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**WILLINGNESS TO BORROW:  
USING LAB EXPERIMENTS TO EXAMINE  
LOAN AVERSION AMONG  
CANADIAN HIGH SCHOOL STUDENTS**

Cathleen Johnson, University of Arizona and CIRANO

Claude Montmarquette, CIRANO and University of Montreal

Jean-Pierre Voyer, SRDC

With the collaboration of Julie Heroux and Nathalie Viennot-Briot, CIRANO

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Any errors or omissions are the sole responsibility of the authors.



## **Abstract**

Evidence is presented on whether the willingness to borrow for education varies significantly among some at-risk students: low SES levels, First Nations, and first generation students. 1248 students participated in a survey, filled a numeracy assessment and took part in experimental sessions. During these sessions, students were presented with a series of paid binary decisions: bursaries vs. cash, loans for PSE studies vs. cash, intertemporal decisions and risky decisions. The paid binary decisions involved trade-offs between cash and various types of student financial aid, allowing us to generate a cost per dollar of educational financing (grants, loans, mixtures of loans and grants). The experiment was designed in such a way that prices for the various types of educational financing overlapped substantially in order to be able to more clearly distinguish the impact of loan aversion on the decision to take up financial assistance to pursue PSE. Results show that several factors influence the subjects' decisions about education financing but the most prominent influence was the price of educational subsidies. Participants were marginally sensitive to the form of financing (grant or loan), with no evidence of systematic loan aversion being detected.



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# I. Introduction

Despite Canada having one of the world's best-educated populations, numerous rationales have been presented to support the continued expansion and broadening of PSE participation. Not only do recent federal and provincial occupational projections suggest that future jobs will overwhelmingly require candidates with some form of PSE, the evidence on earnings premium and private rates of return to PSE provide indications that the labour market can still absorb large quantities of PSE graduates.

Yet, demographic trends suggest that maintaining, let alone increasing, the number of post-secondary graduates in coming years will prove challenging. Within 20 years, the pool of post secondary-aged Canadians will be substantially shallower than it is today. To keep the supply of skilled workers at current levels, participation rates will have to keep climbing. As participation rates are already quite high among economically advantaged segments of the population, there is growing consensus that the best opportunity for growth in participation rates may be among groups that are currently under-represented in PSE, such as students from low-income families, students with no history of post-secondary education in their families and Aboriginal students.

It is now standard to argue that increasing participation among groups with low participation rates will require strategies to overcome complex and interrelated barriers as differences in abilities to learn, literacy skills and financial barriers. A thorough review of all potential explanations for the under-representation of some groups in university is beyond the scope of this paper. Instead, our study is mainly concerned with one type of financial barrier: loan aversion. We are interested to learn **to what extent does reluctance to borrow act as a barrier to PSE participation among various under-represented groups (e.g. low income, first generation, Aboriginal, and those living outside of commuting distance to university).**

Loan aversion is not likely to be a serious concern for potential PSE participants who have the means to pay for PSE. The major concern is that individuals might be unwilling to take out loans to finance their PSE even though they know PSE represents a good investment.

If loan aversion is an important barrier in the decision to invest in education, it would have profound consequences on the way student financial aid is delivered. In Canada, a post-secondary student in need of financial aid must first qualify for student loan before being considered for a need-based grant. If the decision to pursue PSE study for certain groups is affected by such personal characteristics as loan aversion or aversion to debt, this would certainly suggest a need for changes in existing policies. For instance, consideration could be given to the decoupling of loans and grants.<sup>1</sup>

The possible importance of loan aversion as a barrier has been addressed in a few studies using surveys and interview data. For example, Callender and Jackson (2005) found that lower income subjects are more likely to be debt averse, while Rasmussen (2006), based on a small set of interviews, suggested that income-contingent loans are not

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<sup>1</sup> See Berger, Motte, and Parkin (2009) for a full discussion of the potential advantages of such change.

likely to solve the problem, because attitudes toward debt often vary widely by cultural background and income.

Aside from research done with traditional empirical aggregate or survey data, a few experimental studies have been completed on the decision to invest in education and on loan aversion. In a large experiment conducted by SRDC and CIRANO, Eckel, Johnson and Montmarquette (2007) found that, overall, controlling for other factors, aversion to debt is not an important factor in determining whether subjects (adults aged 18 to 55) will take up higher education financing. Furthermore, subjects who carry heavy debt loads were more willing than others to take on additional debt to finance higher education. However, while there was no evidence that entire subgroups were debt-averse, the original study noted that both high school students and post-secondary students presented sizeable probabilities of debt aversion (Johnson and al, 2003).

Experimental techniques remain the best approach to assess the impact of loan aversion on the decision to take-up financial aid to pursue PSE. Experimental manipulation allows the research to carefully control for many factors in the decision-making process and varying those of interest. In this study, we will use an experiment to offer a set of financial incentives to the population of interest and observe their revealed preferences for PSE under pre-specified conditions.

The next section details the experimental design that will be used to find out about loan aversion. The third section outlines the implementation of the experiment in the field. The fourth and fifth sections investigate the demand for educational subsidies. The sixth section focuses on the presence or absence of loan aversion.



## II. Design

This study is designed to answer the fundamental question, “Does the willingness to borrow vary significantly among types of students?” In this section we outline the experimental techniques that will be used to find out if loan aversion does represent a barrier to accessing PSE for certain under-represented groups.

### **CHOOSING BETWEEN DIFFERENT TYPES OF FINANCIAL AID**

The distinguishing feature of this study is the use of experimental measures to reveal differences in the willingness to take up financial aid depending on different forms used to provide this aid. We first construct a series of decisions involving choices between different types and levels of financial aid and some cash alternative. As the amount of implicit subsidy embodied in each type and level of aid varies, we can compare this implicit subsidy with the cash alternative offered and determine a cost per dollar of subsidy for each decision. We use these decisions to distinguish pricing from types of financing.<sup>2</sup>

We use a within subjects design where participants are presented with a series of binary choices: grants vs. cash, student loans vs. cash, etc. Within subjects design means that each subject acts as his or her own counterfactual. All subjects are presented with the full set of decisions and are paid for one of their choices, randomly selected, at the end of the session. This allows a comparison of what the subject would do in each situation. Since the subjects know they will be paid for one of their decision, but they do not know which one before the end of the session, they have the incentive to reveal what they really want for all decisions.

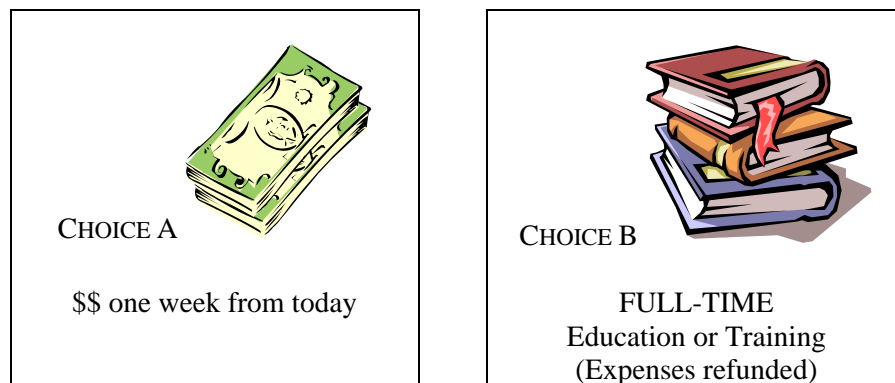
An example of an educational subsidy choice is pictured in Figure 2.1 below. This particular example offers a choice between a \$1000 grant and \$25 cash. Given that these subsidies are only available for a limited time (two years from the date of the study), if a participant has no interest in acquiring additional education, he or she will opt for the cash. The complete set of decisions presented to participants can be found in Appendix A.

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<sup>2</sup> The study described here is similar in design to the study conducted earlier by SRDC and CIRANO for the Canada Student Loans (CSL) Branch of Human Resources Development Canada, with the exception of three critical design changes. The first and most important difference is that this study has a far more comprehensive parameterization of the loans and grants decisions. The second difference is that this study was conducted solely on students in secondary school, whereas the CSL study had a very small high school sample, merely for comparison purposes. And lastly, the CSL study was done on an individual decision-making basis. In the current study, parents were provided with an information packet so that they had an opportunity to discuss with their children their expectations regarding the choices their children will be asked to make. See Eckel, Johnson, and Montmarquette (2002)

**Figure 2.1: Example of Educational Subsidy Choice**

You must choose A or B:



Decision 124

\$25

\$1000 GRANT

Four subsidy types were used in the choices provided to participants: Grants, Loans, Hybrid Loans (½ loan, ½ grant), and Income Contingent Hybrid Loans. The grants varied from \$500 - \$4000, the loans varied from \$1000 - \$4000 and the Hybrids varied from \$800 - \$4000. Cash alternatives varied from \$25 - \$700. These decisions are summarized in Table 2.1.

To participants in the study, accepting a grant, loan or hybrid is not free. They must pay a price, which is the cost per dollar of subsidy accepted. No matter what the subsidy type is, participants have to give up a certain amount of cash. For instance, if they choose a \$1000 Grant rather than a \$25 cash alternative (Decision 124), their cost would be  $\$25 / \$1000$  or 2.5 cents per dollar of subsidy. If they choose a loan rather than the cash alternative, they have given up the cash alternative but gotten the use of the subsidized loan for approximately 5 ½ years, interest free. If participants choose a \$1000 loan rather than \$300 cash alternative (Decision 112), the cost of the subsidy would roughly include the \$300 they gave up to get the loan, plus the inflation depreciated payback at the end of approximately 5 ½ years, less the value of subsidized interest for approximately 5 ½ years. In other words, the cost per dollar of loan subsidy would be  $[Cash + PV \text{ of the loan} - \text{subsidized interest}] / \text{Subsidy amount}$ . For decision 112, it would be  $[300 + (1000 - 113.86) - 269.14] / 1000 = \$0.917$ .<sup>3</sup>

<sup>3</sup> For this table and the computations presented in this report, for loans, a 2% inflation rate, 3% real interest rate, and 5 ½ years of interest subsidy were assumed. This is slightly different than the field implementation of a 2.5% inflation rate. This small discrepancy should have a minimal impact on the findings and no qualitative impact.

**Table 2.1: Educational Finance Decisions**

Decision number	Type of subsidy	Maximum subsidy amount	Cash alternative	Cost per \$ of education subsidy	Proportion take-up
109	Loan	\$2000	\$25	0.629	0.458
110	Loan	\$2000	\$300	0.767	0.172
111	Loan	\$2000	\$700	0.967	0.051
112	Loan	\$1000	\$300	0.917	0.110
110*	Loan	\$2000	\$300	0.767	0.172
113	Loan	\$4000	\$300	0.692	0.284
114	Hybrid	\$2000	\$25	0.321	0.834
115	Hybrid	\$2000	\$300	0.458	0.637
116	Hybrid	\$2000	\$700	0.658	0.390
117	Hybrid	\$800	\$300	0.683	0.288
115*	Hybrid	\$2000	\$300	0.458	0.637
118	Hybrid	\$4000	\$300	0.383	0.728
119	ICR Hybrid	\$2000	\$25	0.321	0.854
120	ICR Hybrid	\$2000	\$300	0.458	0.659
121	ICR Hybrid	\$2000	\$700	0.658	0.377
122	ICR Hybrid	\$800	\$300	0.683	0.295
120*	ICR Hybrid	\$2000	\$300	0.458	0.659
123	ICR Hybrid	\$4000	\$300	0.383	0.742
124	Grant	\$1000	\$25	0.025	0.886
125	Grant	\$1000	\$100	0.100	0.823
126	Grant	\$1000	\$300	0.300	0.687
127	Grant	\$1000	\$700	0.700	0.413
128	Grant	\$500	\$300	0.600	0.385
126*	Grant	\$1000	\$300	0.300	0.687
129	Grant	\$2000	\$300	0.150	0.764
130	Grant	\$4000	\$300	0.075	0.836

\*These decisions were presented only once in the study. They are repeated here to demonstrate potential groupings or comparisons of decision arrays.

The cost per dollar of subsidy must overlap substantially for loans and grants in order to be able to more clearly distinguish the impact of loan aversion. For instance, if a participant favours one type of subsidy versus another when the prices of each subsidy are the same, it would indicate a preference or an aversion towards one particular type of subsidy. If subjects are willing to pick grants, but not loans that are priced the same, then this would indicate the presence of loan aversion.

We recognize that presenting subjects with similar effective prices does not guarantee that they will see it that way. In the eyes of participants, the effective price of a loan is in part subjective and linked to different perceptions regarding future interest rates and inflation rates. In other words, subject may see important differences in effective prices between grants and loans when these are in fact quite similar. The experiment attempted to limit these variations in subjects' perceptions by reminding them of current interest rates and proposing plausible inflation rate scenarios in the material provided at the

session. In the end, if large differences in preferences are observed, favouring grants versus loans at comparable prices, we could then attribute these differences to loan aversion.

Perhaps some of the most interesting choices are those made by students at the margin, that is, those who are somewhat motivated to attend PSE, but may also be loan averse. They may vary their willingness to invest in PSE as a function of the financing options available – for example, they may be more likely to choose grants over cash, but cash over loans. These decisions tell us how generous financial assistance needs to be in order to induce marginal participants to invest in PSE.

To investigate whether some groups are less likely to borrow, after controlling for the price of educational subsidies, we relate the educational subsidy choices of participants to their vital characteristics collected from the baseline measures — socio-economic groups, numeracy level, risk and time preference, etc. The baseline measures include demographics, attitudes and behaviours, (from the subject survey); socio-economic status and attitudes (from the parental survey); a numeracy assessment (from the numeracy assessment), and measures of inter-temporal and risk preferences (from the laboratory experiment).

This comprehensive set of measures on resources, attitudes, behaviours, preferences and ability provides a unique opportunity to create an extremely rich data set describing the characteristics of each participant. The motive for collecting so many baseline measures was to be able to identify key characteristics of those impacted by each of the experimental conditions, each designed to answer the policy questions posed by the study. The survey measures in particular can be used to check the representativeness or verify the composition of each sample.

