United World Scholarships** to top graduate students. One major scholarship with a total value of $20,000 is available each year. In addition to the major scholarship, two minor scholarships of $4,000 each are available for the two top runners-up to the major winner each year.

- The **Canada Millennium Scholarship Foundation** provides bursaries worth $1,500 to $4,500 to British Columbia students. To be eligible, students must be in undergraduate programs and have completed at least one year of post-secondary studies. In 2002–2003, 10,642 students received the bursary for a total investment of $38.3 million.

Financial Assistance Available to Ontario Students

Government financial assistance in Ontario consists of eight main programs:

- The **Canada-Ontario Integrated Student Loans Program** lent about $1.12 billion ($647.6 million from the Government of Canada and $467.5 million from the Government of Ontario) to 150,000 Ontario students in 2002–03.

- **Canada Study Grants** are available to students with permanent disabilities for educational supports and unmet need, high-need part-time students, women in non-traditional doctoral studies and students with dependants. In 2002–03, Ontario students received $30.9 million through all programs. Of this amount, $26.9 million was awarded to reduce the debt of students with dependants.

- The **Ontario Special Bursary Plan** encourages financially needy students to pursue part-time post-secondary studies for the first time. This bursary is also available to full- and part-time students taking academic upgrading or training programs that will enable them to advance their employment-related skills. The largest bursary one can receive is $2,500 per academic year; the bursary is taxable. In 2002–03, 5,442 students received the bursary for a total investment of $4.57 million.

- The **Ontario Child Care Bursary** is a non-repayable bursary designed to assist students who have childcare costs for three or more children. Childcare costs for the first and second eligible children are included in the Canada-Ontario Integrated Student Loan as well as the Canada Study Grant for Students with Dependants. In 2002–03, 226 students received the bursary for a total investment of $230,000.

- The **Ontario Work Study Plan** helps students at public universities and colleges of applied arts and technology in Ontario to meet their educational costs by working part-time during the year. Eligible students can earn up to $2,000 over two terms. In 2002–03, 12,615 students received the bursary for a total investment of $7.51 million.

- The **Queen Elizabeth II Aiming for the Top Scholarship Program** is designed to recognize students who have shown academic excellence at the high school level and to assist students with financial need. The value of the scholarship varies between $100 and $3,500 per academic year. The scholarship is renewable for four years at the amount the student is eligible to receive in his or her first year. To have the scholarship renewed, a student must continue to study on a full-time basis (as defined by the Ontario Student Assistance Program) and must maintain an average of at least 80% or its equivalent, as determined by his or her post-secondary institution. In 2002–03, about 12,000 students received a scholarship for a total investment of $25 million.

- The **Ontario Student Opportunity Grant** is available to help students reduce their annual Canada-Ontario Integrated Student Loan debt by limiting a student's repayable debt to $7,000 for a two-term academic year and $10,500 for a three-term academic year. It is available at the end of each academic year. In 2002–03, 39,430 students received the grant for a total investment of $121.8 million.

- The **Canada Millennium Scholarship Foundation's Millennium bursaries** are cash grants of $3,000 each within the Ontario Student Assistance Program. To be eligible, students must be in undergraduate programs and have completed at least one year of post-secondary studies. In 2002–03, 35,583 Ontario students received a millennium bursary, for a total investment of $106.8 million.

Student Financial Assistance in Quebec

Government-funded financial assistance in Quebec included the following programs:

- The **Loans and Bursaries Program** of the provincial government's Aide financière aux études distributes most of Quebec's student financial aid. Students are given interest-free loans that vary according to the type of post-secondary institution. In 2003–04, college and secondary students in professional training received the first $2,005 as a loan. Undergraduate university students received the first $2,460 as a loan. Students in graduate and doctoral programs received the first $3,255 as a loan. If the loan is insufficient, a bursary may be added to the assistance package. In 2002–03, the program provided $568.5 million to approximately 130,000 students. More than half received both a loan and a bursary. The rest received a loan only.

- Through its **Millennium bursaries**, the Canada Millennium Scholarship Foundation provided $71.1 million to 22,783 Quebec students in 2002–03. Recipients must be in undergraduate programs and have completed at least one year of post-secondary studies.

Quebec's Aide financière aux études manages several other programs:

- Six months after they complete full-time studies, students must begin to repay their loans. They may, however, have access to the **Deferred Payment Plan**, designed to assist borrowers in financial difficulty. In 2001–02, the program provided $7.1 million to 22,869 students.

