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PARENTAL CONTRIBUTIONS TO LOW-INCOME CANADA STUDENT LOAN BORROWERS: SHORTFALLS, OVER-CONTRIBUTIONS AND ASSOCIATED STUDENT OUTCOMES

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1. Introduction[1]

Canada has a needs-based student loan program, led by the federally operated Canada Student Loans Program, where loan eligibility is determined by both students' costs of schooling and the financial resources available to them. As part of the process of assessing students' financial resources, applicants are first classified as "dependant" or "independent" students. Dependent students are essentially those considered to still be reliant on their parents for support, and tend to be younger, single and childless. Independent students are considered to be in a situation where they are looking after themselves, without help from their parents, and include older or married students, as well as those with children.

Among independent students, parental income does not enter into loan eligibility calculations made by the student financial aid system, but among dependant students, parental income does matter.[2] Any student in a family with an income in excess of what is deemed sufficient to maintain a particular standard of living (which varies by province) is considered to have discretionary income, and the student loan program considers a portion of that income to be available to the student as a resource.

If a dependant student's total resources from all sources (including their own earnings along with the expected parental contribution) are deemed sufficient to cover all schooling costs (tuition and other related student fees as well as living costs), the student will not qualify for a loan. But if the student's resources are estimated to be insufficient to meet their schooling-related expenses, they will qualify for a loan, and the amount of the loan will depend on their

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[2] Eligibility for student financial aid is determined by provincial programs. Furthermore, although the formulae used to determine the federal portion of student aid are the same for all jurisdictions, formulae which determine provincial aid amounts vary to some degree, as do the amounts awarded in any particular situation, but all formulae share the same general structure, as described.

assessed need. In this way, expected parental contributions affect whether a student qualifies for a loan and, if so, the amount of aid awarded.[3]

Whether or not a student actually receives the expected parental contribution does not, however, factor into loan eligibility or repayment requirements – it is only the *assumed* amount that matters. But in reality, some students of course do not receive the full amount of parental contribution the government formula assumes, while others receive more than expected. This at least potentially results in financial hardship for those students who face "contribution shortfalls" and a more comfortable situation for those who receive "over-contributions".

By linking student loan administrative data which include information on expected parental contribution amounts with survey data in which students report the actual contributions received, the Longitudinal Survey of Low Income Students (L-SLIS) provides a unique opportunity to explore the differences between expected and actual parental contributions to students' post-secondary education (PSE) in Canada.

In this paper we report the findings of an analysis that exploits the L-SLIS by undertaking the first empirical analysis of which we are aware which focuses on expected parental contributions, actual parental contributions, and the differences in these. We first document the general extent of these different contribution situations and how they relate to various family background characteristics using both descriptive and regression approaches. We then see how facing a shortfall or over-contribution is related to a number of important schooling experiences and outcomes, such as working and studying while in school, grades, and leaving school before graduation.

The principal goal of this paper is to better inform policy makers, and the public generally, of these relationships so that any appropriate redesign of student aid schedules may be considered, such as adjusting expected parental contributions where these seem to systematically deviate from actual contributions. The other goal is to provide evidence on the consequences of existing imbalances in expected and actual parental contributions. In doing the latter, we also

[3] In addition to loans, government-provided student aid can also come in the form of non-repayable grants, and sometimes other forms of aid such as debt forgiveness. All individuals in our sample were loan recipients, but not all also received grants or other forms of aid. Student need and parental contributions figure in all these calculations and in general, a higher level of assumed parental contributions means a lower amount of student financial aid is available to the student.

hope to lend some insight into student behaviour more generally when funding shortfalls or surpluses are faced.

These findings have potentially important implications for a range of policy issues relating to participation in PSE, the extent of hardship that may be faced by some students who do go, and the consequences of any such hardship. To the extent that PSE represents a central pillar of the nation's future prosperity, as well as a stepping stone to improved life chances for individuals, these are important issues.

2. Literature Review

This literature review has a specific focus on the Canadian experience. Due to past data limitations, there have been no previous studies which have compared expected parental contributions (as determined by the Canada Student Loans Program and its provincial counterparts) to the actual amount of money students receive from their families. There is, however, a more general literature on student finances and student aid in Canada which we will now discuss in the context of the current paper. Of particular focus are the relationships between receiving funds from various sources, and the relationships between financial matters and school outcomes.

Financing PSE

Overall, the recent Canadian literature points to a negative relationship between government assistance and money from other sources such as the student's employment income or money from other family members, although researchers struggle to identify directions of causality.

For instance, in 2001-2002, EKOS Research Associates carried out the "2001-2002 Student Financial Survey", a one-year longitudinal survey of 1,543 PSE students. During the year of the survey, students were contacted every month and asked a number of questions regarding their PSE experiences and financial matters. In their report, they discuss the negative

relationship between government assistance and employment revealed by their survey but, importantly, point out:

> "It is difficult to determine, whether students are not qualifying for student loans because...they prefer to rely on employment rather than debt or because they are working to make up for a deficit in the amount of loans made available to them." (EKOS 2003, p.45, emphasis added)

Similarly, a negative relationship between government assistance and financial support from family members is found, but:

> "Again, the presence of family support may be limiting students' eligibility for government assistance, or parents may be supporting children who did not receive sufficient government assistance to cover expenses." (EKOS 2003, p.48)

In explaining the relationship between family support and employment, the EKOS report found that while the presence of financial support from family did not appear to be related to whether or not students were employed during the school year, it did have a negative relationship with the amount of work students do. Meanwhile, students living with their parents were more likely than those in other living arrangements to receive financial support from family.

Interestingly, The EKOS Survey also found a slight difference in the incidence of assistance from family by gender, with males being more likely to receive support than women. Meanwhile, university and college students were found to be equally likely to receive support from family members and to receive similar amounts, although the amount of parental support received was greater among university students, while college students received more from other family members.

Ouellette (2006) also outlines students' sources of funding, in this case using Statistics Canada's 2002 Post-Secondary Education Participation Survey (PEPS), which involves a much larger sample (5,141) of youths aged 28 to 24, both attending and not attending PSE. Although the author does not delve into the relationships between various sources of funding, it is reported that government student loans and family support are the most important sources of funding that students receive, each cited by about one in five students as their primary source of money. Barr-Telford et al (2003), Arce (2003), Canada Undergraduate Survey Consortium (2006) and, Finnie et al (2010a) report similar findings.

An extensive review of literature regarding the affordability of post-secondary education in Canada published by the Council of Ministers of Education, Canada has reported that all forms of private contributions to PSE have increased over the past decades, but that no conclusions could be drawn as to whether these increases can be explained by escalating costs, or a decline in government support (Tandem Social Research Consulting, 2007).

How Parents Pitch In

EKOS Associates followed their 2001-2002 Student Financial Survey with the 2003-04 "Canadian Post-Secondary Student Financial Survey" which included 9,401 students from 46 institutions across the country. Patterns of family financial support closely matched those discussed above, but this second survey is worth discussing separately, as 2,796 parents completed a corresponding parental survey which allowed the researchers to determine to what extent parents were providing support using current income versus funds that had been saved.

Among parents of current students, those who supported their children during the first academic term were more likely to draw on current income (55 percent) than general savings (37 percent). To a much lesser extent, parents also used personal lines of credit and credit cards (14 percent) and funds from RESPs (12 percent). Fewer than five per cent drew on other sources such as loans, life insurance policies, non-custodial parents (i.e., child and spousal support payments) and other investments.

Statistics Canada's 2002 "Survey of Approaches to Educational Planning" (SAEP) showed that over 84 percent of parents who were saving for their children's education still expected to have to use a portion of their current income to support their children once they were in PSE (Shipley et al., 2003). Just over one in four of the parents expected to provide assistance to their children by taking out loans themselves.

Financing and Academic Performance

Interestingly, results from EKOS Associates' Student Financial Survey suggest that employment during the school year had little impact on academic performance as measured by

students' grades. That said, the Survey of Undergraduate University Students undertaken by the Canadian Undergraduate Survey Consortium found that about 3 in 10 of those employed said their employment had a positive impact on their performance and about one third said their employment had a negative impact (Prairie Research Associates, 2011). The negative impact was especially common among those going to school full-time and working more than 20 hours per week.

Finnie et al (2010b) use the same Longitudinal Survey of Low Income Students used in the present paper to also find only a slight negative relationship between the number of hours university students spend working per week and overall grade averages. The authors also report that among university students, those who did more paid work generally spent less time studying.

Financial Reasons for Leaving PSE

A national level Canadian study based on the PEPS found that among students who left PSE prior to completion, half of them cited "lack of interest in their programs or PSE in general" as the reason for dropping out, whereas 29 percent cited "financial considerations" (Barr-Telford et. al, 2003). This implies that motivation plays a more important role than financial factors with respect to persistence. Grayson and Grayson (2003) in their review of the literature conclude that the few studies that consider financial constraints as a reason for leaving PSE find only a weak relationship.

Using Statistics Canada's Youth in Transitions Survey, Cohort B (YITS-B), Finnie and Qiu (2008) report that only 1.8 of all those who start a college program leave because of money problems within their first five years, with the comparable number being 2.3 percent for those who start a university program.