## **STUDENT SURVEY**

Obtaining a good profile of the participants and their family context was essential to this study. Many relevant and excellent survey questions were adapted from the Youth in Transition Survey (YITS), Post Secondary Education Survey (PEPS) and Survey of Labour and Income Dynamics (SLID).<sup>4</sup> These data include measures on: educational ambitions, expectations with regards to ambitions, perceived obstacles to pursuing PSE, financial means at student's disposal, debt aversion, and experience with debt, educational background, educational experiences, parent's education and parent's economic status. In addition, several other scales were included to assess other attitudes and behaviours like inter-temporal orientation (planning ability), attitudes towards risk, aspiration level, engagement while in high school, perceptions of labour market conditions and perceptions of the cost of, and returns to, PSE.

In short, we attempted to include as many questions as possible on personal characteristics, attitudes, or behaviours that have been shown in previous research to correlate with educational choice.

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<sup>4</sup> These questions are available to duplicate at no charge as long as Statistics Canada is acknowledged as the source.

## **PARENTAL SURVEY**

Some of the questions asked of parents were redundant with the students survey, but provided more reliable data. Parents were interviewed by telephone for basic income information, educational background and expectations concerning their child's educational achievement.

## **NUMERACY ASSESSMENT**

For many, the lack of basic literacy skills represents the most severe barrier to participation in education. Numeracy skills are often a gatekeeper for entrance into further education in many occupational areas and can critically affect employability and career options. Numeracy assessments typically involve the use of mathematics in real-life situations.<sup>5</sup> The results of this assessment provide a rough gauge of an individual's overall literacy competencies and allow for investigation of the relationship between the readiness to learn and the decision to invest in learning. It is also possible to make comparisons between perceived and measured ability to learn.

This study uses a numeracy assessment to provide a very simple proxy for participants' readiness to learn and to engage in educational activities.

## **MEASUREMENT OF PREFERENCES**

In addition to survey measures providing a relevant set of preferences pertaining to investment behaviours, we used the experimental sessions designed to capture the willingness to take up different offers of financial aid to also collect inter-temporal and risk preferences using experimental techniques.

### **1. Inter-temporal preferences**

In principle, time preference of an individual can be measured by offering a choice between two payments of different value to be made at different points in time. The later payment will have a greater value than the earlier payment, thereby rewarding the subject for delaying gratification, i.e. rewarding saving. The payments depend on the size of the initial endowment, the rate of return to saving, the timing of the earlier payment and the waiting time for the later payment. (Eckel, Johnson, and Montmarquette, 2002 and 2005; Harrison et al., 2002)

By carefully varying these parameters and offering each respondent a set of binary choices, one can develop a comprehensive picture of each subject's willingness to forgo smaller returns sooner for larger returns later. The set of time preference choices is summarized below in Table 2.2.

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<sup>5</sup> Numerate behaviour is observed when people manage a situation or solve a problem in a real context; it involves responding to information about mathematical ideas that may be represented in a range of ways; it requires the activation of a range of enabling knowledge, behaviours and processes. See Gal (2000).

**Table 2.2: Summary of Time Preference Choices**

Time of \$75 Earlier Payment	Annualized Rates of Return %	Later Payment Amount	
		ONE MONTH Investment	ONE YEAR Investment
TOMORROW, ONE WEEK, ONE MONTH, OR THREE MONTHS	5	75.31	78.75
	10	75.63	82.50
	20	76.25	90.00
	50	78.13	112.50
	100	81.25	150.00
	200	87.50	225.00

The earlier payment is consistently \$75, paid on the date indicated, i.e., one day, one week, one month or three months from the time of the experiment. Participants have to choose between one of these “earlier payment” dates and a later payment amount (either a one month investment period or a one year investment period). One month and three month earlier payments are included to test and control for possible hyperbolic discounting (see the papers in Loewenstein et al., 2003).<sup>6</sup> All eight decision time combinations are repeated using six annualized rates of return, as shown in the table. A broad range of rates of return is included because our previous results have suggested a great deal of variation in subject preferences (see Eckel et al., 2005). Finally, decisions involving both short (one month) and long (one year) investment periods are included.

Willingness to delay gratification cannot be underestimated. In each of our previous studies, experimentally measured patience has explained a fair proportion of the variation in the outcomes data: willingness to invest in own education, willingness to invest in a family member’s education and willingness to invest in long term savings. (See Eckel, Johnson, and Montmarquette, 2002; and Johnson, Montmarquette, and Eckel, 2003.)

## 2. Attitudes towards risk

Attitudes towards risk in a population play a key role in many models of economic and social behaviour, yet they are typically treated as unobserved characteristics in empirical analyses of individual decisions. Results from risk experiments conducted on college students (Eckel and Grossman, 2002; Holt and Laury, 2002), adults in Canada (see Johnson et al., 2004), and Houston high school students indicate substantial heterogeneity in responses. In the Canadian studies, these responses correlate with important lifetime decisions, including decisions about investments in education.

<sup>6</sup> “Today” and “Tomorrow” early payoff choices are sometimes included to test for a possible confound, i.e., whether the experimenter is trusted by the subject to pay future amounts. If the subject doubts future payments, his choices will make him appear more impatient than he really is. In our earlier work with very similar instruments, we tested for trust effects by comparing results for today vs. one month and tomorrow vs. one month and find no significant difference. Thus there was no trust issue arising in our data at the time.

We used two sets of decisions under uncertainty. One set was a graphical representation of the Holt and Laury (2002) 10-binary decision instrument, scaled three different ways. The second set were 5 graphical versions of the one out of six 50/50 gambles based on Eckel and Grossman (2008). These decisions are presented as numbers 49 to 108 in Appendix A.

An individual's attitude towards risk is likely to vary depending on the decision-making domain (e.g., investment or insurance, health-related behaviour, social risks) and will also depend on whether the risk involves gains or losses. In the experimental component of the baseline measures, the focus was on risks related to abstract gambles, which are described as "cash payments with uncertain outcomes" to avoid any negative association with gambling. At the end of the session, if a risk decision was chosen for payment, the participant was asked to roll a fair die to determine the payoff for their chosen gamble.<sup>7</sup>

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<sup>7</sup> Note that the measurement of other domains of attitudes towards risk was included in the survey component of the study.





### III. Implementation

From October 2008 to March 2009 nearly 1250 Canadian students, mostly ranging in age from 16-18 years, participated in 75 experimental sessions. This sample was drawn from both urban and non-urban sites across Canada and was made up of full-time students, most of whom were enrolled in high school and some in CEGEP.

#### SAMPLE

To generate meaningful comparisons by population group, the original project design called for 1400 respondents with the goal of recruiting a minimum of 200 participants per group of interest – high and low SES, aboriginals and rural vs. urban – in three or four different provinces. The 1248 teenaged students were recruited from across Canada, representing both rural and urban areas as well as low and middle income areas. Although not a focus of the stratified sampling strategy, special attention was paid to document immigrant students and students from single parent families for use in the analysis. A small number of participants over the age of 18 were included primarily because one participating high school had adult learners who had returned to school. These older students represented approximately six per cent of the sample. Table 3.1 briefly summarizes the numbers of participants in several groups of interest and by selected characteristics.

**Table 3.1: Participants**

Total Population = 1248	
Male	577
Female	671
Rural (U > 40 km)	152
First Nations	110
Low Income	218
First Generation PSE	352
Single Parent Family	123
Work > 20 hours per week	794
High School	948

It was found essential to have a sample of non-urban residents to compare their behaviours to urban residents. People in rural areas may face particular barriers to learning: transportation costs, lack of access to education providers, or simply reluctance to leave a community that they are deeply attached to. For many individuals in more

remote areas the decision to pursue education may mean abandoning their social ties and a way of life that they cherish.

The project design called for 400 participants from rural areas to allow meaningful analysis and comparisons between rural and urban behaviour. For the purpose of the analysis, this sample size would allow subgroups to be created that included one characteristic in addition to the rural/urban characteristic. Unfortunately, however, the recruitment efforts, summarized in the next subsection, were only able to attract 152 rural participants, defined as students whose permanent residences were located more than 40 km away from a university, although 244 students could be classified as attending a school that met that criterion.<sup>8</sup>

## **SITE SELECTION**

The experiment was conducted using pen and paper choice booklets and simple random draw devices like bingo balls and dice. Given the individual nature of the decisions, computers were not necessary. Therefore, the experiment was highly portable and accommodating to a variety of environments. Project cost considerations suggested that participants be drawn from locations with convenient travel connections from the SRDC Ottawa and CIRANO Montreal offices where possible. Manitoba, Saskatchewan, Ontario and Quebec were the selected provinces. Urban and rural school districts were selected in each of the four provinces and the implementation team was able to carry out work in urban and rural schools in each of the four provinces.

In order to ensure enough diversity within the non-urban sample, the planned site selection included a minimum of five different rural areas in different parts of the country and with different concentrations of industrial activity. Given budgetary considerations, these rural sites selected were in close proximity (1–4 hour driving distance) to the urban sites. Based upon the literature comparing rural and urban educational preferences, a set of criteria was established (Andres & Looker, 2001; Frenette, 2003; Dupuy, Mayer, & Morissette, 2000). Where possible, the selected rural sites had limited availability of post-secondary educational opportunities and were located a minimum of 40 km from a university.

## **RECRUITMENT**

Few changes were made during the recruitment phase of the study. Partly this is because the students were recruited through selected classes at school. Details as to the nature of the experiment were released before the experiment in each locality. School administrators were well aware of the purpose of the study and the high stakes involved. The school administrator packets included speaking points to promote the study to the students without prompting the students to behave in a particular way. The initial recruitment strategy relied on the co-operation of each targeted school. The school administrators were invaluable in assisting the field team in tracking down parental consent, making computers available to students to complete their web surveys and providing space during and after school time for the in-person experimental sessions of

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<sup>8</sup> Only 46 participants lived 40 km away from any type of PSE institution, including CEGEP or community colleges.

the study. Generic school contact materials can be found in Appendix C: Recruitment materials.

Students took home a packet with a letter to parents. The packet included an overview of the study, times when they could participate (typically within a week or two of packet distribution) and answers to frequently-asked questions. Packets also included instructions for completing the online survey, each with a unique ID. Lastly parents received a letter explaining that they would be contacted by telephone for their consent and would be asked to answer a five-minute survey. Typically students supplied their home phone numbers when they received their recruitment packet. In general, recruitment advertising included a brief description of the research partners, a statement acknowledging the support of the Canada Millennium Scholarship Foundation, the time commitment involved, participation times available, the show-up fee, the potential to earn additional income and assurance of confidentiality and privacy. A set of student recruitment materials can be found in Appendix C: Recruitment materials.

## **STUDENT SURVEY**

At least a week before the experimental session at school, students were given a unique identifying number to complete an online survey. At the end of the survey, each student could select the session to which they were to participate. Sometimes it was as easy as identifying their math class and teacher. Each evening the web survey participation and partial schedules were downloaded by the field crew so they could plan the upcoming weeks, increase recruitment and trouble shoot in general.

## **PARENTAL SURVEY**

Parents were contacted by telephone through a telephone survey company, EKOS. School sign-up sheets were transmitted to EKOS from the schools. These included student name and parental phone numbers. They requested consent and conducted a very short survey. The results of this work were uploaded each evening.

## **SCHEDULING EXPERIMENTAL SESSIONS**

Upon study approval, experiment staff were granted access to the high schools and cooperated with student services staff to recruit and schedule senior students. Where possible, the field team made reminder e-mails or phone calls to encourage high levels of attendance at the sessions. Sessions were also scheduled during school hours, after school, during lunchtime, and split over two days. Participation times were recorded and if a student volunteered for the study outside of normal class time, this was controlled for in the regression analysis. This variable never correlated with any behaviours of interest.

Participants signed up for their session at the end of their web survey. Survey participation and parental consent were required to participate in the experimental session.

## EXPERIMENTAL PROTOCOL

The experimental sessions were held in controlled environments including classrooms, libraries, career counselling rooms, activity rooms and auditoriums. All sessions were held on the campus where the student attended classes. As the demand for different session times in different locations varied, a total of 75 sessions were conducted with 50 as the maximum number of participants in any session.

For showing up on time, each participant received \$20. This fee guaranteed that they would not leave the experiment empty-handed and allowed the experimenters to show the participants that they keep their word in terms of making promised payments. It also helped the participant to feel committed to finishing the experiment, and, most importantly, encouraged the participants to show up on time.

Upon arrival, the experimenter greeted participants. This greeting reminded participants that all information collected would be kept confidential and used for research purposes only. All participants received an identification number to protect their confidentiality. Participants were also reminded that this was a volunteer study, one that required their consent (Participant consent was obtained prior to filling out the web survey). The receipt form at the conclusion of the session included a provision to authorize for confidential follow-up at a later, undetermined date. If they indicated that they would be available for follow-up research they were asked to include their name and address. Follow-up contacts could include surveys and verifications of subsequent actions by participants.<sup>9</sup>

During the introduction to the experiment, participants were told that they could earn substantially more than their show-up fee by completing *three* parts of the study. They had already completed one before they came to the experimental session, the web survey. The in- school session included the two remaining tasks: a set of real decisions about financial aid and the life skills assessment (numeracy).

The experimenter provided participants with appropriate details of the compensation available. This compensation included opportunities to receive both cash rewards (in the form of a check) and non-cash rewards in the form of educational financing. All participants were provided with the following information regarding the educational financing:

*Grants* — Educational grants will be disbursed if a participant enrolls in an institution for learning or training *full time* within two years from the date of experiment participation. The grant will cover direct and indirect costs related to the learning activity. For tuition fees, payments will be made directly to the education institution. Receipts will be required for the reimbursement of other costs.

*Loans* — Educational loans will be disbursed if a participant enrolls in an institution for learning or training *full time*. These loans will be available up to two years from the date of the experiment. The loans are repayable upon the

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<sup>9</sup> For instance, if in the future there is interest in finding out how many grant, loans, or saving incentives recipients actually completed education or training courses successfully, it would be possible to contact individuals to collect that information. It would also be possible to find out the reasons and barriers that prevented the recipients of the financial assistance from completing their studies or from paying back their loans.

completion of the study or if the participant drops out of the program of study. The interest rate floats and is set at the prime rate plus 2.5%.

*ICR loans* — ICR educational loans were described as identical to the “loans” described above with the additional feature that repayment can be suspended, but not forgiven, if the income of the participant falls. If the income contingency option is instituted and repayment is suspended, interest will continue to accumulate.