- The **Bursary Program for Students with Major Functional Disabilities** provided $6.8 million in bursaries in 2001–02. Students who received this assistance received bursaries only; they were not required to make a minimum contribution.

- The **Loan Remission Program** reduces the debt of the most disadvantaged university students. To participate, students must have completed their studies during the normal prescribed time limits and must have received a grant for each year of study. In 2001–02, 1,298 students received $2 million through this program.

- The **Work/Study Program**, inaugurated in 1999–2000, distributed $4 million to 2,562 students in 2001–02.

- The **Bursary Program for Permanently Elected Student Leaders** provided $100,000 to approximately 20 students during the 2001–02 academic year.

Appendix D: Standardization Methodology

We calculated annualized amounts of loans, grants and total aid for each student using the following definitions:

- Annualized loan: Amount of loan annualized for year of study completed.

- Annualized grant: Amount of grant annualized for year of study completed.

- Annualized aid: Amount of combined grant and loan annualized for year of study completed.

Basic Method of Standardization

We calculated annualized loan aid, grant aid and overall aid as follows:

1. Determine the percentage of the total required credits that the student had earned.

   Example:
   — 20 credits are required to complete a particular four-year program.
   — Student A had earned 10 credits over a five-year period.
   — Hence, student A had completed 50% of the total credits required.

2. Estimate the number of years of the program that the student had completed, based on full-time equivalency.

   Example:
   — Student A had completed 50% of the total credits required in a four-year program over a five-year period.
   — 50% x 4 = 2 years completed.
   — Hence, student A had completed 2 years of study (at a full-time equivalent rate).

3. Calculate the annualized aid for the years completed.

   Example:
   — Student A had completed 2 years and had received a total of $10,000 in aid since entering the program.
   — Annualized aid = $10,000/2 = $5,000 per year of study completed
   — Hence, student A had received $5,000 in annualized aid.

The result is standardized measures of aid (loan, grant and total aid) with these features:

- Removes any spurious relation between aid amounts and total credits earned.

- Increases as total aid amounts increase when other variables are constant.

- Preserves the relationship between aid and persistence, regardless of full-time or part-time status: full-time and part-time students who received the same amount of aid and completed the same percentage of credits will have the same amount of annualized aid.

- Shows the cost per value received, by presenting the amount of aid relative to years of the program completed.

These features are illustrated in Tables D.1, D.2 and D.3, which provide examples of this measure for various levels of student aid, credits earned and years of study.

Table D.1 — Standardization Removes the Relationship between Aid Received and Credits Earned

	Student A	Student B	Student C	Student D	Student E
Program length	4 years	4 years	4 years	4 years	4 years
Credits required	20	20	20	20	20
Credits earned	5	10	15	20	25
% of required credits earned	25%	50%	75%	100%	125%
Years of study completed	1	2	3	4	5
Total aid received	$5,000	$10,000	$15,000	$20,000	$25,000
Annualized aid	$5,000	$5,000	$5,000	$5,000	$5,000

Table D.2 — Standardized Aid Amounts Increase as Total Aid Amounts Increase when All Else is Constant

	Student E	Student F	Student G	Student H	Student I
Program length	4 years	4 years	4 years	4 years	4 years
Credits required	20	20	20	20	20
Credits earned	10	10	10	10	10
% of required credits earned	50%	50%	50%	50%	50%
Years of study completed	2	2	2	2	2
Total aid received	$5,000	$10,000	$15,000	$20,000	$25,000
Annualized aid	$2,500	$5,000	$7,500	$10,000	$12,500

Table D.3 — Standardization Shows the Cost per Value (Credits or Years Completed) Received

	Student J	Student K	Student L	Student M	Student N
Program length	4 years	4 years	4 years	4 years	4 years
Credits required	20	20	20	20	20
Credits earned	5	10	15	20	25
% of required credits earned	25%	50%	75%	100%	125%
Years of study completed	1	2	3	4	5
Total aid received	$15,000	$15,000	$15,000	$15,000	$15,000
Annualized aid	$15,000	$7,500	$5,000	$3,750	$3,000

Adjustment to Standardization

Although the basic method of standardization normally produces measures that have favourable properties, it can create undesirable results in two situations:

- Students who had completed less than one year of study have inflated annualized aid amounts, since their loan, grant and aid amounts are divided by a number less than one.