Summary

Overall, the literature points to a negative relationship between government assistance and financing from other sources, but researchers struggle to identify the direction of causality. In particular, student loans and family support represent two very important sources of funding

for students, and both these sources are negatively correlated with working while in school. Parents who support their children's financially typically provide these funds from savings and current income. Meanwhile, working for pay while in school does not appear to have a strong impact on academic performance. Importantly, very few students who leave PSE without graduating cite financial reasons for doing so.

3. Data Description

The Longitudinal Survey of Low Income Students (L-SLIS) and Sample Selection

Conducted as part of the Measuring the Effectiveness of Student Aid (MESA) project, the Longitudinal Survey of Low Income Students (L-SLIS) represents a longitudinal survey of student financial aid recipients. The survey was originally designed for the purpose of evaluating the now-ended Canada Millennium Scholarship Foundation's Millennium Access Bursary (MAB). The survey was, therefore, based on a very deliberate sampling of students who received the MAB and in the cases of Nova Scotia and British Columbia, some other students who came close to receiving the awards but did not.[4]

The L-SLIS thus captures a sub-population of students – student aid recipients – that is of particular interest to policy makers who are concerned with eliminating financial barriers to participation (and success) in PSE. The L-SLIS also represents a group for whom the parental contributions issue is highly relevant, since all individuals included in the sample we select for our analysis filled out student aid application forms where this information is required (at least in the case of the dependent students to which this analysis is restricted), and this information was then used to determine the student's aid package.

A unique aspect of the L-SLIS is its inclusion of both student loan administrative data and survey responses. Due to arrangements negotiated directly with the provinces, the Canada Millennium Scholarship Foundation gained access to a significant amount of administrative data on recipients of its Access Bursary and, as mentioned above, in the case of Nova Scotia and

[4] As noted above, all individuals in the L-SLIS were student loan recipients, for which they had filled out student financial aid applications to qualify. Eligibility for the MAB was based on these same applications, with no special applications or requests required – i.e., it was rolled into the normal student financial aid application system of each province.

British Columbia a selection of student aid recipients whose family income levels were just above the line required to receive the bursaries.

The L-SLIS survey sample was drawn from this underlying set of datafiles, and data from the two sources (i.e., administrative and survey-based) were merged to create the L-SLIS. This data design, previously used in the United States for its National Post-Secondary Student Aid Survey (NPSAS), is considered a "best practice" among many researchers (Mesa Project, 2010). Most important to the analysis performed in this paper is the fact that family income amounts and expected parental contribution amounts are derived from administrative data, permitting confidence in the accuracy of their measurement.

The 10,511 respondents of the L-SLIS entered PSE for the first time in the fall of 2006. Surveys were conducted, by telephone, in the early winter months of 2007, and then again in 2008 and 2009.

Due to provincial differences in the MAB qualification criteria, the L-SLIS represents somewhat different populations in different provinces.[5] Putting restrictions on the sample was therefore required to create a meaningful, sample that serves the purposes of this analysis.

To begin, all students who were not classified as single dependent students were dropped, since parental resources do not figure in their applications or eligibility for student financial aid.

Second, we had to limit the sample to students from a select number of provinces. Due to the unique nature of the MAB requirements in Quebec (which used a unique low-income definition), Saskatchewan (which provided the MAB to Aboriginal students only), and Alberta (which provided the MAB to rural students only), students from these provinces were also excluded. Students from Prince Edward Island were also dropped as the MAB was uniquely given exclusively to second year students in that province.

Students from New Brunswick and Manitoba were also excluded as MAB eligibility was restricted to those with incomes below the relevant National Child Benefit (NCB) cut-off. This threshold varies by family size, but for a two-child family in 2006 it was $35,595 (Mesa Project,

[5] A full description of the Longitudinal Survey of Low-Income Students and provincial differences can be found in Mesa Project (2010).

2010). This cut-off was too low to allow for a sufficiently wide distribution of income – or parental contributions – for the purposes of our analysis.

Students from Newfoundland and Labrador were dropped because students were eligible for the MAB only if their parental contribution was less than $1000 per year, again significantly limiting the variation in the variable of most interest to us.

This same $1,000 parental contribution cut-off applied to students in British Columbia and Nova Scotia, but in these provinces, students on student financial aid who did not receive the MAB because their family incomes were too high were also surveyed and included in the S-LIS, thus providing a sufficiently wide distribution of parental contributions for our analysis.[6]

Finally, Ontario is also included in our sample because although the NCB cut-off determined eligibility for a full MAB, smaller grant amounts were available for those with family incomes up to roughly double the NCB amount, again providing for a sufficiently wide distribution of family incomes and parental contributions. Both college and university students are included in the Ontario and British Columbia samples, while only university students are available in the Nova Scotia sample.

Thus, while the selected sample does not represent a neatly defined underlying population, and the findings should therefore not be thought of as applying to any particular general population, it does have sufficient variation in the key parental contribution measures for the purposes of our analysis.

The lack of clearly defined representativeness must be noted, but in the context of the unique strength of the data in terms of including information on both expected and actual parental contributions, along with the other variables of interest included in the analysis, which make this analysis uniquely possible. We do not suggest that this is the last word on this topic, but it is perhaps a useful and interesting start.

After the above restrictions were imposed, 7,467 observations remained. The analysis makes use of sample weights constructed by the researchers which take account of attrition and

[6] Not all students on aid are included, only those who qualified or narrowly missed qualifying for the MAB.

therefore scale the samples up to the underlying populations of lower income students which the sample represents in each province.

4. Empirical Findings

The first part of the empirical analysis presents both descriptive statistics and regression model results which provide a portrait of the relationship between various student and family characteristics and parental contribution amounts: how much the student loan system expected each student's parents to give, the actual contribution, and the difference between the two (i.e., "shortfalls" versus "over-contributions", or the two amounts being equal). All figures regarding expected parental contributions and actual contributions relate to students' first year of PSE.

We then look at the relationship between facing a parental contribution shortfall and certain student behaviours and outcomes, including whether and how much students work for pay, their time spent studying, grades, and whether they continue in their studies. Again, all outcomes relate to students' first year of PSE with the exception of persistence which relates to continuing in both first and second year.

The outcomes we focus on are those which may reasonably be expected to be affected by a student's financial situation. That is, when a student receives less financial support from their parents than the amount which the aid system assumes they do (which in turn relates to how much the system gives the student to top up their resources to pay for their studies and support themselves), does the student tend to work more, study less, obtain lower grades, and have a higher likelihood of leaving school before graduation?

And from these results, can we say anything about the effects of student finances more generally – regardless of the underlying causes of any financial shortfall? This is a matter perhaps of special relevance to the student financial aid system and the lower income students who depend on it.

The definitions of all the background characteristic variables used in the analysis are shown in the Appendix.

The Incidence and Extent of Contribution Shortfalls

Table 1 (first row) indicates that the students in our sample had an average expected parental contribution of $820, but actually received an average of $1,520[7] from their parents, for an average over-contribution of $700 (i.e., the average "shortfall" is negative). Thus, the first finding of interest is that, on average, the parents in our samples give somewhat more to their children in support of their schooling than student loan programs assume. The distributions of actual and expected parental contributions, and the differences between these, are shown in Appendix Table 1. They are shown for the entire sample, and for each of the separate provincial samples.

Looking at the proportions of students in each contribution situation (the right hand side columns in Table 1), 42.5 percent received over-contributions, 32.2 percent received parental contributions that were equal to the expected amount (in most cases these are zeros in each respect), and 25.3 percent received shortfalls. We caution again, however, against assuming these findings apply to a more general population due to the nature of our samples.

Showing how these contribution patterns vary by the various student (and parent) characteristics shown in Table 1 is, though, an interesting and meaningful exercise.[8] Since in this first descriptive table these characteristics are taken one at a time, they do not explain the underlying source of the funding situation, which may be related to the student financial aid system and/or with the other characteristics of the students and their families which are related to the characteristic in question. For example, rural students may be more likely to come from one province or another, to have different levels of parental education and family income, and so on. We sort out these different factors in the regression analysis presented in the following section.

By province, students from Nova Scotia have higher actual family contributions ($2,060) than those in Ontario ($1,490) and British Columbia ($1,480), but expected contributions are also considerably higher in Nova Scotia ($2,550 versus $660 and $1,090, respectively, for

[7] It should be noted that actual parental contribution amounts were obtained through survey responses provided by students. While there may be some amount of error inherent to measuring parental contributions in this manor, we cannot say whether students may under-report or over-report parental contributions.

[8] Descriptions of the background characteristics variables can be found in Appendix 1: Variable Descriptions.