Participants were advised that all types of support must be for direct or indirect expenses related to a program of study at an authorized institution. The financial support would only be awarded if the participant, not a family member or friend, enrolled during the two years following the experimental session. Additionally, any financial aid received through this study could not be disbursed to pay for past educational investments.

To familiarize participants with the experimental decisions, 22 practice examples, one for each kind of experimental decision, were given to the participants before they began completing any of the real decisions. It was essential that they understood the nature of the decisions and how payment would be made. This practice was conducted with a lot of one-on-one help. The field crew was made up of three to five people on hand to ensure that all participants got the attention they needed to complete the practice decisions and the actual choices during the experiment.

In completing the actual choices, participants made a decision for each choice and, after *all* decisions were made, one decision was selected at random for each participant and the participant received the payoff corresponding to the choice made for the selected decision. For instance, if a participant chose (B) in a decision between (A) \$100 cash or (B) \$1,000 grant and that choice was randomly selected, the participant would be eligible for a \$1,000 grant for education or training. Participants used a bingo ball cage where each decision number was matched with one corresponding numbered ping pong ball to randomly select the decision they would be paid for. Each decision had an equal probability of being selected, making decisions independent of each other.

The experimental decisions were checked by the study staff while participants completed their numeracy assessments. Where necessary, participants were informed of missed decisions or illegible answers so that they could answer all decisions prior to the random selection process. This process of checking was instituted primarily to ensure that all experimental decisions were answered and to prevent the possibility of randomly selecting a decision for compensation where no choice had, in fact, been made.

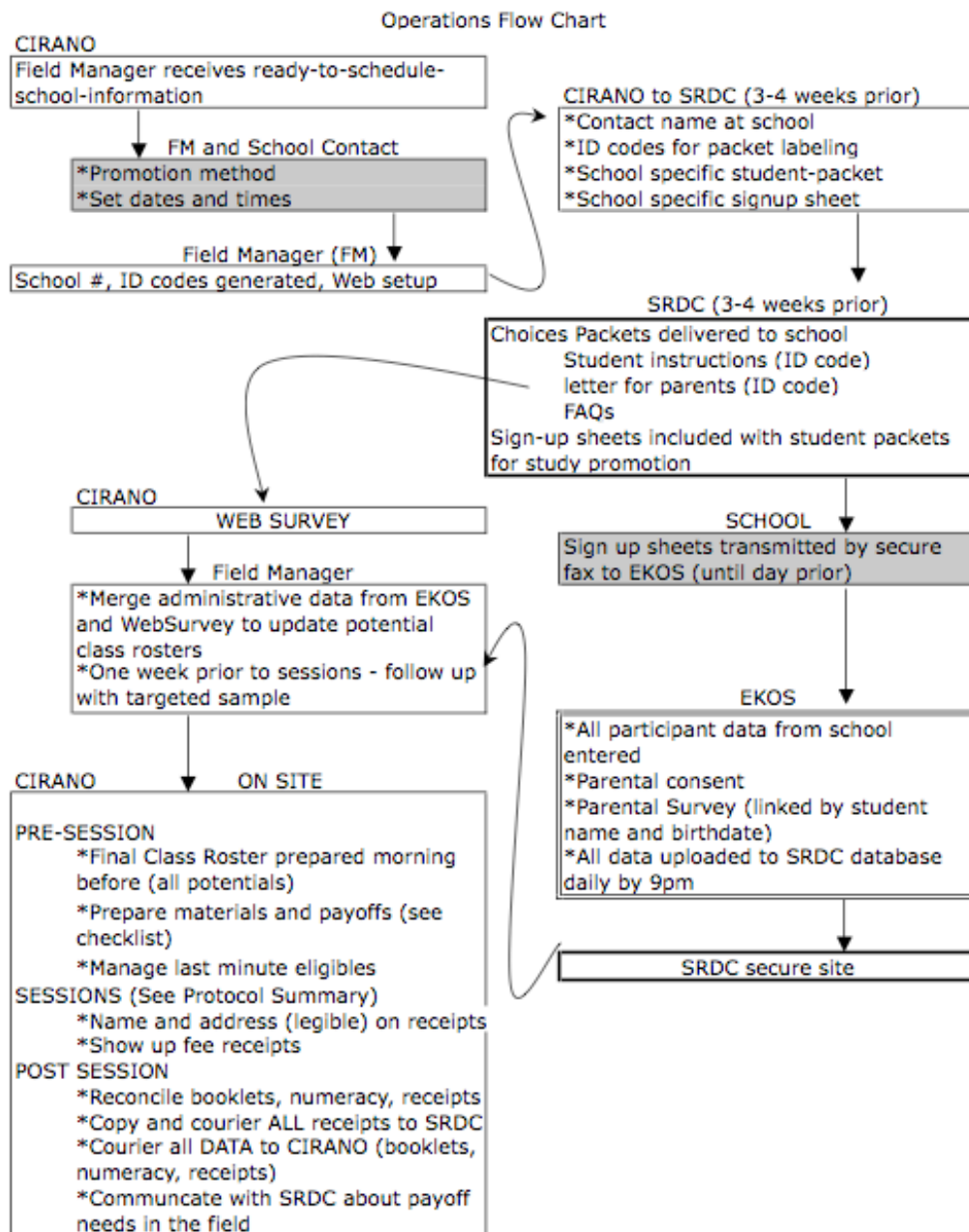
After both instruments were completed, the participants met in private with the experimenter in order to be paid for his or her randomly selected decision from the experimental decisions. Appendix A includes a copy of the experimental decisions and Appendix B includes a copy of the participant questionnaire. Statistics Canada provided the numeracy assessment.

The overall experience for each participant was scheduled to take two hours. Some participants finished in as little as 1 hour 40 minutes, others took up to three hours to complete both parts. Approximately 20 minutes was scheduled for participant check-in, 35 minutes was scheduled for instruction, 15 minutes for the experimental decisions, 40 minutes for the numeracy assessment. Time was needed at the end of the session to

pay individually each participant. Although the numeracy assessment was estimated to take 30 minutes to complete, explicit instructions were provided to the experiment delivery team that participants should not be rushed to finish the experiment within the two hours scheduled. In practice however, the numeracy assessment took far more than 30 minutes to complete for a majority of the participants. Therefore, some participants took up to three hours to complete the experimental choices and the numeracy assessment.

Figure 3.1 below shows the operation flow chart of the field work.

**Figure 3.1**

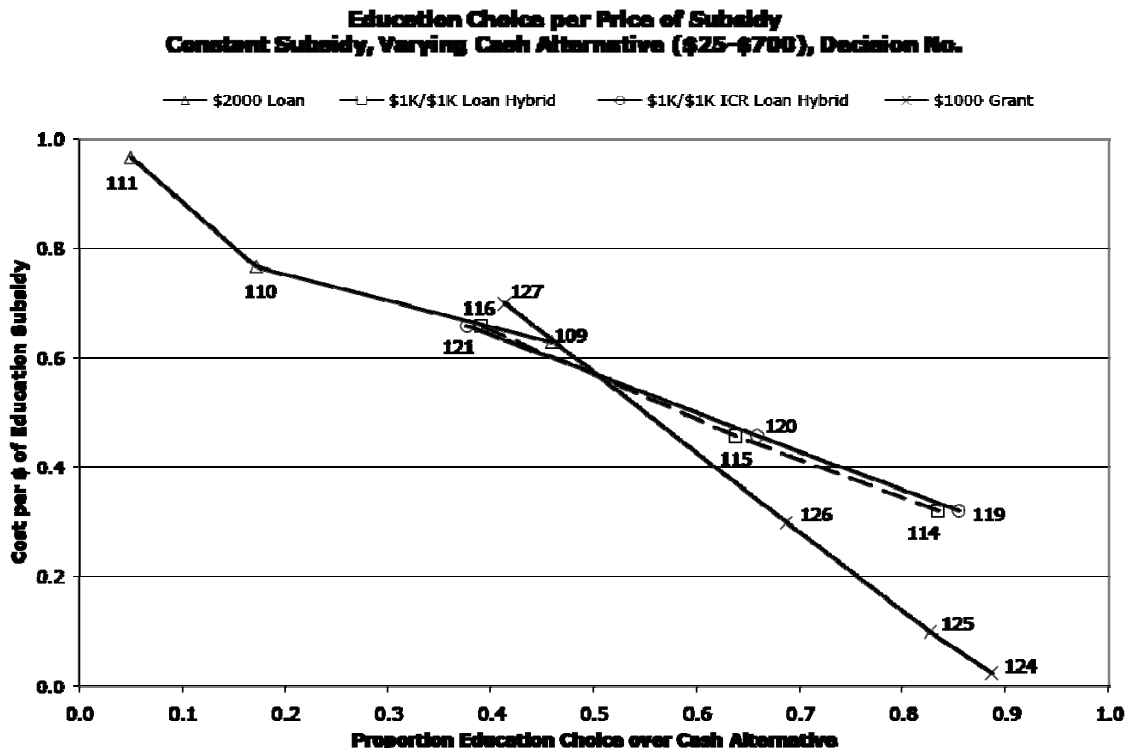


## IV. Investigating the Demand for Educational Subsidies

This section of the report takes a first look at the experimental choices made by subjects on the types of financial aid offered. We begin simply by observing the impact of the design parameters -- cost per dollar of educational subsidy and type of subsidy -- on the number of students accepting educational subsidies. Using the costs per dollar of financial subsidy derived earlier and presented in Table 2.1, we can depict demand curves for financial aid by type of subsidies. In subsequent sections, we will investigate the determinants of this demand through multi-regression analysis. For now, we limit the discussion to a mere description of the relationships between price and demand for different sub-groups and categories of subjects.

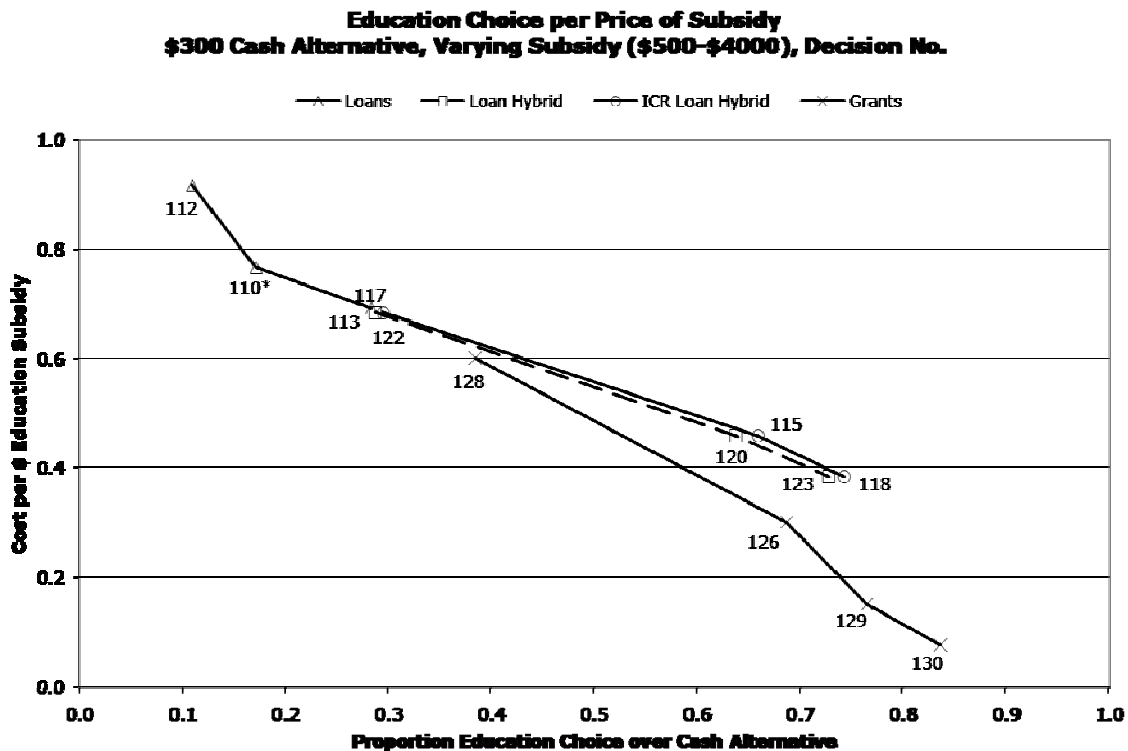
Figure 4.1 depict the demand curve for financial aid resulting from the choices made by all participants to the experiment, with the proportion of respondents that chose education over a cash alternative by type of subsidy on the horizontal axis, and the cost per dollar of education subsidy, or the price of the subsidy, on the vertical axis. The set of choices presented here reflects a constant subsidy amount and allow the cash alternative to vary. For instance, starting at the left most point, 5.1 per cent of participants chose the option of a \$2000 loan for PSE over a \$700 cash alternative, 17.2 per cent chose a \$2000 loan over a \$300 cash alternative and 45.8 per cent chose a \$2000 loan over a \$25 cash alternative, at respective prices of \$0.97, \$0.77, and \$0.63 per dollar of loan subsidy. The decision numbers are noted in the graph for ease of comparison with decision characteristics and reported take-up proportions found in Table 2.1.

Figure 4.1



We combine nine other decisions and four decisions used above to illustrate another demand curve over the same price range. This time instead of allowing the cash alternative to vary, Figure 4.2 used a collection of decisions where the cash alternative is kept constant at \$300, but the amount of subsidy offered vary. Figures 4.1 and 4.2 are plainly consistent with one another. Both figures show clearly that the price of the subsidy matters to participants. Both figures show downward sloping demand curves indicating that participants were mindful of the relative values of the different subsidies they were offered. Furthermore, each segment of these demand curves, representing different forms of subsidies, is also downward sloping.

Figure 4.2



Whether or not the type of educational subsidy matters is to be investigated more thoroughly in the analysis section. But for now, we can observe that demand for grants seems to lie slightly lower than offers of very low-priced loans (half loan and half grant subsidies). One would expect the opposite, as one would think a priori that, for a same price, grants would be more attractive than any types of financial aid including loans. As well, the addition of a set of decisions allowing for repayment of loans to be based on the ability to repay (ICR Loan Hybrid), seems to have a negligible impact on overall demand.