  Example:
  — 20 credits are required to complete a particular four-year program.
  — Student X had earned only one credit.
  — Hence, student X had completed 5% of the total credits required, equivalent to 0.2 of a year of study.
  — If the student had received $1,000 in aid that year, calculation of the amount of annualized aid yields:
  — Annualized aid = 1,000/0.2 = $5,000 per year of study completed: five times higher than the total amount of aid received.

- The opposite problem arises for students who had earned over 100% of the credits needed. As calculated by the basic method, their full-time equivalent years of study exceed the program length and can even exceed the tracking period (five years). The result is an annualized amount that is too low.

  Example:
  — 20 credits are required to complete a particular four-year program.
  — Student Y had earned 30 credits over a five-year period.
  — Hence, student Y had completed 150% of the total credits required, equivalent to six years of study.
  — If the student had received $10,000 in aid over his or her entire time in school, calculation of the amount of annualized aid yields:
  — Annualized aid = $10,000/6 = $1,667 per year of study completed.
  — However, since the tracking period is only five years in length, the student could not have been studying for six years. Hence, $1,667 is lower than the average aid per year of actual study.
  — If the student had studied for five years, the amount of annualized aid would be $2,000, not $1,667.

To correct for these two situations, minimum and maximum values were imposed in the calculation of program length completed as follows:

- The minimum number of full-time equivalent years was set at one. Students who actually earned less than one year's worth of credits were deemed to have completed one year, so that standardized amounts of aid could be based on completing one year. As illustrated in Table D.4, this avoids inflating the aid amounts.

- The maximum value allowed was the program length plus one year. Students who earned more than 100% of the required credits for their program had their length of study capped as follows:

    — Those in three-year programs were allowed a maximum length of four.
    — Those in four-year programs were allowed a maximum length of five.
    — Those in five-year programs were allowed a maximum length of six.

For most students, no adjustment was needed. These adjustments only applied to students who had earned less than one year's worth of credits or more than one year's worth of credits above the number needed for their program.

The adjusted amounts avoid inflated and deflated figures. However, they no longer have all the properties of the original standardized amount. In particular, the amounts are no longer fully independent of the length of time in school. For students who had earned less than one year's worth of credits (873 of the students who had received aid) or more than one year's worth above the number needed (29 of the students who had received aid), the amounts are not independent of persistence. This is illustrated in Table D.4.

It should be noted that the previous examples (students A through N) are not affected by this adjustment. Nor does this adjustment affect this study's overall findings with regard to student aid and persistence; the same pattern of results was found with and without the adjustment.

Table D.4 — Adjusted Standardized Aid Amounts for Students with Very Low and Very High Percentage of Required Credits Earned

	Student W	Student X	Student Y	Student Z
Program length	4 years	4 years	4 years	4 years
Credits required	20	20	20	20
Credits earned	1	1	30	30
% of required credits earned	5%	5%	150%	150%
Years of study completed	0.2	0.2	6	6
Adjusted years of study completed	1	1	5	5
Total aid received	$5,000	$1,000	$10,000	$25,000
Annualized aid	$25,000	$5,000	$1,667	$4,167
Adjusted annualized aid	$5,000	$1,000	$2,000	$5,000

Appendix E: Regression Results

Indicator Variables

All categorical variables have been recoded into appropriate indicator (dummy) variables. A reference category was coded as 0, and the comparison category was coded as 1. For variables with two categories only one indicator variable is needed to specify both categories. Variables with three categories need two indicator variables and variables with four categories need three indicator variables. The table below shows the indicator variables and the reference category used for each variable.

Table E.1 — Indicator Variables Used for Each Category Variable

Variable	Indicators (Coded 1)	Reference Category (Coded 0)
Gender	Female	Male
Program length	4 + 5 Year	3 year
Type of aid	Grant only	No aid
	Loan only	No aid
	Loan + Grant	No aid
Jurisdiction	BC	Ontario
	QC	Ontario

The coefficients[24] for each indicator variable are interpreted as follows:

- The coefficient for the female indicator is the change in the intercept for females compared to males.[25] The model intercept is the value of the predicted variable for males (with all other variables equal to zero).

- The coefficient for 4 + 5 Years is the change in the intercept for programs of four or more years in length compared to three-year programs.

- The grant only coefficient refers to the change in the intercept for grant only students compared to students with no aid.

- The loan only coefficient refers to the change in the intercept for loan only students compared to students with no aid.

- The loan + grant coefficient refers to the change in the intercept for loan + grant students compared to students with no aid.

- The coefficient for BC refers to the change in the intercept for BC students compared to Ontario students.