Ontario and British Columbia). High expected contributions essentially outstrip the actual contribution gap in Nova Scotia, leaving more students with shortfalls in parental contributions (50.5 percent versus 22.9 and 29.7 percent) and a higher average shortfall amount $490 versus average negative shortfalls, or over-contributions, of $830 and $390 in the other two provinces. Ontario thus lies at the other end, with lower actual contributions (similar to British Columbia) and the lowest expected contributions and, therefore, the fewest students facing a shortfall and the largest average over-contribution. British Columbia lies between these two provinces. These differences may be explained by differences in the provincial samples. For example, the Nova Scotia sample, compared to the other provincial samples, contains individuals with higher family incomes due to the way the samples were constructed. Also, the Nova Scotia sample does not include individuals who attend college. Given these sample differences, the results of the regression analysis presented below, which allows us to control for income and other factors, will be more meaningful than these raw differences.

Interestingly, gender does not seem to have a significant relationship to any of the contribution measures (expected contributions, actual contributions, and the difference between the two), thus leaning against certain previous findings in the literature which have suggested that males tend to be favoured over females in terms of parental contributions to their children's post-secondary schooling.

Students from rural areas in the three provinces included in our analysis have higher expected parental contributions than those from urban areas, but actual contributions are similar, leaving rural students facing a parental contribution shortfall and a smaller average over-payment overall. We emphasize here, however, that other factors are not controlled for in these simple descriptive statistics, and that rural students generally differ from urban students in various ways, including the level of PSE they attend (relatively more go to college as opposed to university) and parental education and family income (both are generally lower for rural students). That said, rural students are more likely than urban students to leave home for school, implying greater expenses. Also, urban and rural students are not evenly distributed across the provinces of our sample, therefore, effects related to provincial differences could be explaining these urban/rural differences in expected parental contributions. For these reasons we again stress that the results of the regression analysis will be more meaningful.

Those students from two-parent families receive, on average, greater parental contributions than those from mother only, or other families, but their expected family contribution levels are also higher, leaving more of them facing shortfalls, resulting in a smaller average over-contributions.

The patterns by number of siblings, which can enter student aid formulae and presumably affect actual contributions in different ways (as well as potentially being related to other student and family characteristics), show that both expected and actual parental contributions are greater for those with no siblings or just one, but the patterns of average shortfalls and the proportion facing shortfalls or over-contributions is mixed.

Differences relating to immigration and visible minority status are interesting. Native-born students who are not visible minorities have higher expected parental contributions, followed by native-born visible minorities, followed by the two immigrant groups. But actual contributions are somewhat similar among these groups, leaving fewer visible minority immigrants facing shortfalls and enjoying the greatest over-payments, while non-immigrant/non-minority students are in the opposite situation.

Comparing across categories of parental education, we see that both expected and actual contributions tend to rise with the parents' education level, but the net effect of these is curious. Students with parents who did not complete high school are particularly unlikely to experience shortfalls and to have relatively high average over-contributions, while the results by the other parental education levels are perhaps surprisingly mixed. Within this context it is interesting to see what is found in the regression analysis, especially when family income, to which parental education is obviously strongly related, is controlled for.

Perhaps most interesting of all, and of the greatest direct policy relevance, is that the proportion of students who receive parental contribution shortfalls increases sharply with family income above the $50,000 family income mark, driven mostly by the low expected contributions (mostly around zero) at the lower income levels – meaning that any actual contribution will result in an over-contribution. Intriguingly, it is students from families at the highest income categories who are most likely to face shortfalls (e.g., almost 80 percent among those with family

incomes over $75,000.00), and who also have the only average shortfalls that are indeed actually shortfalls rather than an over-contributions.

Finally, there are no great differences between the proportions of college and university students who face parental funding shortfalls: the parents of university students are expected to contribute more (costs are higher and parents will also tend to have higher incomes), and do, with the net difference leading to moderately higher average over-contributions for university students.

Contribution Amounts: Results of OLS Regression Models

Table 2 shows the results of OLS regression models where the dependant variables represent i) students' expected family contribution amounts, ii) actual contribution amounts, and iii) the shortfall amounts (i.e., expected contributions minus actual contributions – which are negative in the case of over-contributions).

Many of the patterns hold from the descriptive statistics, or show small differences once the different sets of factors are all controlled for, so the discussion will focus on those findings that seem most interesting and most relevant from a policy perspective. The most important effects are related to parental education, family income, and whether the student is in university or college.

Controlling for all the other variables included in the models, students from Nova Scotia still have substantially higher (and statistically significant) expected parental contribution amounts than the comparison group (i.e., the omitted category in the regressions) from Ontario, with a much smaller difference (though still significant) in the same direction for those from British Columbia. One possible explanation for this finding is that the cost of living in Nova Scotia is lower than that in Ontario and British Columbia, therefore, given the same level of after tax income, families in Nova Scotia are deemed to have higher Discretionary Income, and hence a higher expected contribution.

Actual contributions across the provinces show no statistical difference, though, leaving students from Nova Scotia to experience shortfalls that are, on average, significantly greater than

those experienced in Ontario ($552 less within the model) driven by their higher expected contributions. That is, Nova Scotia parents appear to give as much as others (in fact a bit more if one looks only at the point estimate – although this difference is not statistically significant) , but the aid system *assumes* they give more, leaving the observed shortfalls.[9] British Columbia's shortfall (again as compared to Ontario) is estimated to be a little less than half that, but is not statistically significant.

We repeat our previous warnings against generalising too much from these provincial comparisons due to the different nature of the provincial samples, but further investigation of whether parental contributions are generally over-estimated in Nova Scotia, in particular, resulting in undue student hardship or otherwise affecting student choices and behaviour, may be worth pursuing to see if the system should be adjusted in this respect.[10]

There are – as in the descriptive statistics seen above – no differences by gender. This lack of any differences is itself an interesting result: there appears to be no family discrimination against girls when it comes to contributing financially to their advanced schooling.

The rural effects now disappear in this regression context. This finding suggests that the differences observed in the simple descriptive statistics above were driven by other factors, which are now controlled for; rural versus urban differences are, on their own, apparently not important to to expected contributions, actual contributions, nor to the difference between the two.

Interestingly, when family income, parental education, and the other background characteristics are controlled for, students from mother only and other families are actually found to have slightly higher expected family contribution amounts compared to those from two-parent households (the latter effect is only marginally statistically significant), but differences in the actual contribution and shortfall amounts are mostly entirely non-significant.

As expected, the number of siblings a student has (here captured by a single linear variable to keep the model simple) is negatively related to both expected and actual

[9] Here we are equating expected parental contributions with what the system assumes they actually give, which may or may not be an accurate depiction of what determines expected contributions in the student aid system.

[10] It should, however, be noted in this context that Nova Scotia tends to have among the highest overall PSE participation rates, and the highest university rates in particular, in the country (Finnie et al., 2009).

contributions, while the net effect on shortfalls is estimated to be small and is statistically not different from zero. One interpretation of these findings is that student financial aid systems do a good job of taking the number of siblings into account when calculating expected parental contributions.[11]

The visible minority and immigrant variables are, interestingly, mostly non-significant, particularly with respect to actual parental contribution shortfalls now that the other factors considered in the model have been taken into account. (Immigrants who are not visible minorities seem to have somewhat lower levels of both expected and actual contributions holding other factors constant). The differences observed in the simple descriptive statistics above of course remain, but appear to be driven by the other variables included in the models – presumably the income and education effects, in particular: visible minority immigrant families, in particular, tend to be characterised by higher levels of parental education and lower family incomes.

Some of the most interesting findings of this report pertain to the parental education and family income variables reported in Table 2. We find that, controlling for income, along with the other variables included in the model, parental education is not related to expected contributions – which makes sense, since this is not a factor which student loan systems take into account. But it is positively related to actual contributions, and thus negatively related to student shortfalls.

Meanwhile, controlling for parental education and the other variables included in the model, family income is strongly related to expected contributions, has a much smaller effect on actual contributions, and thus students from higher income families face greater shortfalls than lower income students.[12]

This set of results is consistent with the emerging story on access to PSE, which finds that parental education dominates family income in determining who goes on PSE overall, and

[11] This is disappointing from a research standpoint, as we had theorized that the siblings variable could be used as an instrument for the purpose of examining the relationship between parental contribution shortfalls and working during school and other student outcomes and behaviour. That is, it could presumably be safely argued that the number of siblings is not chosen by the student or is in any other way related to the outcomes of interest, but might drive funding shortfalls (or over-contributions), which *may* affect these outcomes.

[12] These income effects hold to a very similar degree in models which do not include parental education.

who goes to university in particular (see various papers in Finnie et al., 2009 as well as Finnie et al., 2011a, 2011b). The results reported here suggest that perhaps part of this education effect may work at least in part through the more generous financial support more highly educated parents apparently provide to their children. Alternatively, parental education might affect access through other channels, including the "cultural" factors that have been suggested in other literature which may also affect financial contributions, while the latter may have little or no effect on access and the two may instead represent only spurious correlations in terms of access. Further research would be required to sort out these various relationships.

That said, it is the (negative) parental income effects which dominate, which may in turn be related to the relatively small influence of parental income (especially in comparison to the effects of parental education) found in the literature on the determinants of access to PSE.

Finally, holding other factors constant, the parents of university students are expected to give slightly more than the parents of college students, actually give significantly more than this, resulting in a negative effect on shortfalls.