We now turn to representations of the demand for financial aid by sub-groups and individual characteristics to flesh out some more basic observations. Given that both representations of the demand for financial aid are strikingly similar whether we keep the cash alternative constant (Figure 4.2) or the amount of subsidy constant (Figure 4.1), we will present the next set of descriptive results using one of these representations only.



# THE IMPACT BY POPULATION SUB-GROUP

The study was conducted in four provinces. Figure 4.3 presents graphs of the demand for educational financing by province: Manitoba, Quebec, Ontario and Saskatchewan. The difference between Saskatchewan and other provinces is quite notable. However, recall that this study did not have the luxury of gathering representative samples. Saskatchewan, by design, included a sizable rural population and First Nations population, which could explain why the demand for education appears much lower in this province.

Figure 4.3: Educational Subsidy Demand by Province

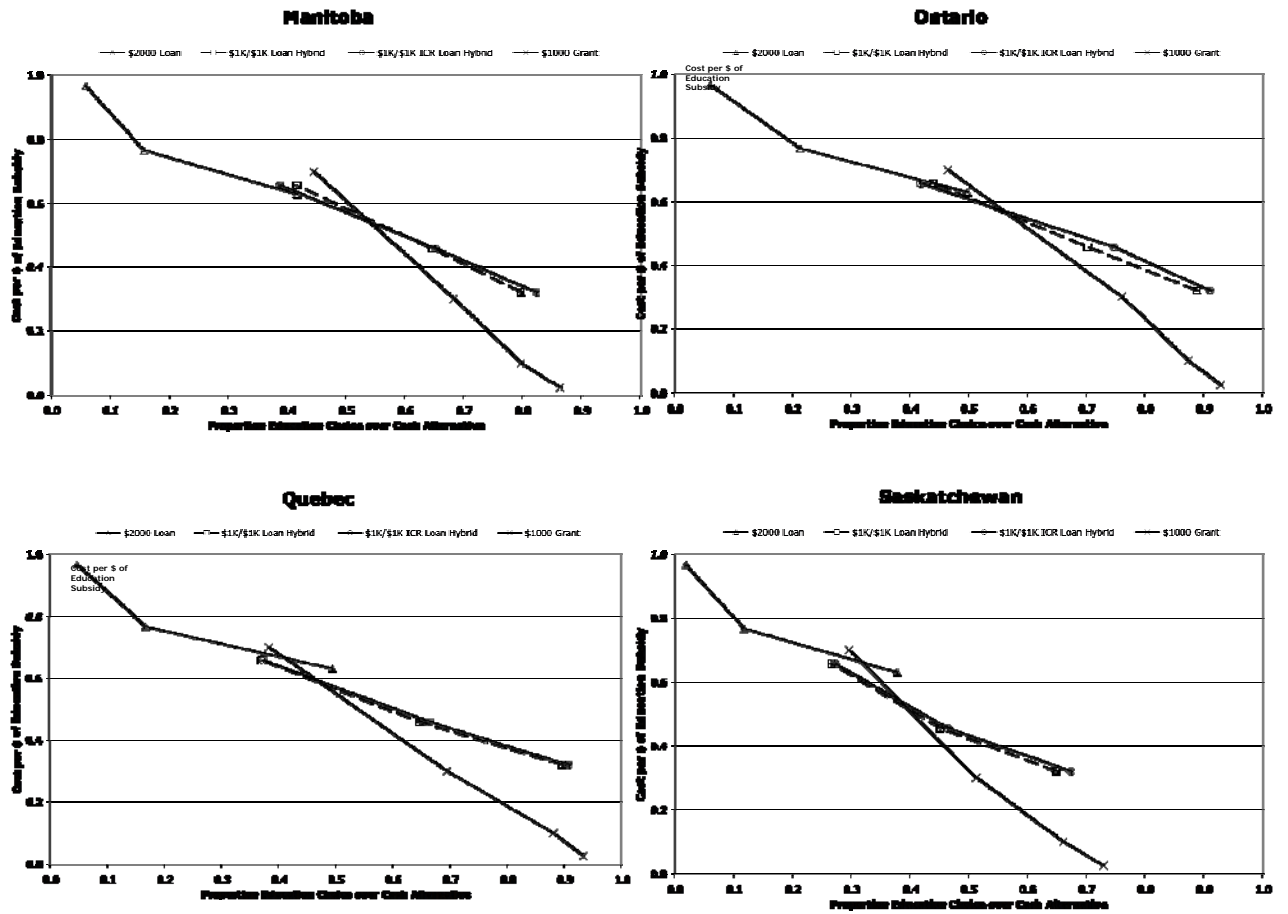
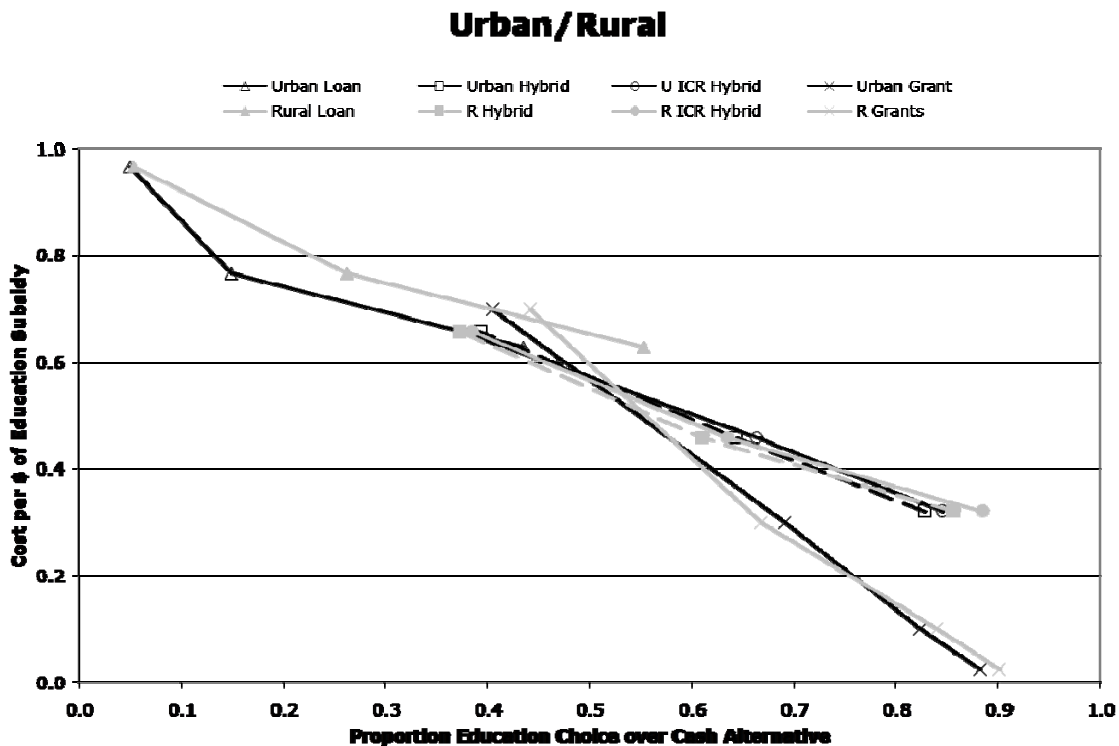


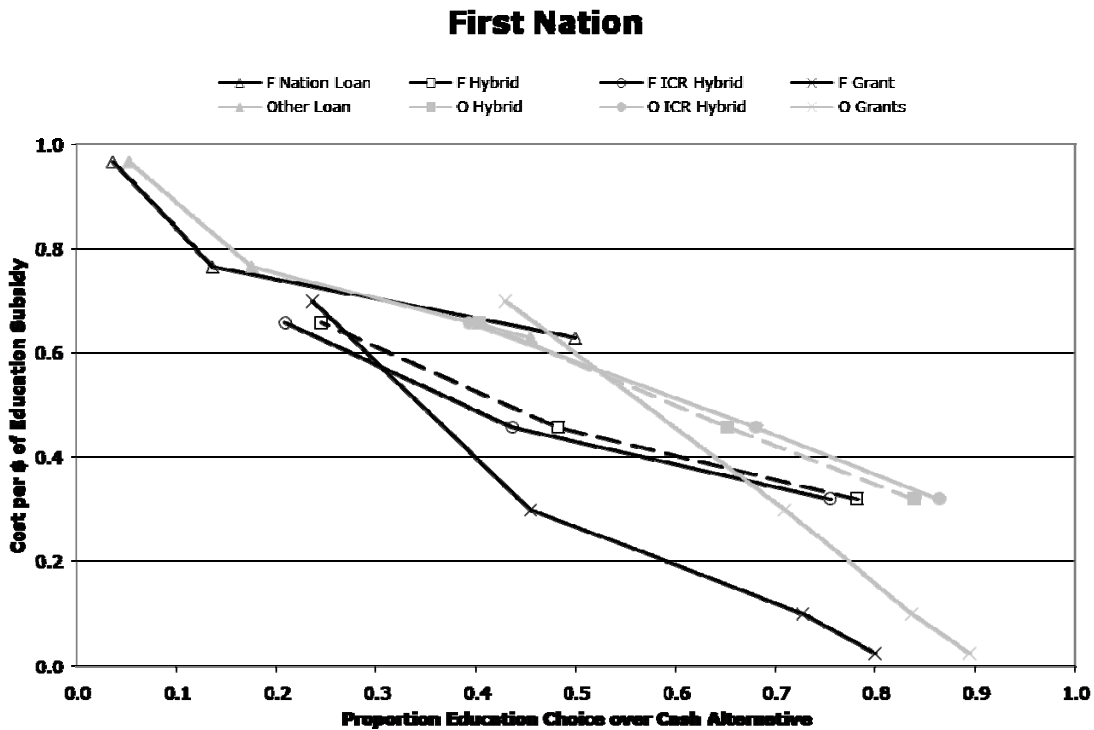
Figure 4.4 summarizes the demand for educational subsidies when the sample is split into rural and urban participants. The dark lines represent the demand by urban participants and the lighter gray lines represent the demand by rural participants. Urban participants are defined as those who live within 40 km of a university and rural participants are classified as those who live more than 40 km away from a university. There is hardly any difference in these respondents with respect to their behaviour for grants and low-priced loans (half grants and half loans). But there does seem to be a larger willingness to pay for loans on the part of rural respondents.

**Figure 4.4 Educational Subsidy Demand by Geographical Proximity to a University**



Both parents and students were asked if they identified themselves as a Treaty Indian, Registered Indian or a member of an Indian Band/First Nation. If students responded yes to this question, they are identified as “First Nation” in Figure 4.5. All those that said no to this question are identified as “Other” and their responses are coded with light gray lines. Those who identified as First Nation have across the board noticeably lower demands for educational financing. This factor alone may account for the lower demand in Saskatchewan.

Figure 4.5: Educational Subsidy Demand by Identifying as First Nation



A small part of the student population (79) in our study identified themselves as arriving in Canada as immigrants. Their responses are represented by the dark line segments in Figure 4.6, with the responses of their counterparts, labelled as “other”, being represented by gray line segments. A substantially higher proportion of immigrant students took the cheapest regular loan (Decision number 109: \$2000 loan, \$25 cash alternative) and just about every other type of financing. However, immigrant students as a whole did not take more of the most expensive grant (Decision number 127: \$1000 grant, \$700 cash alternative). A whopping 90 per cent of immigrant students took the subsidy options at low prices (\$0.10) and lowering the price further (\$0.025) did not seem to induce any more take up.

Figure 4.7 indicates that coming from a family with a single parent, whether male or female, may have a negative impact on the demand for PSE. Note the separation of the dashed (non-ICR) and solid (ICR) Hybrid line segments. For this first time, we notice that a subgroup is sensitive to the Income Contingent Repayment subsidy. Children from families with more than one parent do not seem to be sensitive to income contingent repayment.