- The coefficient for QC refers to the change in the intercept for Quebec students compared to Ontario students.

24 Each coefficient represents the *additional* effect of adding its corresponding variable to the model, if the effects of all other variables in the model are already accounted for.

25 The intercept represents the value of the persistence measure when the value of all predictors in the model is zero. For this models this refers to male Ontario students who received no aid and were in three year programs with an age of zero. Since an age of zero is not possible the intercept does not have a literal interpretation and simply anchors the regression line in the right place.

There are also two quantitative variables in the model: age at entry into the program and amount of annualized aid received. The interpretation of the coefficients for these two variables is straight forward:

- The coefficient for age refers to the change in the predicted value for each unit increase in age.

- The coefficient for annualized aid refers to the change in the predicted value for each unit increase in annualized aid received.

Mean Persistence (Actual Persistence)

Table E.2 — Mean Progress (% of Credits Earned) by Type of Aid, Annualized Aid Groups and Gender

	Annualized Aid	Male	Female	Overall
Loan only	Under $1,000	0.89	0.93	0.91
	$1,000–$1,999	0.77	0.84	0.80
	$2,000–$2,999	0.80	0.77	0.78
	$3,000–$9,999	0.53	0.58	0.56
	$10,000 and above	0.43	0.44	0.44
	Overall	0.64	0.68	0.66
Grant + loan	Under $1,000	0.98	1.02	1.01
	$1,000–$1,999	1.01	1.02	1.02
	$2,000–$2,999	0.98	0.98	0.98
	$3,000–$9,999	0.84	0.90	0.87
	$10,000 and above	0.68	0.76	0.72
	Overall	0.82	0.89	0.86
Grant Only	Under $1,000	0.93	0.96	0.95
	$1,000–$1,999	0.82	0.81	0.81
	$2,000–$2,999	0.85	0.84	0.84
	$3,000–$9,999	0.96	0.87	0.91
	$10,000 and above	—	—	—
	Overall	0.91	0.93	0.92
No Aid	Overall	0.68	0.75	0.71

Table E.3 — Mean Completion Rates (Degree Earned) by Type of Aid, Annualized Aid Groups and Gender

	Annualized Aid	Male	Female	Overall
Loan only	Under $1,000	0.58	0.60	0.59
	$1,000–$1,999	0.42	0.54	0.48
	$2,000–$2,999	0.50	0.53	0.52
	$3,000–$9,999	0.22	0.33	0.28
	$10,000 and above	0.06	0.11	0.08
	Overall	0.32	0.41	0.37
Grant + loan	Under $1,000	0.76	0.81	0.79
	$1,000–$1,999	0.71	0.83	0.78
	$2,000–$2,999	0.69	0.78	0.75
	$3,000–$9,999	0.53	0.68	0.62
	$10,000 and above	0.31	0.45	0.38
	Overall	0.50	0.65	0.59
Grant Only	Under $1,000	0.64	0.78	0.72
	$1,000–$1,999	0.55	0.60	0.58
	$2,000–$2,999	0.67	0.66	0.67
	$3,000–$9,999	0.76	0.67	0.71
	$10,000 and above	—	—	—
	Overall	0.63	0.74	0.69
No Aid	Overall	0.40	0.53	0.47

Table E.4 — Mean Progress for BC and Ontario Only by Type of Aid, Annualized Aid Groups and Gender

	Annualized Aid	Male	Female	Overall
Loan only	Under $1,000	0.90	0.95	0.92
	$1,000–$1,999	0.77	0.86	0.81
	$2,000–$2,999	0.78	0.75	0.76
	$3,000–$9,999	0.53	0.61	0.57
	$10,000 and above	0.42	0.43	0.42
	Overall	0.62	0.66	0.64
Grant + loan	Under $1,000	0.98	1.02	1.01
	$1,000–$1,999	1.00	1.03	1.01
	$2,000–$2,999	0.98	0.98	0.98
	$3,000–$9,999	0.87	0.91	0.89
	$10,000 and above	0.75	0.82	0.79
	Overall	0.86	0.91	0.89
Grant Only	Under $1,000	0.93	0.96	0.95
	$1,000–$1,999	0.82	0.81	0.81
	$2,000–$2,999	0.85	0.84	0.84
	$3,000–$9,999	0.96	0.88	0.92
	$10,000 and above	—	—	—
	Overall	0.91	0.93	0.92
No Aid	Overall	0.71	0.80	0.76