Relating Parental Contributions (Shortfalls) to Student Outcomes

Tables 3 and 4 present various descriptive statistics of how parental over-contributions and contribution shortfalls are related to a student's working while in school (three different measures), the number of hours spent studying, grades (end of first year), and whether the student left school without graduating (as measured by whether they return to begin their second year of studies.

In Table 3, we show the distributions of the outcomes for each of these measures for each parental contribution status (over-contributions, no difference shortfalls), hence the figures sum to 100% vertically; while in Table 4 we show the distribution of students in each parental contribution category for each outcome, so the figures sum to 100% horizontally. The two tables thus offer two different perspectives of the relationships between parental contributions and the outcomes in question.

These tables suggest, first of all, that there may be a positive relationship between having a parental contribution shortfall and working while in school, although the patterns are not perfectly consistent. More specifically, those facing shortfalls are more likely to have had a job or to have worked at a paid job every week (the first two outcomes shown in Table 3) than those with over-contributions – but the even-contribution group worked most of all by these measures. Looking at the number of hours worked every week among those who had jobs, the over-contribution group worked most of all – but being a conditional measure (i.e., it applies only to those who worked), it is perhaps a less meaningful overall measure than the others.

Roughly similar majorities (56-58 percent) of all students studied 8 to 20 hours per week (the fourth set of results), while fewer students facing parental contribution shortfalls studied more hours than this, and more students in this group studied the least number of hours – perhaps at least partly related to the work patterns just observed (i.e., more work, less time available to study).

Ultimately, though, parental contributions do not appear to be related to grades or to the rate of leaving school without graduating (the final results shown). The proportion of students with each of the grade levels is mixed across the contribution groups (e.g., those facing shortfalls have the highest proportions in both the highest and lowest grade categories), while those facing shortfalls actually have the lowest leaving rates.

We thus have an intriguing story where students facing financial contribution shortfalls appear to perhaps work a bit more, study a bit less, but have no different schooling outcomes as measured by grades and dropping out.

Table 5 summarizes the results of a series of binomial and multinomial logit models which further explore the relationships between shortfalls and these same student work and study habits and schooling outcomes. The average marginal effects shown in Table 5 are taken from the results presented in Appendix Tables 2 through 10, which represent models where controls for province, gender, urban/rural status, family type, number of siblings, immigrant and visible minority status, parental education, and family income are included (similar to the parental contribution models discussed above).

These models come in a number of different specifications. First, in each case shortfalls are represented in two ways: i), as a continuous variable representing the dollar amount of the shortfall (with over-payments translating into negative shortfalls), and ii) as an indicator (0-1) variable of whether the student faced a parental contribution shortfall, or not (the latter category including both over- and equal-contributions). The results for the first specifications thus show the differences in outcomes for those with any amount of shortfall versus others while controlling for the other factors represented in the models, while the results in the second set of specifications represent the effects of each additional $1,000 in shortfall. Models were also estimated (as shown in the appendix tables) including different sets of control variables from the set enumerated above.

The purpose here was to explore the relationships in question in different ways, and to test for the robustness of the findings. In Table 5, we report only the versions including the fullest set of control variables for both the categorical and continuous (dollar amount) measures of contribution shortfalls.

The results in Table 5 show, first of all, that an increase in the shortfall amount of $1,000 is, on average, associated with a 1.4 percentage point increase in the probability that a student had any paid jobs during their first year of PSE. The overall rate is 35.6 percent (Table 3), so these are substantial effects. A $1,000 increase is also associated with a 1.6 percentage point increase in the probability that a student worked every week during their first year (overall rates of 31.0 percent). Meanwhile shortfall amounts do not appear to be related to whether the student works more than 20 hours per week for pay (although as mentioned earlier this measure is conditional on working some positive number of hours) or on studying 20 hours a week or more.

The results of the bottom panel of Table 5 indicate that shortfall amounts do not appear to be related to getting lower grades in first year of PSE, while they are weakly associated (p=.1) with the probability of leaving PSE by the start of the second year.

Table also 5 also shows the marginal effects associated with the incidence of a shortfall, regardless of the shortfall amount (i.e., as measured by a zero-one indicator variable). We find that experiencing a shortfall is associated with a 6.2 percentage point increase in the probability

that a student had any paid jobs during their first year of PSE and a 5.4 percentage point increase in the probability that a student worked every week during their first year. As noted above, these are fairly substantial effects relative to the average rates of working (35.6 and 31.0, respectively).

Meanwhile experiencing a shortfall is also associated with a 5.7 percentage point decrease in the probability that a student spent over 20 hours per week in work for pay (among those that did work) and – more meaningfully – a 3.3 percentage point decrease in the probability that a student spent over 20 hours per week studying (again among all students).

None of the marginal effects associated with experiencing a shortfall have statistically significant relationship with grades or leaving PSE.

We would thus summarise these results as indicating that there is consistent evidence that facing a shortfall is associated with working more at jobs for pay, weaker but still notable evidence that it is related to time spent studying, but almost no evidence that it is related to grades or leaving school.

5) Conclusion

One of the principal findings of this paper is that students are more likely to have parents who contribute less than assumed by the standard funding formulae (other factors held constant) if, i) they are from Nova Scotia (in comparison to Ontario or British Columbia – although with the strong caveat that the samples are not directly comparable), ii) they come from a mother-only family (small effects), and most of all iii) they come from a higher income family. Over-contributions – again taking other factors into account – are most likely when the parents have higher levels of education, although these over-contribution effects are not nearly as large as the family income shortfall effects.

Furthermore, it is almost entirely the expected contributions side that is driving the shortfalls results (i.e., expected contributions rise much more with income than do actual contributions), while it is the actual contributions side that accounts for the over-contribution results (i.e., expected contributions don't change much with parental education but actual contributions rise). The small effects for single-mother families are, in contrast, due to small effects on each side.

One important implication of these findings is that student aid formulae should perhaps be revisited, and possibly adjusted, with respect to the measured imbalances between expected and actual parental contributions if students in these different situations – those students on financial aid from relatively higher income families in particular – are not to be left facing funding shortfalls. Any such shortfalls could, furthermore, have knock-on effects on PSE participation decisions – although testing for such effects lies beyond the scope of this paper, or the data available.

The parental education over-contribution effects are interesting for, among other reasons, how they are consistent with the emerging literature which finds that parental education is an important determinant of who goes to PSE, university in particular – with a much stronger effect than family income, in particular. The general interpretation of this relationship has generally been related to "cultural" factors, whereby individuals raised in families where the parents have themselves been to PSE will have a stronger orientation towards PSE, will better understand the benefits and place the costs in the context of those benefits, will be increasingly better prepared for PSE as they move through secondary school, will enjoy the benefits of early investments in their cognitive and perhaps non-cognitive skills, and other such influences.

The findings reported here suggest that part of this parental education effects may work through the more generous funding parents with more education provide their children. That said, it is not clear if the relative modest magnitude of those funding differences could amount to much of an influence on decisions to go to PSE. An alternative interpretation is that parental education simultaneously drives both the funding differences observed here and the participation effects documented elsewhere, without the latter being due to the former. Further research on these different effects would be required before more definitive statements can be made in this regard.

The parental education effect also raises, however, the policy question as to whether student financial assistance plans should take parental education into effect. On the one hand, if students from different backgrounds are to be left equally well off in terms of the funds available to pay for their schooling, the findings suggest that this should be done. On the other hand, this would be punishing families who choose to invest more in their children's education. Being

based on average relationships, rather than actual individual situations, makes the issue all the more complex. In practical terms, this is probably not a direction policy can, or should, take.

The other main findings concern student behaviour and outcomes. Students facing parental contribution shortfalls tend to work more and study less, yet they don't have lower grades and are no more likely to drop out of school.

It should be emphasized that the observed contribution-work relationships may to at least some degree reflect reverse causality: that is, some students may first choose to work more, and then (as a result) receive less financial help from their parents and study less. That is, work decisions may drive the apparent financing shortfalls as well as study time, rather than the other way around. Disentangling the causality of the observed relationships represents a significant challenge, but we emphasize the need for more research on these questions since underfunding remains an ongoing concern for the student financial aid system, including the effect of underfunding on the amount of time students work, have to study, and other related student outcomes.

The final sets of findings are, however, very interesting in this regard. Regardless of the causality regarding parental contributions, work, and study time, the measured shortfalls do not appear to have any significant effect on the outcomes that presumably matter most: student performance, as measured here by grades and student retention. So while student funding formulae may or may not need adjusting to be more fair in how they align expected parental contributions with actual contributions, their failure to do so in certain situations does not appear to have any consequences for students' academic performance or their ability to continue in their studies.

As for the broader question of how funding shortfalls, regardless of their source, affect student outcomes, if we accept the assumption that one source of funding shortfalls (parental contributions) has the same effect as any other on student behaviour and student outcomes, the evidence presented here suggests those effects are not large.

Further research on all these issues is, however, necessary, before any of these questions can be addressed with any degree of confidence. But we hope that by exploiting the unique properties of the L-SLIS dataset used in this analysis we have been able to make a contribution

to our understanding of parental contributions to their children's PSE schooling, of low income students' finances, of the student financial aid system, and of how these relate to at least some student experiences and outcomes.