Figure 4.6: Educational Subsidy Demand by Immigrant Status

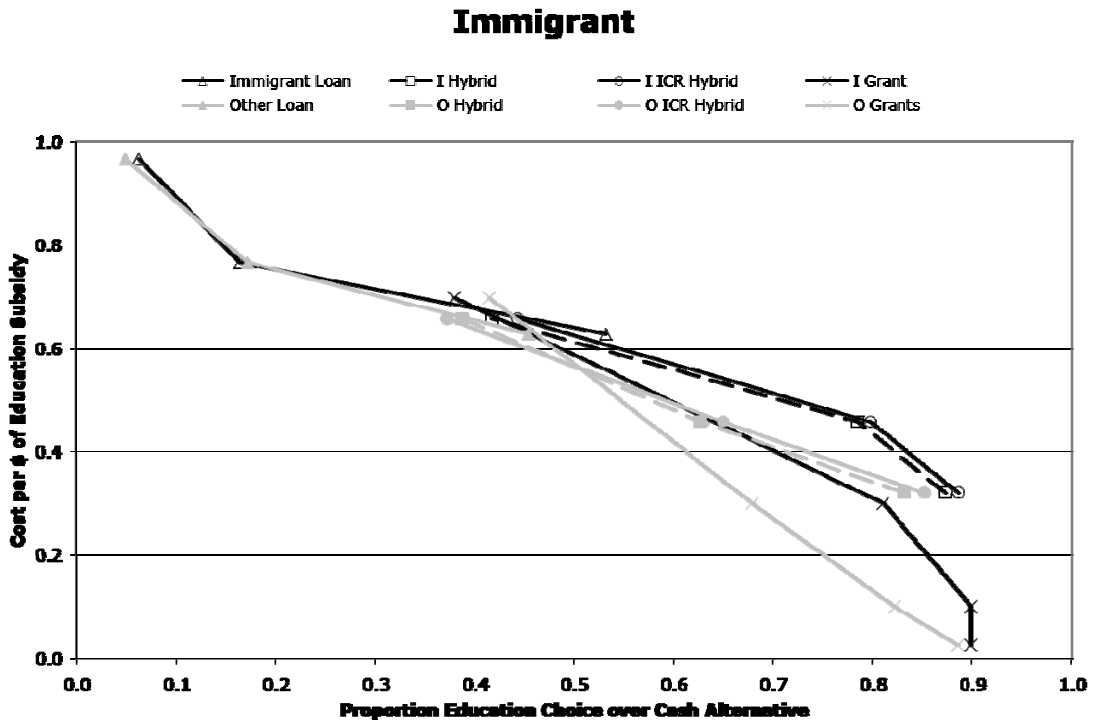
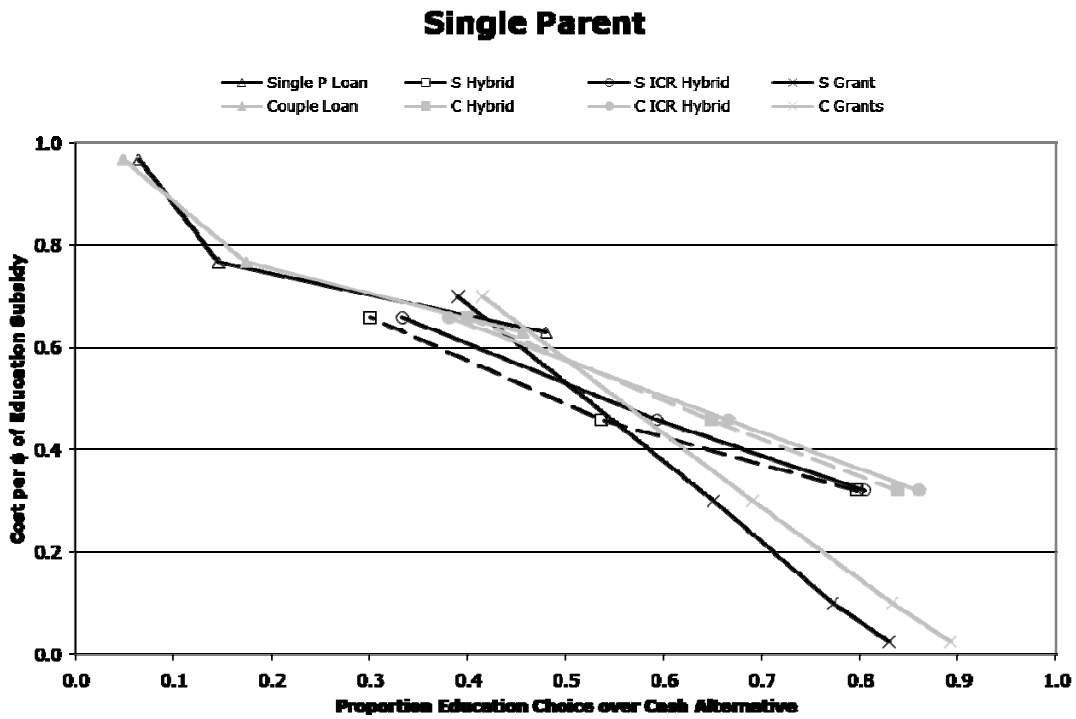
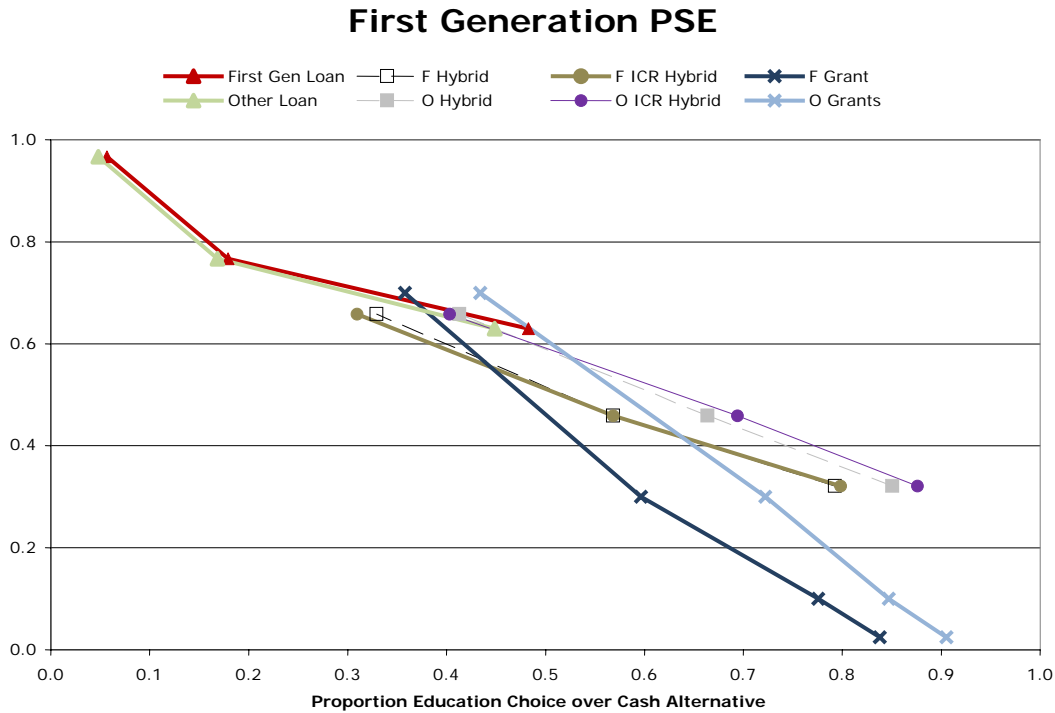


Figure 4.7: Educational Subsidy Demand by Children of Single Parents



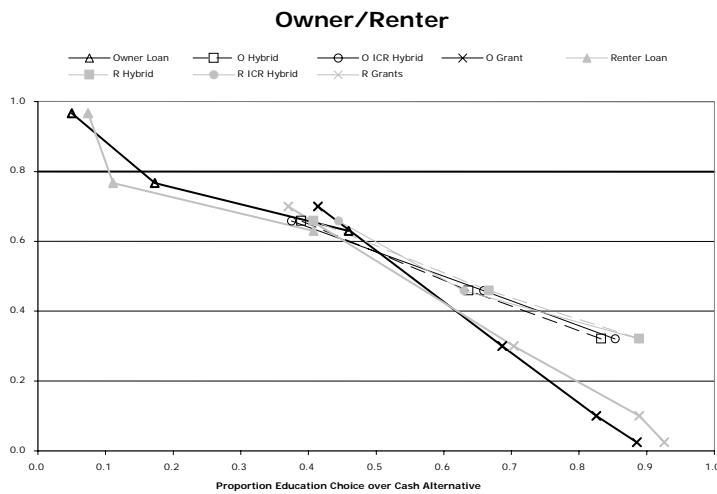
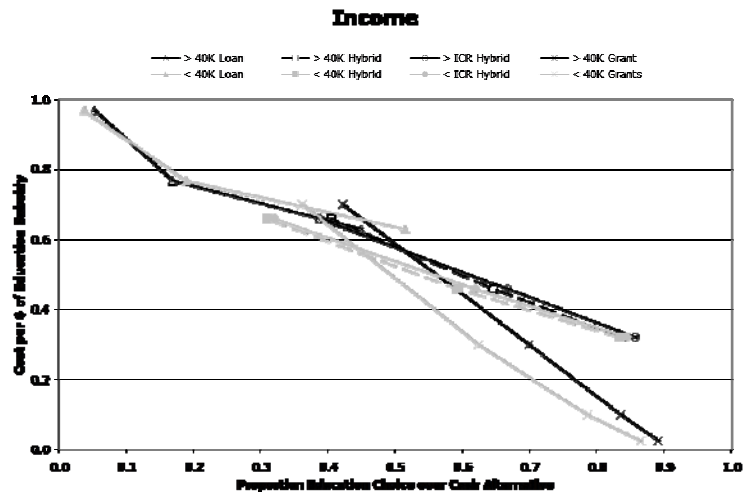
210 or 16.8 per cent of participants came from households with no PSE experience. Figure 4.8 summarizes the demand for this population subgroup with the black lines and the subpopulation with PSE experience with the gray lines. The First Generation PSE sub-sample seems to be demanding much less education at prices less than \$0.65 per dollar of educational financing as compared with their counterparts.

**Figure 4.8: Educational Subsidy Demand by First in Family to go to PSE**



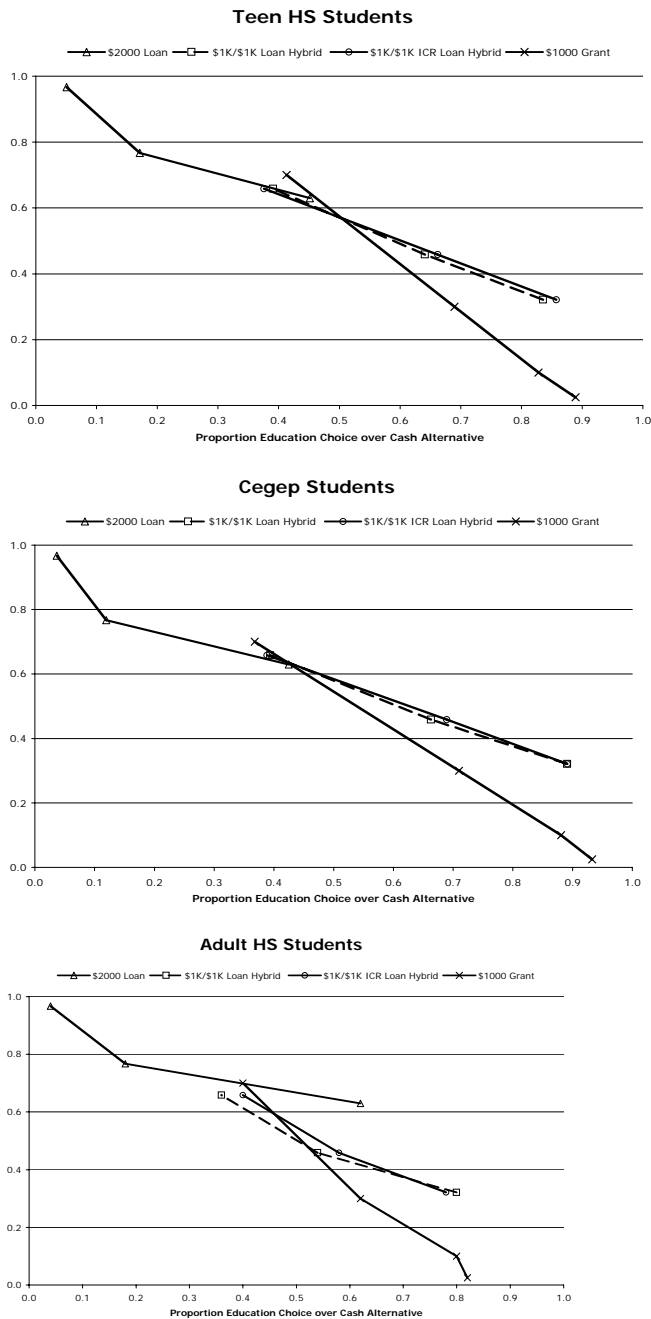
Both parents and students were queried on household income levels. Upon examining the data, the parental data was deemed more reliable for this variable. One Quebec school district refused to allow specific income questions, so a question was posed to parents on home ownership as a proxy for income. Figure 4.9 summarizes the responses of these subpopulations of students. The first graph compares those with household incomes above \$40,000 to those with lesser income. Here the demand for educational financing is similar at high prices and diverges at lower prices. However, for some ranges in price, there is indication that the poor are *more willing to borrow* to pursue PSE. When comparing those students whose parents responded that they own their own home with those that rent, the picture is different. The children of renters exhibit a mostly lower demand at high prices, or less willingness to borrow, and higher demand at lower prices.

Figure 4.9: Educational Subsidy Demand by Income



The last comparison to make among sub-group populations is that of the student population in which the experiment was conducted. The primary target of the implementation was typical teenaged high school students during their last year of school, 12<sup>th</sup> year of schooling for Canada at large and 11<sup>th</sup> year of schooling for Quebec. To capture similarly-aged youth in Quebec, a sample of 1<sup>st</sup> year CEGEP students were recruited. And lastly, our sample included adult students who had returned to high school to complete their diploma. This sub-sample included 107 students. The three graphs in Figure 4.10 summarize the demand generated by each of these sub-samples. Two observations are worth making here. Firstly, the demand in the lower price ranges is remarkably similar between the three groups. Secondly, the adults have a remarkably higher demand for expensive loans, with approximately a 50% greater demand for regular loans at the price of \$0.63 per dollar of subsidy.

**Figure 4.10: Educational Subsidy Demand by Student Population**



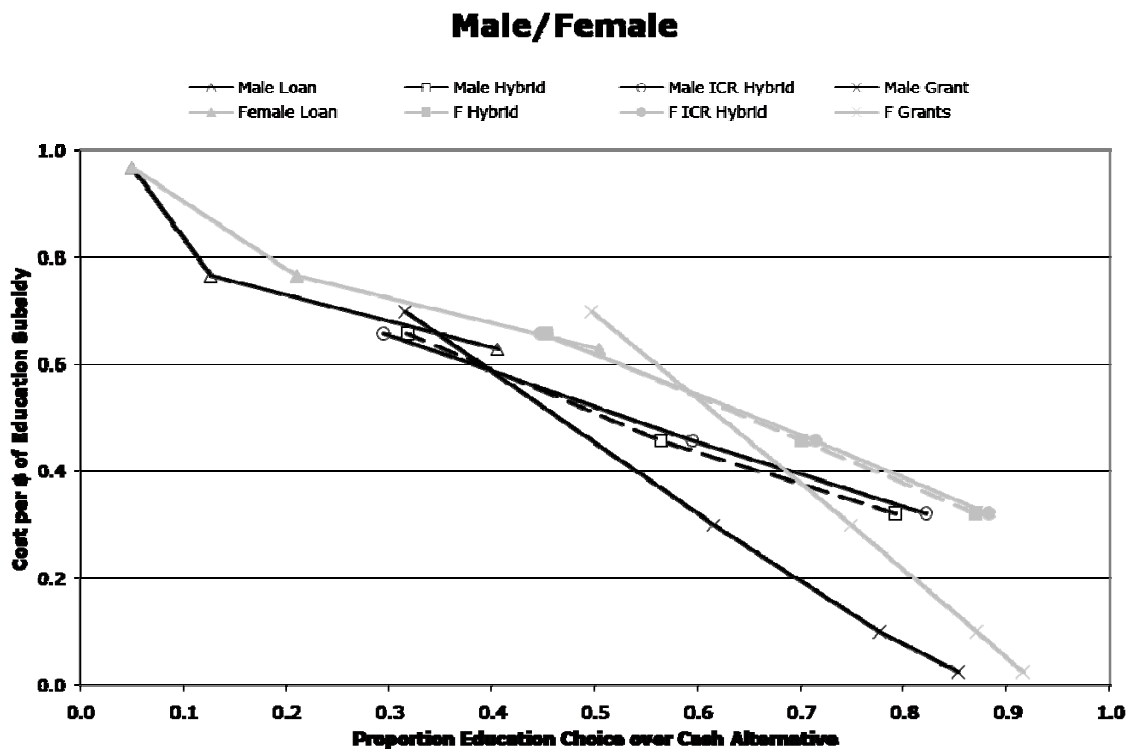
In summary, many of the traditional groups usually known for lower participation in PSE show evidence of such lower participation in the simple demand curves constructed above. Students from low-income households, from households with no PSE experience, from Indian Band/First Nation populations, all exhibit, to some extent, lower willingness to invest in PSE than the general population. Students from rural areas and Immigrant families do not exhibit these tendencies. The next part of this section examines how personal characteristics interact with the decision to invest.