Table E.5 — Mean Completion Rates for BC and Ontario Only by Type of Aid, Annualized Aid Groups and Gender

	Annualized Aid	Male	Female	Overall
Loan only	Under $1,000	0.53	0.59	0.56
	$1,000–$1,999	0.32	0.50	0.40
	$2,000–$2,999	0.40	0.46	0.44
	$3,000–$9,999	0.19	0.35	0.28
	$10,000 and above	0.05	0.11	0.08
	Overall	0.25	0.38	0.32
Grant + loan	Under $1,000	0.76	0.81	0.79
	$1,000–$1,999	0.74	0.84	0.80
	$2,000–$2,999	0.67	0.76	0.72
	$3,000–$9,999	0.56	0.71	0.65
	$10,000 and above	0.36	0.50	0.44
	Overall	0.53	0.68	0.62
Grant Only	Under $1,000	0.64	0.78	0.72
	$1,000–$1,999	0.55	0.60	0.58
	$2,000–$2,999	0.67	0.66	0.67
	$3,000–$9,999	0.76	0.70	0.72
	$10,000 and above	—	—	—
	Overall	0.63	0.74	0.69
No Aid	Overall	0.40	0.56	0.48

Original Models

Table E.6 – Regression Model for Predicting Progress

Model Summary	
Model Adjusted R^2	.134
Model F	229.456
Degrees of freedom	9 & 13,269

Variables in Model	Unstandardized Coefficients	Standardized Coefficients
Female	0.05	0.07
Age at entry	-0.02	-0.19
Four- + five-year programs	-0.04	-0.05
Loan only aid	0.08	0.08
Grant only aid	0.22	0.19
Loan + grant aid	0.28	0.31
Annualized aid	-1.6E–05	-0.19
Loan only X annualized aid	-1.2E–05	-0.07
Grant only X annualized aid	-9.7E–06	-0.01
Constant	1.18	

Table E.7 — Logistic Model for Predicting Completion

Model Summary	
Model Nagelkerke R^2	.143
Model Chi-square	1503.685
Degrees of freedom	9

Variables in Model	Coefficients * (Log Odds)	Coefficients ** (Odds)
Female	0.53	1.70
Age at entry	-0.11	0.90
Four- + five-year programs	-0.23	0.79
Loan only aid	0.50	1.64
Grant only aid	1.03	2.79
Loan + grant aid	1.43	4.17
Annualized aid	-1.2E–04	1.00
Loan only X annualized aid	-1.0E–04	1.00
Grant only X annualized aid	2.6E–05	1.00
Constant	1.85	6.34

*   Coefficient on log scale
** Exponent of coefficient

Predicted Persistence from Original Models

Table E.8 — Mean Predicted Progress (% of Credits Earned) by Type of Aid, Annualized Aid Groups and Gender

	Annualized Aid	Male	Female	Overall
Loan only	Under $1,000	0.75	0.82	0.79
	$1,000–$1,999	0.73	0.79	0.76
	$2,000–$2,999	0.70	0.75	0.73
	$3,000–$9,999	0.59	0.66	0.63
	$10,000 and above	0.33	0.32	0.32
	Overall	0.63	0.69	0.66
Grant + loan	Under $1,000	0.96	1.02	1.00
	$1,000–$1,999	0.95	1.00	0.98
	$2,000–$2,999	0.92	0.99	0.96
	$3,000–$9,999	0.85	0.91	0.88
	$10,000 and above	0.69	0.75	0.72
	Overall	0.82	0.89	0.86
Grant Only	Under $1,000	0.90	0.95	0.93
	$1,000–$1,999	0.88	0.93	0.91
	$2,000–$2,999	0.84	0.90	0.87
	$3,000–$9,999	0.81	0.82	0.81
	$10,000 and above	—	—	—
	Overall	0.89	0.94	0.92
No Aid	Overall	0.69	0.74	0.71

Table E.9 — Mean Predicted Completion Rates (Degree Earned) by Type of Aid, Annualized Aid Groups and Gender