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Appendix: Variable Descriptions

Province: Students were classified according to their "survey province" (i.e., the province they were surveyed in during their first year of PSE).

Urban/Rural: Students were classified according to their responses to the question "How big was the community in which you last attended high school?" Students who responded said they lived in a city of 100,000 or greater were classified as urban and all other students were classified as rural.

Family Structure: This variable is derived from the response to the survey question: "Who were the parents/guardians that you lived with most during high school?" Step-parents are counted as parents. The "Other" category includes those who lived in father-only households, and those who lived without parents or at an institution.

Number of Siblings: Number of siblings is derived from responses to survey questions about number of brothers and sisters.

Visible Minority X Born in Canada: Visible minority status is derived from responses to the question, "Could you describe your cultural or racial background?" Immigration status is derived from response to the question "Are you a landed immigrant?"

Highest Level of Parental Education: Students were surveyed about the highest level of education completed by their guardians.

Family Income: Family income includes only parents' incomes. Amounts are derived from student loan administrative data which includes information entered on student loan applications. Dependent loan applicants are required to report their parents' incomes of the previous year, and income amounts are checked against Canada Revenue Agency (CRA) records.

Table 1: Contribution Amounts by Student Characteristics

		Contribution Amount (Mean $)			Shortfall Incidence (%)		
	% Dist.	Expected Contribution	Actual Contribution	Shortfall Amount (Expected-Actual)	Over-Contribution	Even	Shortfall
All	100.0	820	1520	-700	42.5	32.2	25.3
Province							
Nova Scotia	5.3	2550	2060	490	35.8	13.7	50.5
Ontario	81.4	660	1490	-830	44.1	32.9	22.9
British Columbia	13.2	1090	1480	-390	34.9	35.3	29.7
Gender							
Female	58.0	820	1510	-690	41.0	33.3	25.8
Male	42.0	810	1540	-730	44.6	30.8	24.6
Urban/Rural							
Rural	52.3	980	1510	-540	42.0	29.2	28.8
Urban	47.7	640	1530	-890	43.0	35.6	21.4
Family Structure							
Two Parents	73.8	980	1600	-620	42.0	28.8	29.2
Mother Only	23.4	350	1290	-940	43.9	42.5	13.6
Other	2.8	480	1320	-840	44.0	36.9	19.1
Number of Siblings							
None	8.8	970	1980	-1020	46.8	27.1	26.1
One	38.9	960	1660	-710	44.0	28.8	27.2
Two	28.2	750	1440	-690	41.4	33.5	25.0
Three	13.7	670	1410	-730	40.4	36.6	23.0
Four	5.6	610	960	-340	35.4	40.7	23.9
Five or More	4.9	440	980	-540	42.4	39.5	18.1
Visible Minority X Born in Canada							
Non-Vismin; Born in Canada	53.8	1010	1500	-490	41.7	28.5	29.7
Vismin; Born in Canada	16.4	710	1630	-920	43.5	32.9	23.6
Non-Vismin; Immigrant	3.9	580	1290	-710	42.9	35.8	21.3
Vismin; Immigrant	25.8	520	1540	-1020	43.4	38.9	17.7
Highest Level Of Parental Education							
Less Than HS	4.3	210	960	-750	36.6	54.1	9.4
HS Completed	25.3	650	1240	-590	42.1	34.5	23.4
Some PSE	18.4	820	1480	-660	40.5	32.8	26.7
College Completed	28.3	940	1610	-670	42.1	29.1	28.8
University-BA	14.7	910	1750	-840	45.0	29.7	25.3
University-Grad	8.9	1010	2020	-1010	47.9	28.0	24.1

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Table 1: Contribution Amounts by Student Characteristics

		Contribution Amount (Mean $)			Shortfall Incidence (%)		
	% Dist.	Expected Contribution	Actual Contribution	Shortfall Amount (Expected-Actual)	Over-Contribution	Even	Shortfall
Family Income							
$0 to $5,000	1.6	10	1130	-1110	47.3	51.4	1.3
$5,000 to $25,000	23.9	20	1200	-1190	45.3	53.2	1.5
$25,000 to $40,000	20.1	10	1320	-1310	50.8	48.0	1.2
$40,000 to $50,000	13.4	70	1720	-1650	51.7	40.3	7.9
$50,000 to $75,000	31.3	1230	1560	-340	37.9	11.0	51.1
$75,000 to $100,000	9.2	4070	2260	1810	20.2		79.8
$100,000 and up	0.6	7860	3700	4160	22.4		77.6
University							
College	35.4	590	1170	-580	37.9	37.3	24.8
University	64.6	940	1710	-770	45.0	29.5	25.6

Table 2: Expected, Actual, and Shortfall OLS Regression Models

	Expected Family Contribution	Actual Family Contribution	Shortfall Amount
Province (Ontario)			
Nova Scotia	757***	205	552**
	(120)	(268)	(276)
British Columbia	148***	-69	217
	(51)	(142)	(141)
Gender (Female)			
Male	7	11	-4
	(31)	(85)	(87)
Urban/Rural (Rural)			
Urban	-8	-44	36
	(32)	(95)	(97)
Family Structure (Two Parents)			
Mother Only	85***	-86	171*
	(27)	(95)	(98)
Other	130*	-35	166
	(73)	(230)	(221)
Siblings			
	-120***	-150***	30
	(11)	(26)	(27)
Visible Minority and Immigrant Status (Canadian Born Non-Visible Minority)			
Vismin; Born in Canada	-53	149	-202
	(42)	(130)	(133)
Non-Vismin; Immigrant	-115*	-353**	238
	(70)	(176)	(184)
Vismin; Immigrant	-36	-57	22
	(39)	(126)	(128)
Parental Education(High School Completed)			
Less Than HS	9	-97	106
	(41)	(201)	(206)
Some PSE	25	185*	-159
	(43)	(108)	(114)
College Completed	76*	312***	-236**
	(39)	(112)	(115)
University-BA	57	425***	-368***
	(50)	(137)	(141)
University-Grad	134**	653***	-520**
	(66)	(208)	(206)

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Table 2: Expected, Actual, and Shortfall OLS Regression Models

	Expected Family Contribution	Actual Family Contribution	Shortfall Amount
Family Income			
$5 000 To $25 000	1	70	-69
	(29)	(226)	(229)
$25 000 To $50 000	10	321	-311
	(30)	(231)	(234)
$50 000 To $75 000	1,172***	301	872***
	(45)	(231)	(236)
$75 000 To $100 000	3,972***	996***	2,976***
	(112)	(294)	(304)
$100 000 And Up	7,516***	2,229**	5,287***
	(812)	(893)	(953)
Missing	24	474	-450
	(40)	(569)	(575)
Institution Type (College)			
University	85***	390***	-305***
	(30)	(93)	(95)
Constant	104*	1,028***	-924***
	(55)	(245)	(250)
Observations	5816	5816	5816

Notes: *** p<0.01, ** p<0.05, * p<0.1

Table 3: Student Experiences and Outcomes by Family Contribution Status

	Over-Contribution	Even	Shortfall	All
	%	%	%	%
Had Any Paid Jobs While in First Year of PSE				
No Jobs	70.8	58.4	61.4	64.4
Had a Job	29.2	41.6	38.6	35.6
Total	100.0	100.0	100.0	100.0
Worked at a Paid Job Every Week During First Year of PSE				
Did not Work Every Week	75.4	62.6	66.3	69.0
Worked Every Week	24.6	37.4	33.7	31.0
Total	100.0	100.0	100.0	100.0
Among Those Who Worked Every Week, Number of Hours				
Seven Hours Or Less	17.3	14.2	16.5	15.9
Eight To Twenty Hours	66.3	70.9	68.5	68.7
Over Twenty Hours	16.4	14.8	15.1	15.4
Total	100.0	100.0	100.0	100.0
Time Spent Studying During First Year of PSE (Per Week)				
Seven Hours Or Less	23.0	23.5	25.8	23.9
Eight To Twenty Hours	57.5	55.8	57.7	57.0
Over Twenty Hours	19.5	20.7	16.5	19.1
Total	100.0	100.0	100.0	100.0
Overall Average in First Year of PSE				
Below 70%	18.9	17.8	18.9	18.6
70%s	51.9	51.6	50.8	51.5
80%s	25.2	27.0	26.0	26.0
90%s	4.0	3.6	4.3	4.0
Total	100.0	100.0	100.0	100.0
Left PSE in First or Second Year Without Graduating				
Did not Leave	89.5	88.4	89.7	89.2
Left Without Graduating	10.5	11.6	10.3	10.8
Total	100.0	100.0	100.0	100.0