## THE IMPACT OF INDIVIDUAL CHARACTERISTICS, BEHAVIOURS AND ATTITUDES

This study affords a rich array of data by which to categorize participants. The next 14 figures highlight some of the basic relationships found in that data, starting with basic individual differences and ending with more subtle attitudes and behaviours.

Men and women respondents averaged the same response rate on one decision only – the most expensive loan. They tie at approximately five per cent of the population choosing the \$2000 loan over the \$700 cash alternative. (Upper left point on Figure 4.11.) At every other price, women express a much higher demand for student aid, and indirectly for PSE, than their male counterparts.

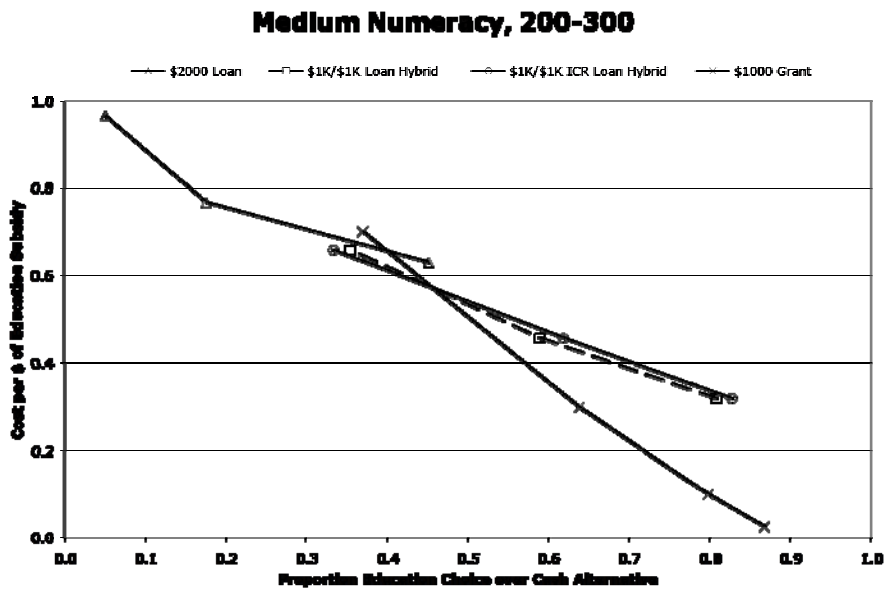
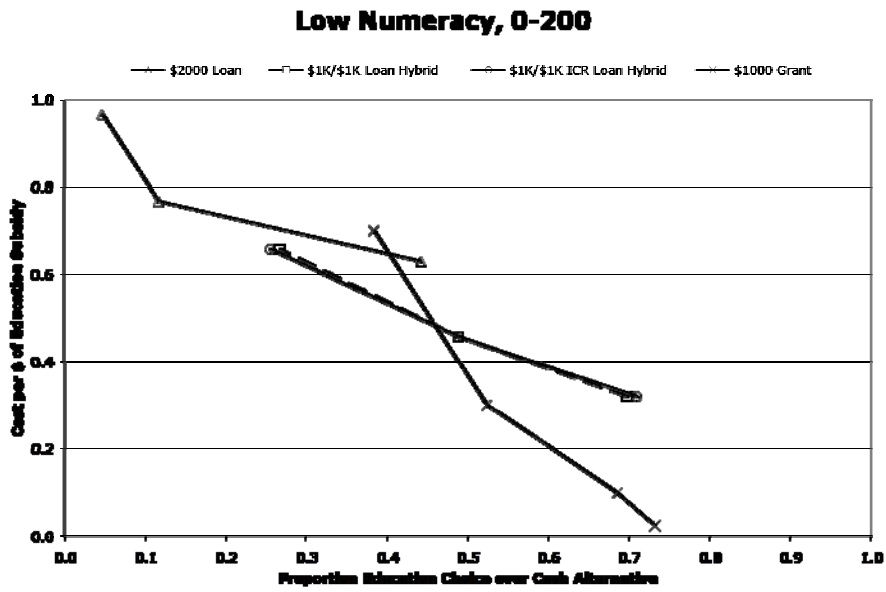
Figure 4.11: Educational Subsidy Demand by Gender



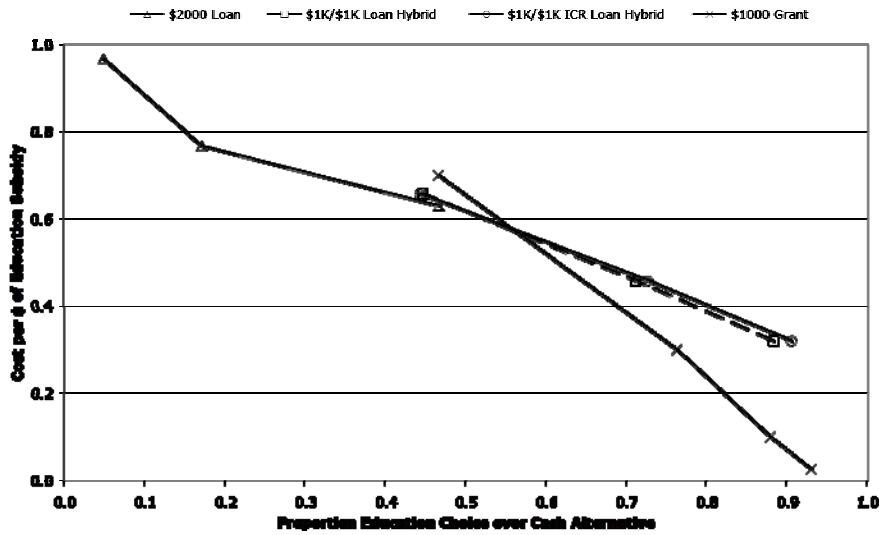
All participants completed a numeracy assessment. In general, participants completed as much of the test as they could, given their skill level. As a reminder, numeracy is a combination of ability and skill level, not an intelligence test. Numeracy can be learned. The numeracy assessment was normalized to the Canadian population and each participant was awarded a score between 0 and 500. This score was used in the regressions that will be discussed in the next sections. For a cursory look at the relationship between the demand for education and a subject's numeracy skills, we subdivided the population into four groups: 0-200, 200-300, 300-400 and 400-500. Over ninety per cent of the participants fall into the two middle categories. Participants with a score over 300 can be thought of as PSE ready.



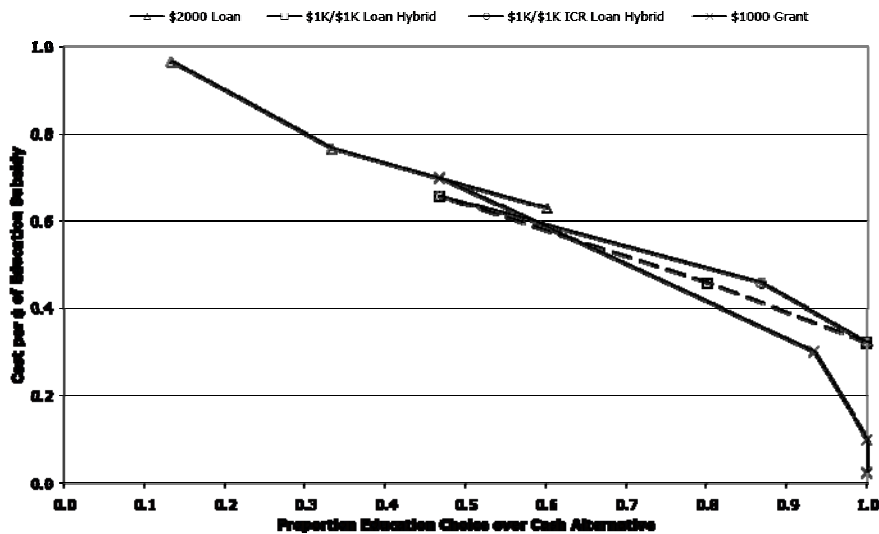
Figure 4.12: Educational Subsidy Demand by Numerate Skill Level



### Medium High Numeracy, 300-400



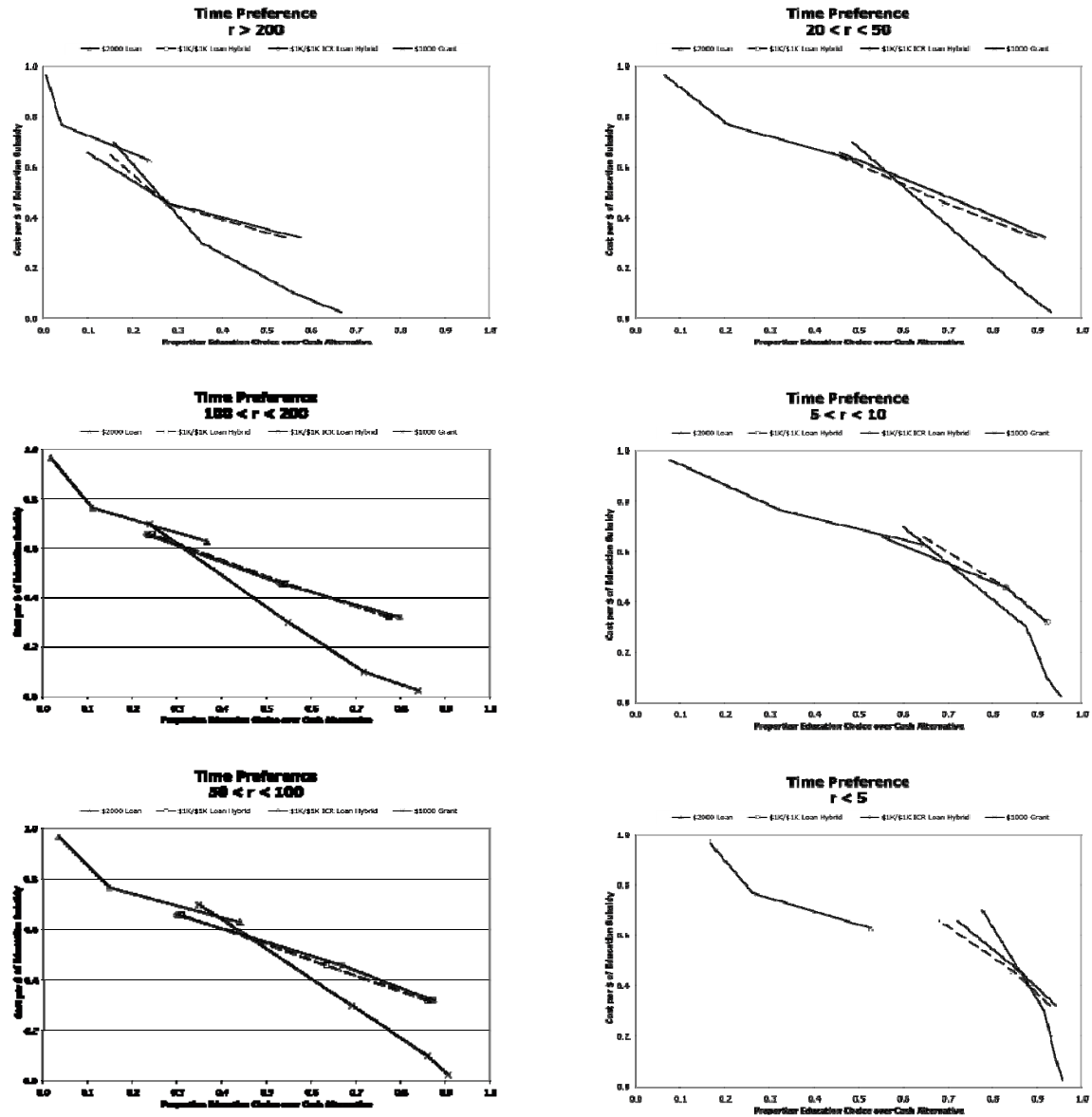
### High Numeracy, 400-500



Clearly, as numeracy increases, so does the demand for financial aid to pursue PSE. The positive relationship between numerate ability and willingness to pursue PSE is only dwarfed by the relationship between willingness to save and willingness to pursue PSE (Figure 4.13). The title on each graph in Figure 4.13 roughly indicates the interest rate at which the participants could be induced to save for one year. The alternative to saving was a smaller cash award (\$75) one week from the date of the experiment (Decisions 31 – 36). The first graph ( $r > 200$ ) summarizes the behaviour of participants who could not be induced to give up \$75 in the following week for a reward of \$225 one year in the future. Behaviour summarized in the immediate graph below the first graph ( $100 < r < 200$ ) is that of participants who saved one time, when offered an interest rate of between 100 and 200 per cent. The graphs are presented in order of increasing patience with the last graph summarizing the behaviour of the close to six per cent of the population that

saved at every option. Participants willing to save and to postpone instant gratification are clearly inclined, ceteris paribus, to express a much higher demand for PSE financing and studies.