	Annualized Aid	Male	Female	Overall
Loan only	Under $1,000	0.48	0.63	0.56
	$1,000–$1,999	0.44	0.58	0.51
	$2,000–$2,999	0.38	0.52	0.46
	$3,000–$9,999	0.23	0.35	0.29
	$10,000 and above	0.05	0.08	0.07
	Overall	0.30	0.42	0.37
Grant + loan	Under $1,000	0.72	0.82	0.77
	$1,000–$1,999	0.70	0.80	0.75
	$2,000–$2,999	0.66	0.78	0.73
	$3,000–$9,999	0.54	0.67	0.62
	$10,000 and above	0.32	0.45	0.38
	Overall	0.51	0.65	0.59
Grant Only	Under $1,000	0.64	0.75	0.70
	$1,000–$1,999	0.62	0.74	0.69
	$2,000–$2,999	0.59	0.71	0.65
	$3,000–$9,999	0.56	0.66	0.61
	$10,000 and above	—	—	—
	Overall	0.63	0.74	0.69
No Aid	Overall	0.40	0.53	0.47

Models Excluding Quebec

Table E.10 — Regression Model for Predicting Progress

Model Summary

Model Adjusted R^2	.114
Model F	134.368
Degrees of freedom	9 & 9,363

Variables in Model	Unstandardized Coefficients	Standardized Coefficients
Female	0.05	0.07
Age at entry	-0.02	-0.10
Four- + five-year programs	-0.04	-0.04
Loan only aid	0.04	0.04
Grant only aid	0.19	0.19
Loan + grant aid	0.25	0.31
Annualized aid	-1.5E–05	-0.19
Loan only X annualized aid	-1.2E–05	-0.08
Grant only X annualized aid	-1.3E–05	-0.02
Constant	1.04	

Table E.11 — Logistic Model for Predicting Completion

Model Summary

Model Nagelkerke R^2	.140
Model Chi-square	1039.425
Degrees of freedom	9

Variables in Model	Coefficients * (Log Odds)	Coefficients ** (Odds)
Female	0.62	1.87
Age at entry	-0.03	0.97
Four- + five-year programs	-0.09	0.92
Loan only aid	0.24	1.27
Grant only aid	0.97	2.65
Loan + grant aid	1.42	4.14
Annualized aid	-1.2E–04	1.00
Loan only X annualized aid	-7.6E–05	1.00
Grant only X annualized aid	3.0E–05	1.00
Constant	0.16	1.18

* Coefficient on log scale
** Exponent of coefficient

Predicted Persistence from Models Excluding Quebec

Table E.12 — Mean Predicted Progress for BC and Ontario Only by Type of Aid, Annualized Aid Groups and Gender

	Annualized Aid	Male	Female	Overall
Loan only	Under $1,000	0.75	0.81	0.78
	$1,000–$1,999	0.73	0.79	0.75
	$2,000–$2,999	0.70	0.75	0.73
	$3,000–$9,999	0.59	0.65	0.63
	$10,000 and above	0.35	0.34	0.34
	Overall	0.61	0.67	0.64
Grant + loan	Under $1,000	0.96	1.02	1.00
	$1,000–$1,999	0.95	1.01	0.98
	$2,000–$2,999	0.93	0.99	0.97
	$3,000–$9,999	0.87	0.93	0.91
	$10,000 and above	0.75	0.80	0.78
	Overall	0.85	0.92	0.89
Grant Only	Under $1,000	0.90	0.96	0.93
	$1,000–$1,999	0.87	0.93	0.91
	$2,000–$2,999	0.84	0.90	0.87
	$3,000–$9,999	0.80	0.83	0.82
	$10,000 and above	—	—	—
	Overall	0.89	0.94	0.92
No Aid	Overall	0.73	0.78	0.76

Table E.13 — Mean Predicted Completion Rates for BC and Ontario Only by Type of Aid, Annualized Aid Groups and Gender

	Annualized Aid	Male	Female	Overall
Loan only	Under $1,000	0.43	0.59	0.51
	$1,000–$1,999	0.39	0.55	0.46
	$2,000–$2,999	0.34	0.49	0.42
	$3,000–$9,999	0.21	0.33	0.28
	$10,000 and above	0.06	0.10	0.08
	Overall	0.26	0.37	0.32
Grant + loan	Under $1,000	0.72	0.83	0.78
	$1,000–$1,999	0.70	0.81	0.76
	$2,000–$2,999	0.67	0.80	0.75
	$3,000–$9,999	0.56	0.70	0.65
	$10,000 and above	0.37	0.51	0.44
	Overall	0.53	0.68	0.62
Grant Only	Under $1,000	0.63	0.76	0.70
	$1,000–$1,999	0.61	0.75	0.69
	$2,000–$2,999	0.58	0.73	0.66
	$3,000–$9,999	0.55	0.68	0.62
	$10,000 and above	—	—	—
	Overall	0.62	0.75	0.69
No Aid	Overall	0.40	0.56	0.48