Table 4: Family Contribution Status by Student Experiences and Outcomes

	Over-Contribution	Even	Shortfall	Total
	%	%	%	%
Had Any Paid Jobs While in First Year of PSE				
No Jobs	46.7	29.2	24.1	100.0
Had a Job	34.9	37.7	27.5	100.0
Worked at a Paid Job Every Week During First Year of PSE				
Did not Work Every Week	46.7	29.2	24.1	100.0
Worked Every Week	33.9	38.9	27.3	100.0
Among Those Who Worked Every Week, Number of Hours				
Seven Hours Or Less	36.9	34.8	28.3	100.0
Eight To Twenty Hours	32.7	40.1	27.2	100.0
Over Twenty Hours	36.0	37.4	26.6	100.0
Time Spent Studying During First Year of PSE (Per Week)				
Seven Hours Or Less	41.0	31.7	27.4	100.0
Eight To Twenty Hours	42.9	31.5	25.6	100.0
Over Twenty Hours	43.5	34.8	21.8	100.0
Overall Average in First Year of PSE				
Below 70%	43.4	30.8	25.8	100.0
70%s	43.0	32.1	24.9	100.0
80%s	41.3	33.3	25.3	100.0
90%s	43.2	29.5	27.3	100.0
Left PSE in First or Second Year Without Graduating				
Did not Leave	42.8	31.9	25.4	100.0
Left Without Graduating	41.5	34.5	24.0	100.0

Table 5: Student Experiences and Outcomes, Regression Results Summary Table

	Had Any Paid Jobs While in First Year of PSE	Worked at a Paid Job Every Week During First Year of PSE	Among Those Who Worked Every Week, Worked Over 20 Hours	Spent Over 20 Hours per Week Studying During First Year of PSE
Shortfall Amount ($1,000s)	0.014***	0.016***	-0.004	-0.002
	(0.003)	(0.003)	(0.003)	(0.002)
Shortfall (No Shortfall)	0.062***	0.054***	-0.057**	-0.033**
	(0.020)	(0.020)	(0.024)	(0.015)

	Overall Average in First Year of PSE			Left PSE in First or Second Year Without Graduating
	%70s	%80s	%90s	
Shortfall Amount ($1,000)	-0.005**	0.004*	0.001	0.003*
	(0.002)	(0.002)	(0.001)	(0.002)
Shortfall (No Shortfall)	-0.006	-0.002	0.011	0.011
	(0.021)	(0.019)	(0.009)	(0.016)

Notes: *** p<0.01, ** p<0.05, * p<0.1

The average marginal effects shown here are taken from the results presented in Appendix Tables 2 to 10. The effect are taken from the final models which included the full set of controls for province, gender, urban/rural status, family type, number of siblings, immigrant and visible minority status, parental education, and family income.

Appendix Table 1: Actual and Expected Family Contributions

	Total Sample	Nova Scotia	Ontario	British Columbia
Expected Family Contribution (Mean $)	820	2550	660	1090
Expected Family Contribution (% Dist.)				
No Expected Contribution	62.4	32.8	65.6	54.9
$1 - $2500	25.7	28.8	24.6	30.8
$2500 - $5000	8.1	20.3	7.4	7.3
> $5000	3.8	18.1	2.4	7.1
Total	100.0	100.0	100.0	100.0
Actual Family Contribution (Mean $)	1520	2060	1490	1480
Actual Family Contribution (% Dist.)				
No Contribution	47.4	40.2	47.3	51.1
$1 - $2500	34.5	34.7	34.6	33.6
$2500 - $5000	11.1	15.6	11.3	8.3
> $5000	7.0	9.5	6.9	7.1
Total	100.0	100.0	100.0	100.0
Shortfall (Expected - Actual) (Mean $)	-700	490	-830	-390
Shortfall (Expected - Actual) (% Dist.)				
Less than -5000	5.7	4.4	5.9	4.9
-5000 to -2501	8.4	7.6	9.0	5.4
-2500 to -1	28.4	23.8	29.3	24.6
Actual Same as Expected	32.2	13.7	32.9	35.3
1 to 2500	18.3	27.8	17.4	20.2
2501 to 5000	5.1	13.3	4.4	6.0
Greater than 5000	1.9	9.4	1.2	3.5
Total	100.0	100.0	100.0	100.0

Notes: Provincial samples are not directly comparable. See text for details.

Appendix Table 2: Logit Model - Had Any Paid Jobs While in First Year of PSE

	Shortfall Amount Models			Shortfall Dummy Models		
	Shortfall Amount Variable Only	**Basic Controls Added**	**Parental Education and Family Income Added**	**Shortfall Dummy Variable Only**	**Basic Controls Added**	**Parental Education and Family Income Added**
Shortfall Amount($1,000)						
Shortfall ($1,000)	0.014***	0.013***	0.014***			
	(0.003)	(0.003)	(0.003)			
Shortfall (No Shortfall)						
Shortfall				0.041***	0.046***	0.062***
				(0.015)	(0.015)	(0.020)
Province (Ontario)						
Nova Scotia		0.086***	0.091***		0.093***	0.094***
		(0.033)	(0.033)		(0.033)	(0.033)
British Columbia		0.097***	0.106***		0.100***	0.106***
		(0.020)	(0.020)		(0.020)	(0.020)
Gender (Female)						
Male		-0.080***	-0.077***		-0.079***	-0.077***
		(0.013)	(0.013)		(0.013)	(0.013)
Urban/Rural (Rural)						
Urban		0.099***	0.100***		0.099***	0.100***
		(0.014)	(0.014)		(0.014)	(0.014)
Family Structure (Two Parents)						
Mother Only		0.033**	0.031*		0.036**	0.032**
		(0.015)	(0.016)		(0.015)	(0.016)
Other		0.024	0.021		0.026	0.021
		(0.038)	(0.038)		(0.038)	(0.038)
Siblings						
Number of Siblings		0.010**	0.010**		0.011***	0.011***
		(0.004)	(0.004)		(0.004)	(0.004)
Visible Minority and Immigrant Status (Canadian Born Non-Visible Minority)						
Vismin; Born in Canada		0.001	-0.000		-0.000	-0.002
		(0.018)	(0.018)		(0.018)	(0.018)
Non-Vismin; Immigrant		0.043	0.047		0.045	0.050
		(0.034)	(0.034)		(0.034)	(0.034)
Vismin; Immigrant		-0.032*	-0.025		-0.031*	-0.024
		(0.017)	(0.018)		(0.017)	(0.018)
Institution Type (College)						
University		-0.177***	-0.173***		-0.180***	-0.175***
		(0.014)	(0.014)		(0.014)	(0.014)
Number of observations	5,808	5,808	5,808	5,808	5,808	5,808

Notes: *** p<0.01, ** p<0.05, * p<0.1

Average marginal effects shown. "No Jobs" is the omitted category. Parental education and family income variables not shown.

Appendix Table 3: Logit Model - Worked at a Paid Job Every Week During First Year of PSE

	Shortfall Amount Models			Shortfall Dummy Models		
	Shortfall Amount Variable Only	**Basic Controls Added**	**Parental Education and Family Income Added**	**Shortfall Dummy Variable Only**	**Basic Controls Added**	**Parental Education and Family Income Added**
Shortfall Amount($1,000)						
Shortfall ($1,000)	0.016***	0.014***	0.016***			
	(0.003)	(0.003)	(0.003)			
Shortfall (No Shortfall)						
Shortfall				0.036**	0.039***	0.054***
				(0.015)	(0.015)	(0.020)
Province (Ontario)						
Nova Scotia		0.105***	0.111***		0.117***	0.118***
		(0.034)	(0.034)		(0.034)	(0.034)
British Columbia		0.110***	0.118***		0.114***	0.118***
		(0.020)	(0.020)		(0.020)	(0.020)
Gender (Female)						
Male		-0.075***	-0.073***		-0.075***	-0.072***
		(0.012)	(0.012)		(0.012)	(0.013)
Urban/Rural (Rural)						
Urban		0.103***	0.104***		0.102***	0.103***
		(0.014)	(0.014)		(0.014)	(0.014)
Family Structure (Two Parents)						
Mother Only		0.025*	0.020		0.026*	0.022
		(0.015)	(0.016)		(0.015)	(0.016)
Other		0.036	0.030		0.037	0.031
		(0.037)	(0.037)		(0.038)	(0.037)
Siblings						
Number of Siblings		0.011***	0.011***		0.012***	0.012***
		(0.004)	(0.004)		(0.004)	(0.004)
Visible Minority and Immigrant Status (Canadian Born Non-Visible Minority)						
Vismin; Born in Canada		0.002	0.001		0.000	-0.001
		(0.018)	(0.018)		(0.018)	(0.018)
Non-Vismin; Immigrant		0.054	0.054		0.055	0.058*
		(0.034)	(0.035)		(0.034)	(0.035)
Vismin; Immigrant		-0.023	-0.019		-0.023	-0.017
		(0.017)	(0.018)		(0.017)	(0.018)
Institution Type (College)						
University		-0.181***	-0.177***		-0.185***	-0.182***
		(0.014)	(0.014)		(0.014)	(0.015)
Number of observations	5,413	5,413	5,413	5,413	5,413	5,413

Notes: *** p<0.01, ** p<0.05, * p<0.1

Average marginal effects shown. "Did not Work Every Week" is the omitted category. Parental education and family income variables not shown.