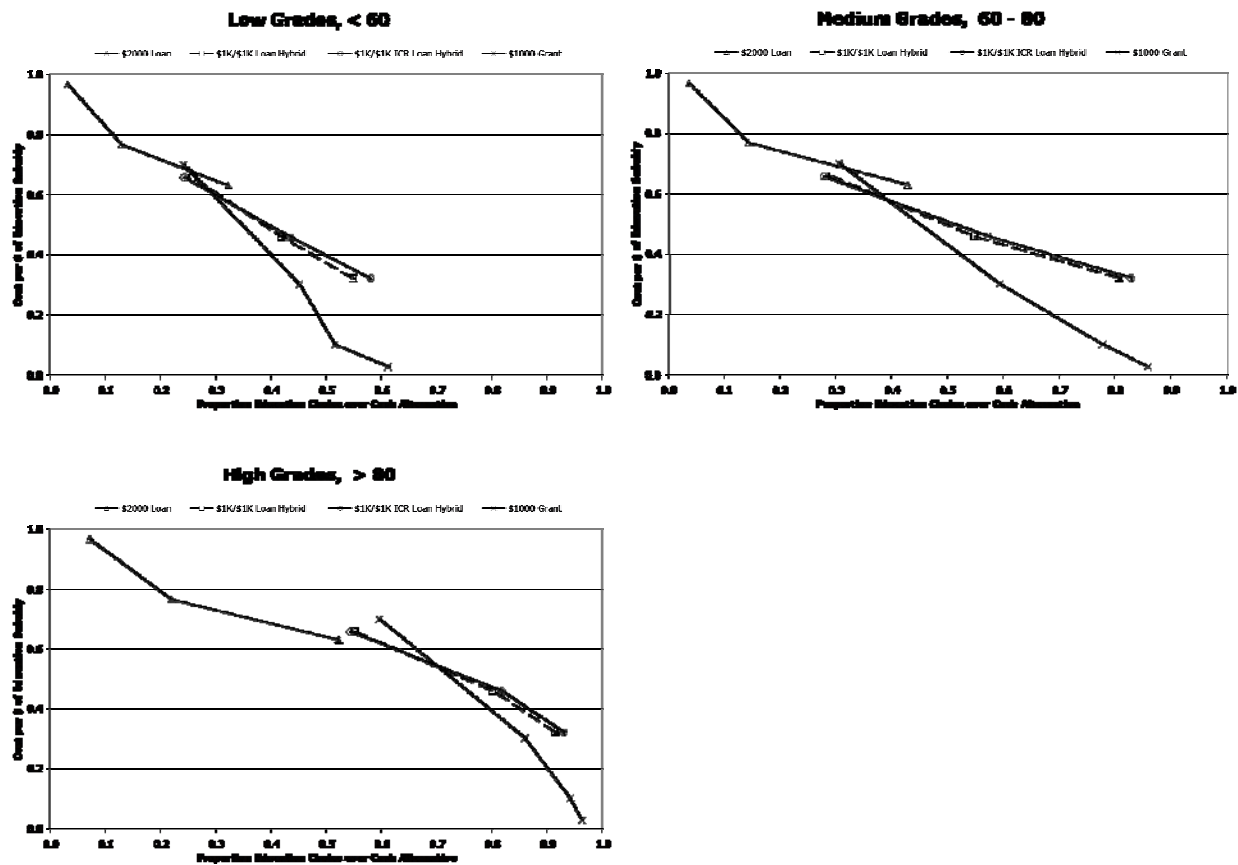
Figure 4.13: Educational Subsidy Demand by Student's Willingness to Save for the Future



The study included several possible measures of attitude towards risk. We found a subtle and positive correlation between risk aversion and demand for PSE, but none of those relationships merited a graphical representation here. We include a measure for risk in the multivariate analysis used in the next sections to see if the relationship holds.

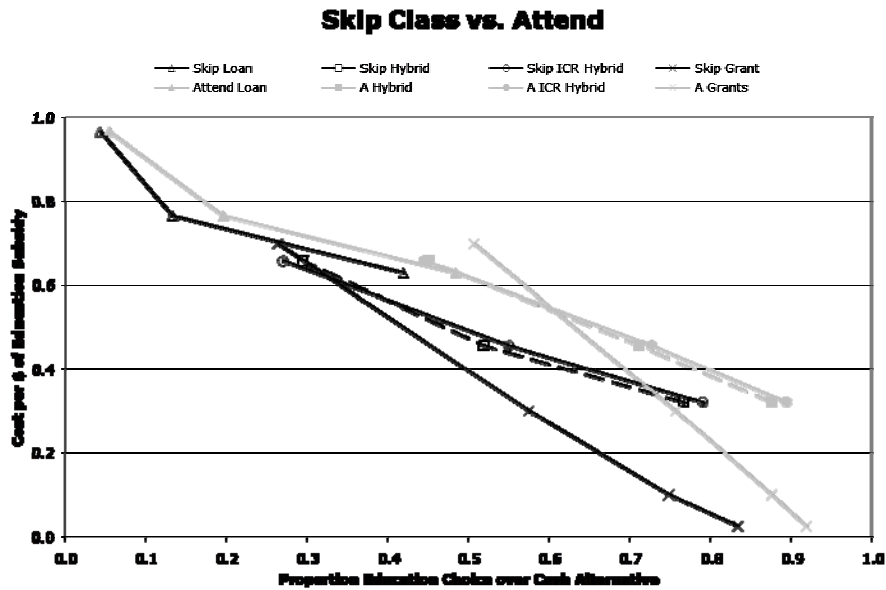
The next three figures, Figures 4.14, 4.15 and 4.16, focus specifically on student behaviour while in high school: grades, attendance and paid work commitment. The positive relationship between grades and the demand for PSE is striking but not surprising. In Figure 4.14, the demand curves seem to walk across the page as we move from low grades, to medium grades and to high grades.

**Figure 4.14: Educational Subsidy Demand by Student's High School Grades**



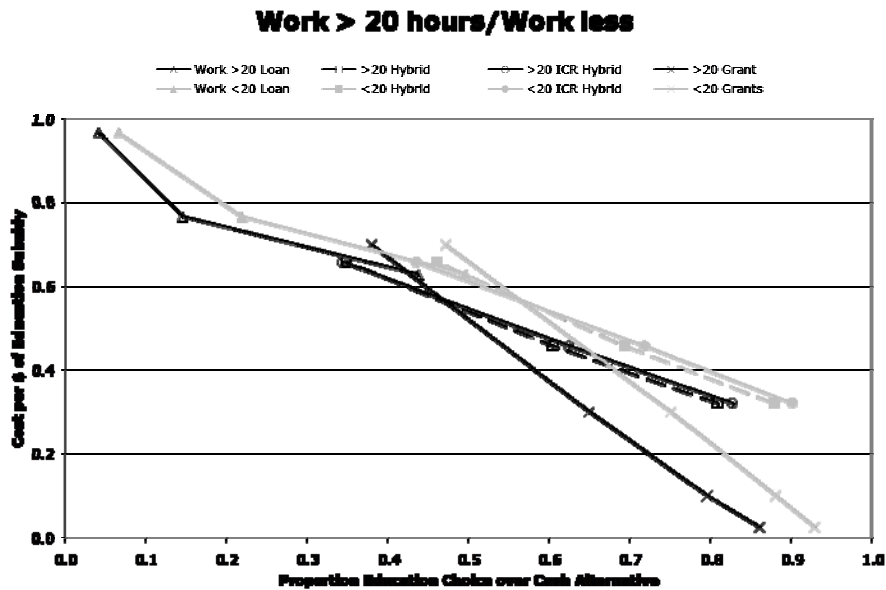
The darker line segments in Figure 4.15 represent the demand for PSE by students who confess to cutting class at least once a month. The 40 per cent of our sample that is often truant consistently chooses less education than their attending counterparts.

Figure 4.15: Educational Subsidy Demand by Student Attendance



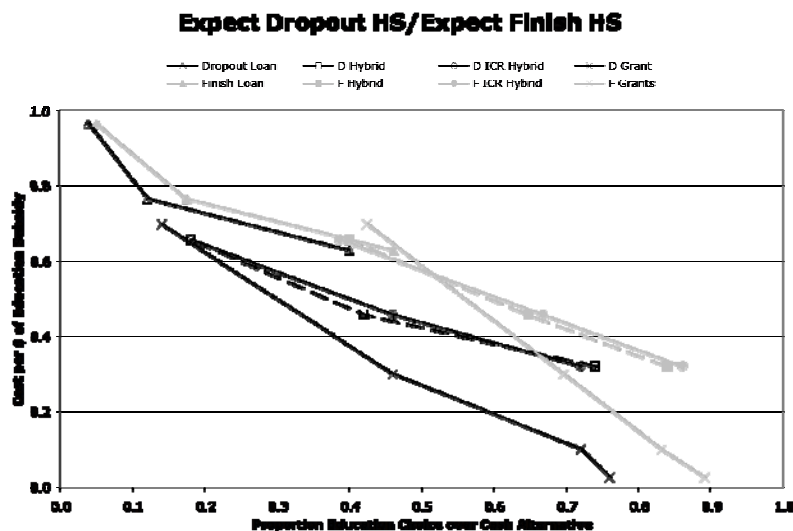
The comparison between students who claim to work more than 20 hours per week and those that do not is dramatic. At every decision, a lesser proportion takes the option of PSE financing.

Figure 4.16: Educational Subsidy Demand by Student's Work Load



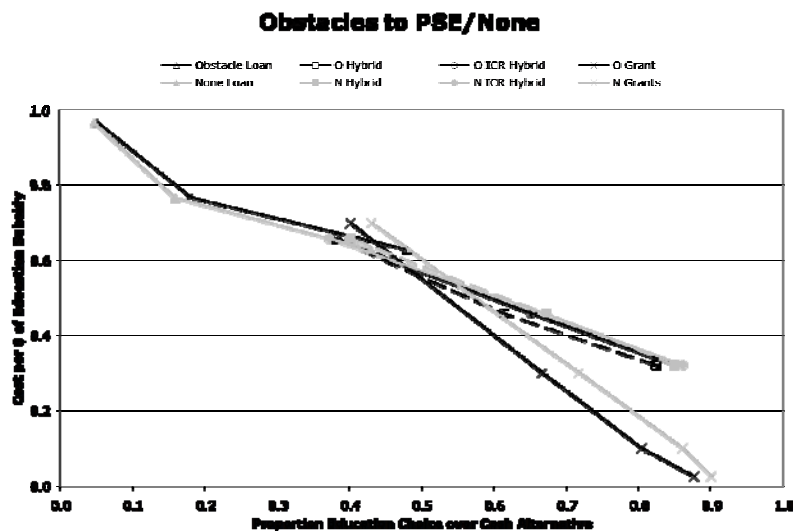
The next four figures summarize some of the most interesting relationships between student attitudes and expectations and the demand for PSE financing. Approximately five per cent of the students in our sample expect to drop out of high school. This expectation manifests itself in a dramatically lower demand for PSE financing.

Figure 4.17: Educational Subsidy Demand by Student’s Expectation to Dropout



Conversely, the 60 per cent of participants who claim they have obstacles to attending PSE are not so different behaviourally from those who say they have no obstacles for accessing PSE (Figure 4.18). The most common obstacles indicated are “financial situation (needs to work/costs too much)”, “not able to get into program/marks too low/not accepted”, “not enough interest or motivation”, and “not sure what to do”. A second tier of responses included “want to stay close to home”, “takes too long”, and “want to work”.

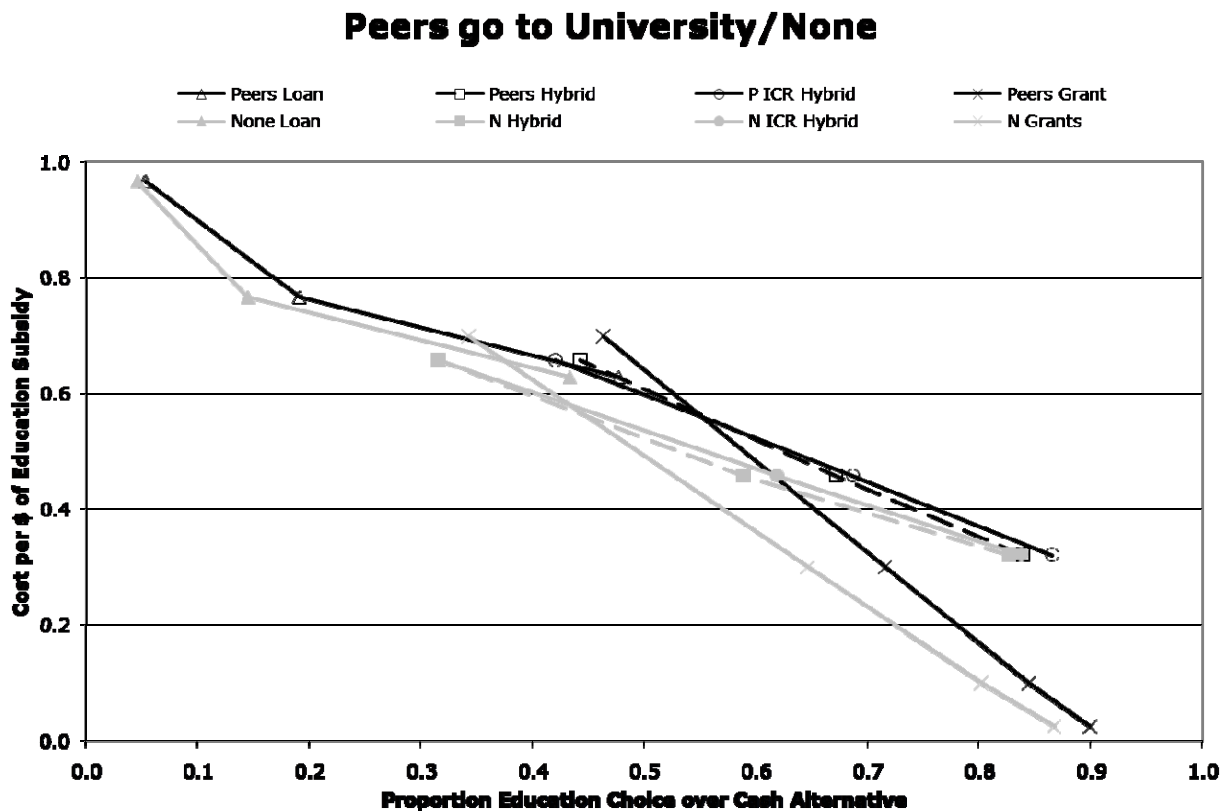
Figure 4.18: Educational Subsidy Demand by Student’s Perception of Obstacles



A number of queries were included in the survey of the form, “People who get a [PSE institution] education will make more money over their lifetime than those who just get a high school education...” and “I’m not sure that a [PSE institution] education would pay off even in the long run, given how costly it is these days...”<sup>10</sup> Subjects were asked to strongly disagree, disagree, uncertain, agree or strongly agree with each of these statements. There was little if no correlation between these statements and demand for PSE financing. An interesting observation among this set of queries is that participants who answer “uncertain” to some of these statements have lower demand for PSE. In general, participants who had opposite views of the investment potential of PSE looked the same, that is, had more demand for PSE than the uncertain participants.