Appendix Table 4: Multinomial Logit Model - Among Those Who Worked Every Week, Number of Hours (Shorfall Amount Models)

	Shortfall Amount Variable Only		Basic Controls Added		Parental Education and Family Income Added	
	Eight To Twenty Hours	Over Twenty Hours	Eight To Twenty Hours	Over Twenty Hours	Eight To Twenty Hours	Over Twenty Hours
Shortfall Amount($1,000)						
Shortfall ($1,000)	0.007	-0.001	0.008**	-0.004	0.008**	-0.004
	(0.005)	(0.005)	(0.004)	(0.003)	(0.004)	(0.003)
Province (Ontario)						
Nova Scotia			-0.132**	0.174***	-0.145**	0.183***
			(0.064)	(0.062)	(0.065)	(0.063)
British Columbia			-0.011	-0.038*	-0.014	-0.036*
			(0.031)	(0.021)	(0.031)	(0.022)
Gender (Female)						
Male			-0.009	0.030	-0.005	0.024
			(0.024)	(0.019)	(0.024)	(0.018)
Urban/Rural (Rural)						
Urban			0.045*	-0.018	0.043*	-0.016
			(0.025)	(0.019)	(0.025)	(0.019)
Family Structure (Two Parents)						
Mother Only			0.060**	-0.022	0.055*	-0.023
			(0.026)	(0.020)	(0.028)	(0.021)
Other			0.107*	-0.075*	0.105*	-0.081**
			(0.059)	(0.039)	(0.060)	(0.036)
Siblings						
Number of Siblings			0.006	0.005	0.004	0.004
			(0.008)	(0.006)	(0.008)	(0.006)
Visible Minority and Immigrant Status (Canadian Born Non-Visible Minority)						
Vismin; Born in Canada			-0.059*	0.035	-0.064*	0.039
			(0.033)	(0.027)	(0.033)	(0.027)
Non-Vismin; Immigrant			0.090*	-0.016	0.098*	-0.019
			(0.052)	(0.045)	(0.051)	(0.044)
Vismin; Immigrant			-0.038	-0.024	-0.024	-0.025
			(0.031)	(0.023)	(0.032)	(0.024)
Institution Type (College)						
University			-0.011	-0.118***	-0.008	-0.118***
			(0.024)	(0.019)	(0.024)	(0.019)
Number of observations	1,691	1,691	1,691	1,691	1,691	1,691

Notes: *** p<0.01, ** p<0.05, * p<0.1

Average marginal effects shown. "Seven Hours or Less" is the omitted category. Parental education and family income variables not shown.

Appendix Table 5: Multinomial Logit Model - Among Those Who Worked Every Week, Number of Hours (Shortfall Dummy Models)

	Shortfall Dummy Variable Only		Basic Controls Added		Parental Education and Family Income Added	
	Eight To Twenty Hours	Over Twenty Hours	Eight To Twenty Hours	Over Twenty Hours	Eight To Twenty Hours	Over Twenty Hours
Shortfall (No Shortfall)						
Shortfall	-0.003	-0.005	0.021	-0.030	0.042	-0.057**
	(0.026)	(0.021)	(0.027)	(0.020)	(0.034)	(0.024)
Province (Ontario)						
Nova Scotia			-0.138**	0.187***	-0.154**	0.196***
			(0.066)	(0.065)	(0.065)	(0.064)
British Columbia			-0.009	-0.036*	-0.015	-0.033
			(0.031)	(0.021)	(0.032)	(0.022)
Gender (Female)						
Male			-0.009	0.030	-0.006	0.025
			(0.024)	(0.019)	(0.024)	(0.018)
Urban/Rural (Rural)						
Urban			0.045*	-0.018	0.041*	-0.013
			(0.025)	(0.019)	(0.025)	(0.019)
Family Structure (Two Parents)						
Mother Only			0.061**	-0.026	0.053*	-0.020
			(0.026)	(0.020)	(0.028)	(0.022)
Other			0.107*	-0.077**	0.103*	-0.078**
			(0.059)	(0.039)	(0.061)	(0.036)
Siblings						
Number of Siblings			0.006	0.004	0.004	0.004
			(0.008)	(0.006)	(0.008)	(0.006)
Visible Minority and Immigrant Status (Canadian Born Non-Visible Minority)						
Vismin; Born in Canada			-0.060*	0.035	-0.064*	0.038
			(0.033)	(0.027)	(0.033)	(0.027)
Non-Vismin; Immigrant			0.088*	-0.017	0.099*	-0.021
			(0.052)	(0.045)	(0.051)	(0.044)
Vismin; Immigrant			-0.039	-0.027	-0.024	-0.025
			(0.031)	(0.023)	(0.032)	(0.024)
Institution Type (College)						
University			-0.012	-0.117***	-0.008	-0.118***
			(0.024)	(0.019)	(0.024)	(0.019)
Number of observations	1,691	1,691	1,691	1,691	1,691	1,691

Notes: *** p<0.01, ** p<0.05, * p<0.1

Average marginal effects shown. "Seven Hours or Less" is the omitted category. Parental education and family income variables not shown.

Appendix Table 6: Multinomial Logit Model - Time Spent Studying During First Year of PSE (Shortfall Amount Models)

	Shortfall Amount Variable Only		Basic Controls Added		Parental Education and Family Income Added	
	Eight To Twenty Hours	Over Twenty Hours	Eight To Twenty Hours	Over Twenty Hours	Eight To Twenty Hours	Over Twenty Hours
Shortfall Amount ($1,000)						
Shortfall ($1,000)	-0.000	-0.004**	0.001	-0.003*	0.001	-0.002
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Province (No Province)						
Nova Scotia			-0.061*	-0.036	-0.060*	-0.037
			(0.033)	(0.024)	(0.033)	(0.024)
British Columbia			-0.018	0.023	-0.017	0.023
			(0.020)	(0.017)	(0.021)	(0.017)
Gender (Female)						
Male			-0.017	-0.030***	-0.017	-0.030***
			(0.014)	(0.011)	(0.014)	(0.011)
Urban/Rural (Rural)						
Urban			-0.012	0.009	-0.012	0.007
			(0.015)	(0.012)	(0.015)	(0.012)
Family Structure (Two Parents)						
Mother Only			-0.002	-0.017	-0.004	-0.018
			(0.016)	(0.012)	(0.017)	(0.013)
Other			0.023	-0.031	0.024	-0.033
			(0.040)	(0.031)	(0.041)	(0.031)
Siblings						
Number of Siblings			0.003	-0.003	0.003	-0.003
			(0.005)	(0.004)	(0.005)	(0.004)
Visible Minority and Immigrant Status (Canadian Born Non-Visible Minority)						
Vismin; Born in Canada			0.005	0.032**	0.005	0.029*
			(0.019)	(0.015)	(0.020)	(0.015)
Non-Vismin; Immigrant			0.030	0.032	0.030	0.023
			(0.035)	(0.028)	(0.035)	(0.027)
Vismin; Immigrant			-0.006	0.077***	-0.006	0.068***
			(0.018)	(0.015)	(0.019)	(0.015)
Institution Type (College)						
University			0.061***	0.080***	0.062***	0.080***
			(0.015)	(0.011)	(0.015)	(0.011)
Number of observations	5,768	5,768	5,768	5,768	5,768	5,768

Notes: *** p<0.01, ** p<0.05, * p<0.1

Average marginal effects shown. "Seven Hours or Less" is the omitted category. Parental education and family income variables not shown.

Appendix Table 7: Multinomial Logit Model - Time Spent Studying During First Year of PSE (Shortfall Dummy Models)

	Shortfall Dummy Variable Only		Basic Controls Added		Parental Education and Family Income Added	
	Eight To Twenty Hours	Over Twenty Hours	Eight To Twenty Hours	Over Twenty Hours	Eight To Twenty Hours	Over Twenty Hours
Shortfall (No Shortfall)						
Shortfall	0.010	-0.036***	0.013	-0.030**	0.021	-0.033**
	(0.015)	(0.012)	(0.016)	(0.012)	(0.020)	(0.015)
Province (No Province)						
Nova Scotia			-0.063*	-0.034	-0.061*	-0.035
			(0.033)	(0.025)	(0.033)	(0.024)
British Columbia			-0.019	0.024	-0.018	0.024
			(0.020)	(0.017)	(0.021)	(0.017)
Gender (Female)						
Male			-0.017	-0.030***	-0.016	-0.031***
			(0.014)	(0.011)	(0.014)	(0.011)
Urban/Rural (Rural)						
Urban			-0.012	0.009	-0.012	0.006
			(0.015)	(0.012)	(0.015)	(0.012)
Family Structure (Two Parents)						
Mother Only			-0.001	-0.021*	-0.004	-0.017
			(0.016)	(0.012)	(0.017)	(0.013)
Other			0.024	-0.034	0.023	-0.032
			(0.040)	(0.030)	(0.041)	(0.031)
Siblings						
Number of Siblings			0.003	-0.004	0.003	-0.004
			(0.005)	(0.004)	(0.005)	(0.004)
Visible Minority and Immigrant Status (Canadian Born Non-Visible Minority)						
Vismin; Born in Canada			0.005	0.032**	0.005	0.029*
			(0.019)	(0.015)	(0.020)	(0.015)
Non-Vismin; Immigrant			0.031	0.030	0.031	0.022
			(0.035)	(0.027)	(0.035)	(0.027)
Vismin; Immigrant			-0.004	0.074***	-0.006	0.068***
			(0.018)	(0.015)	(0.019)	(0.015)
Institution Type (College)						
University			0.061***	0.081***	0.062***	0.079***
			(0.015)	(0.011)	(0.015)	(0.011)
Number of observations	5,768	5,768	5,768	5,768	5,768	5,768

Notes: *** p<0.01, ** p<0.05, * p<0.1

Average marginal effects shown. "Seven Hours or Less" is the omitted category. Parental education and family income variables not shown.

Appendix Table 8: Multinomial Logit Model - Overall Average in First Year of PSE (Shorfall Amount Models)

	Shortfall Amount Variable Only			Basic Controls Added			Parental Education and Family Income Added		
	70%s	80%s	90%s	70%s	80%s	90%s	70%s	80%s	90%s
Shortfall Amount($1,000)									
Shortfall ($1,000)	-0.004**	0.003*	0.000	-0.004**	0.003*	0.000	-0.005**	0.004*	0.001
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
Province (Ontario)									
Nova Scotia				0.000	-0.035	0.004	-0.002	-0.035	0.006
				(0.035)	(0.030)	(0.018)	(0.035)	(0.030)	(0.019)
British Columbia				0.039*	-0.042**	-0.016**	0.037*	-0.044**	-0.018***
				(0.021)	(0.018)	(0.007)	(0.021)	(0.018)	(0.006)
Gender (Female)									
Male				-0.052***	0.003	0.003	-0.049***	-0.001	0.000
				(0.014)	(0.012)	(0.006)	(0.014)	(0.013)	(0.006)
Urban/Rural (Rural)									
Urban				0.029*	0.002	-0.002	0.032**	-0.002	-0.003
				(0.016)	(0.014)	(0.006)	(0.016)	(0.014)	(0.006)
Family Structure (Two Parents)									
Mother Only				-0.012	-0.017	-0.003	-0.015	-0.014	-0.002
				(0.017)	(0.014)	(0.006)	(0.018)	(0.015)	(0.007)
Other				0.029	-0.036	-0.013	0.027	-0.034	-0.012
				(0.042)	(0.035)	(0.014)	(0.042)	(0.035)	(0.014)
Siblings									
Number of Siblings				0.002	-0.003	-0.002	0.002	-0.002	-0.002
				(0.005)	(0.004)	(0.002)	(0.005)	(0.004)	(0.002)
Visible Minority and Immigrant Status (Canadian Born Non-Visible Minority)									
Vismin; Born in Canada				0.011	-0.023	0.013	0.014	-0.025	0.013
				(0.021)	(0.018)	(0.008)	(0.021)	(0.018)	(0.009)
Non-Vismin; Immigrant				-0.042	0.053	-0.009	-0.028	0.029	-0.017*
				(0.036)	(0.033)	(0.011)	(0.037)	(0.033)	(0.009)
Vismin; Immigrant				-0.002	0.002	0.017**	0.013	-0.018	0.005
				(0.019)	(0.017)	(0.008)	(0.020)	(0.017)	(0.007)
Institution Type (College)									
University				0.023	-0.064***	-0.023***	0.027*	-0.069***	-0.028***
				(0.015)	(0.014)	(0.006)	(0.016)	(0.014)	(0.007)
Number of observations	5,283	5,283	5,283	5,283	5,283	5,283	5,283	5,283	5,283

Notes: *** p<0.01, ** p<0.05, * p<0.1

Average marginal effects shown. "Below 70%" is the omitted category. Parental education and family income variables not shown.

Appendix Table 9: Multinomial Logit Model - Overall Average in First Year of PSE (Shortfall Dummy Models)

	Shortfall Dummy Variable Only			Basic Controls Added			Parental Education and Family Income Added		
	70%s	80%s	90%s	70%s	80%s	90%s	70%s	80%s	90%s
Shortfall (No Shortfall)									
Shortfall	-0.010	0.001	0.004	-0.012	0.002	0.006	-0.006	-0.002	0.011
	(0.016)	(0.014)	(0.007)	(0.017)	(0.015)	(0.007)	(0.021)	(0.019)	(0.009)
Province (Ontario)									
Nova Scotia				-0.002	-0.033	0.004	-0.004	-0.034	0.006
				(0.035)	(0.030)	(0.018)	(0.035)	(0.030)	(0.019)
British Columbia				0.037*	-0.041**	-0.016**	0.036*	-0.043**	-0.019***
				(0.021)	(0.018)	(0.007)	(0.021)	(0.018)	(0.006)
Gender (Female)									
Male				-0.052***	0.003	0.003	-0.049***	-0.001	0.000
				(0.014)	(0.012)	(0.006)	(0.014)	(0.013)	(0.006)
Urban/Rural (Rural)									
Urban				0.029*	0.002	-0.002	0.032**	-0.002	-0.003
				(0.016)	(0.014)	(0.006)	(0.016)	(0.014)	(0.006)
Family Structure (Two Parents)									
Mother Only				-0.012	-0.018	-0.003	-0.016	-0.013	-0.002
				(0.017)	(0.015)	(0.007)	(0.018)	(0.015)	(0.007)
Other				0.029	-0.037	-0.013	0.027	-0.033	-0.012
				(0.042)	(0.035)	(0.014)	(0.042)	(0.035)	(0.014)
Siblings									
Number of Siblings				0.002	-0.003	-0.002	0.001	-0.002	-0.002
				(0.005)	(0.004)	(0.002)	(0.005)	(0.004)	(0.002)
Visible Minority and Immigrant Status (Canadian Born Non-Visible Minority)									
Vismin; Born in Canada				0.012	-0.024	0.013	0.015	-0.025	0.013
				(0.021)	(0.018)	(0.008)	(0.021)	(0.018)	(0.009)
Non-Vismin; Immigrant				-0.043	0.053	-0.008	-0.030	0.030	-0.017*
				(0.036)	(0.033)	(0.011)	(0.037)	(0.033)	(0.009)
Vismin; Immigrant				-0.002	0.001	0.018**	0.013	-0.017	0.005
				(0.019)	(0.017)	(0.008)	(0.020)	(0.017)	(0.007)
Institution Type (College)									
University				0.024	-0.065***	-0.023***	0.028*	-0.071***	-0.028***
				(0.015)	(0.014)	(0.006)	(0.016)	(0.014)	(0.007)
Number of observations	5,283	5,283	5,283	5,283	5,283	5,283	5,283	5,283	5,283

Notes: *** p<0.01, ** p<0.05, * p<0.1

Average marginal effects shown. "Below 70%" is the omitted category. Parental education and family income variables not shown.

Appendix Table 10: Logit Model - Left PSE in First or Second Year Without Graduating

	Shortfall Amount Models			Shortfall Dummy Models		
	Shortfall Amount Variable Only	**Basic Controls Added**	**Parental Education and Family Income Added**	**Shortfall Dummy Variable Only**	**Basic Controls Added**	**Parental Education and Family Income Added**
Shortfall Amount($1,000)						
Shortfall ($1,000)	0.003*	0.002	0.003*			
	(0.002)	(0.002)	(0.002)			
Shortfall (No Shortfall)						
Shortfall				-0.006	-0.011	0.011
				(0.012)	(0.011)	(0.016)
Province (Ontario)						
Nova Scotia		0.024	0.029		0.030	0.029
		(0.023)	(0.024)		(0.024)	(0.024)
British Columbia		0.083***	0.079***		0.084***	0.079***
		(0.018)	(0.018)		(0.018)	(0.018)
Gender (Female)						
Male		0.031***	0.030***		0.030***	0.031***
		(0.011)	(0.011)		(0.011)	(0.011)
Urban/Rural (Rural)						
Greater Than 100,000		-0.030***	-0.030***		-0.030***	-0.030***
		(0.011)	(0.011)		(0.011)	(0.011)
Family Structure (Two Parents)						
Mother Only		0.038***	0.020		0.034**	0.020
		(0.013)	(0.013)		(0.013)	(0.013)
Other		0.050	0.034		0.047	0.034
		(0.034)	(0.033)		(0.034)	(0.033)
Siblings						
Number of Siblings		0.011***	0.010***		0.011***	0.010***
		(0.003)	(0.003)		(0.003)	(0.003)
Visible Minority and Immigrant Status (Canadian Born Non-Visible Minority)						
Vismin; Born in Canada		-0.039***	-0.041***		-0.040***	-0.042***
		(0.014)	(0.015)		(0.014)	(0.014)
Non-Vismin; Immigrant		-0.015	-0.016		-0.017	-0.016
		(0.027)	(0.028)		(0.027)	(0.028)
Vismin; Immigrant		-0.070***	-0.076***		-0.072***	-0.076***
		(0.012)	(0.012)		(0.012)	(0.012)
Institution Type (College)						
Number of observations	4,272	4,272	4,272	4,272	4,272	4,272

Notes: *** p<0.01, ** p<0.05, * p<0.1

Average marginal effects shown. "Did Not Leave" is the omitted category. Parental education and family income variables not shown.