Perhaps more important in predicting behaviour than students’ own perceived obstacles is their perception of what their peers intend to do. Figure 4.19 summarizes the demand for education financing for those who say that most of their peers plan on going to PSE (dark line segments) and those whose peers are not continuing schooling after high school (gray line segments).

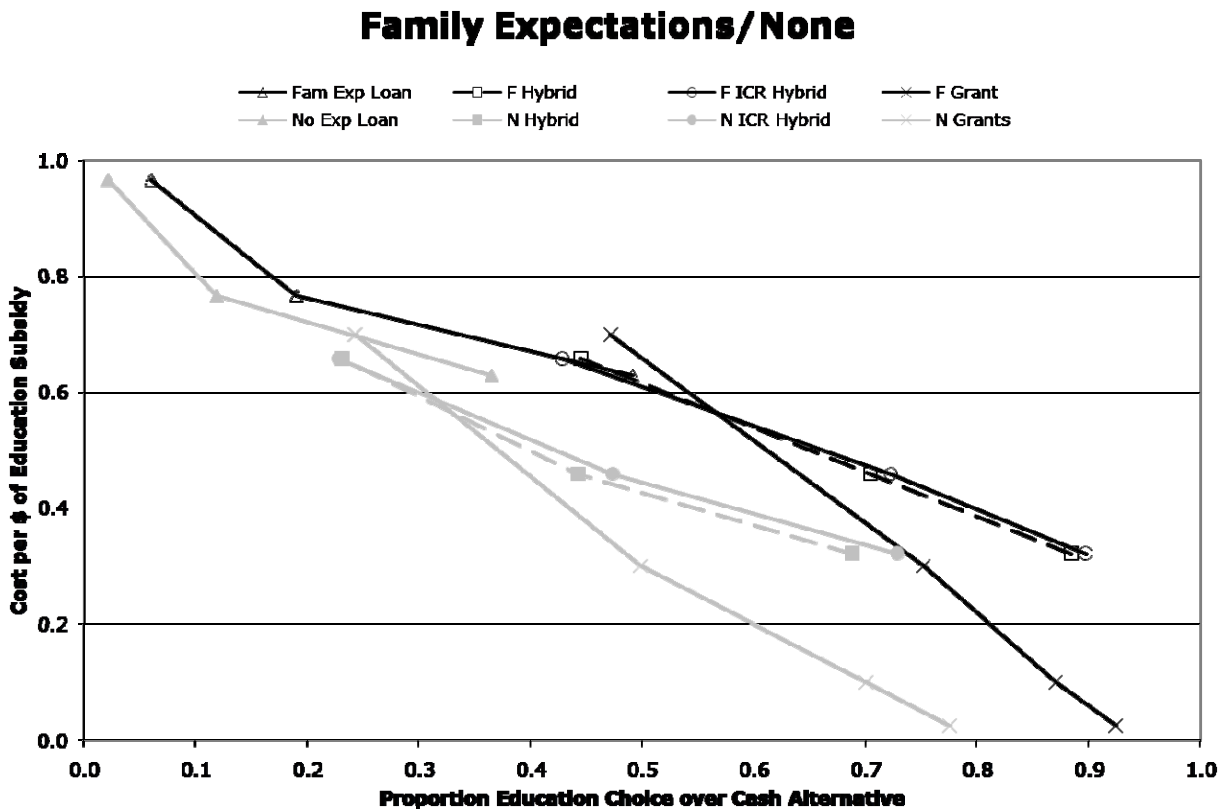
Figure 4.19: Educational Subsidy Demand by Expectation of Peers’ Future Action



<sup>10</sup> Three versions of each statement were made. The first statement always used “community college or CEGEP” as the institution of interest. The second statement referred to “trade/vocational school or registered apprenticeship” and the third statement used “university” as the PSE institution.

The fourth and last figure touching on participants' expectations compares students who believe their family expects them to continue on to PSE and those that do not. There is little correlation between parent expectation and outcome (investment in PSE). For this reason, we investigate the student's perception of family expectations. Indeed, in our sample, nearly all parents surveyed, 92 per cent, expect their child to go on to PSE but only 78 per cent of students believed their family expected them to go on to PSE. When the sample is partitioned with respect to students' beliefs regarding their family expectations, there is a striking separation of behaviour. The dark line segments in Figure 4.20 represent the choices of those students who think their parents expect them to go to PSE. Nowhere do the two demand curves cross.

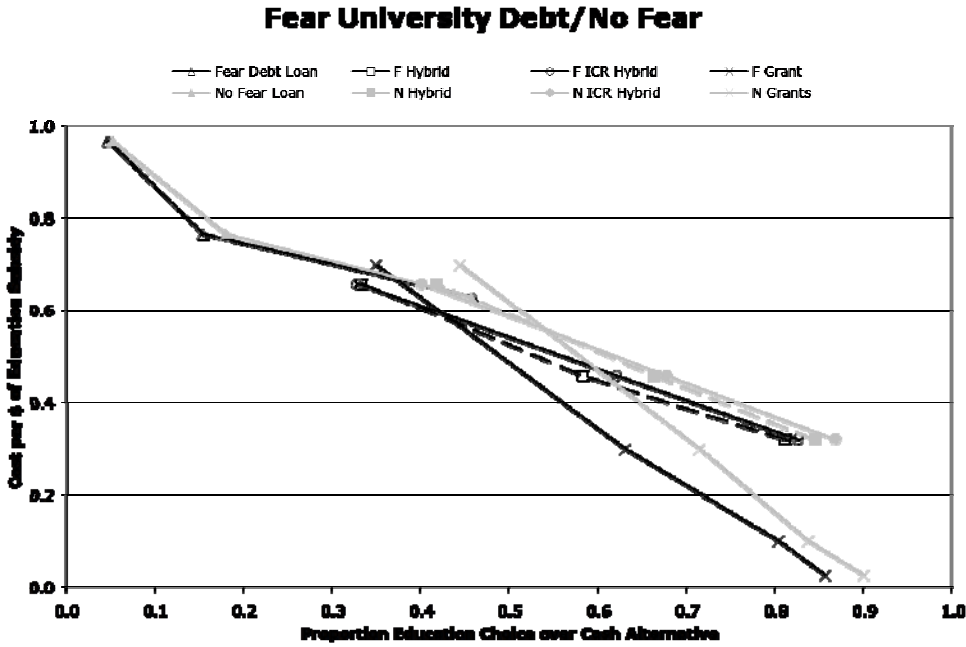
Figure 4.20: Educational Subsidy Demand by Family Expectations (Student Survey)



The final four figures concentrate on attitudes towards debt, experience with credit and saving. With respect to attitudes towards debt, participants were asked to rate their agreement with the following statement for each of the three types of institution noted in brackets: "I'm hesitant to undertake a [community college or CEGEP/Trade/University] education because of the amount of debt I'm likely to accumulate by the time I graduate". The distributions of these responses to the three statements were nearly identical. We use the responses to the third statement (university) to create Figure 4.21. One would expect that those who agree with this statement (that anticipated debt would make them hesitate to invest in university) would be much less willing to take on debt. Yet, Figure 4.21 shows that those who agree and strongly agree are practically indistinguishable in their loans take-up rates from those who are not concerned with taking on debt. Curiously, the difference in behaviour shows up for the lower priced subsidies — hybrids, ICR hybrids and grants.

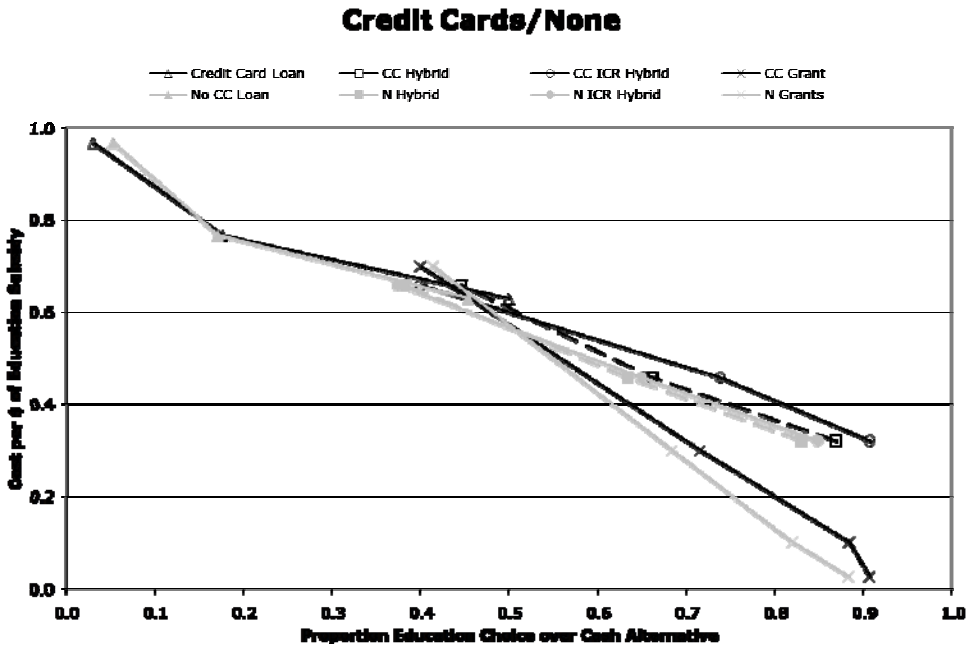


Figure 4.21: Educational Subsidy Demand by Perception of Debt Load to Attend University



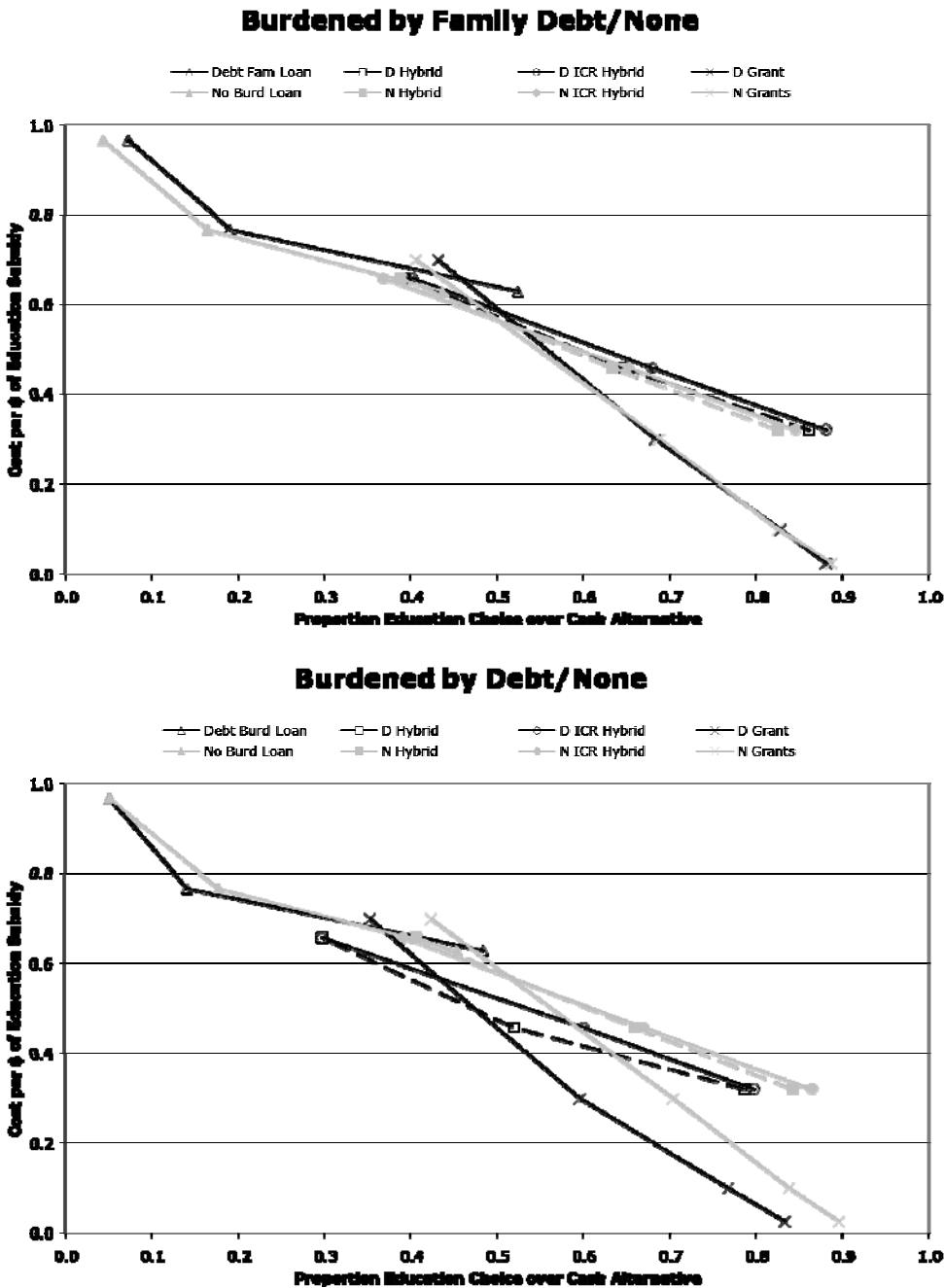
Having experience with debt in the form of access to credit cards does not seem to impact the decision to take loans for PSE. (Figure 4.22)

Figure 4.22: Educational Subsidy Demand by Student's Possession of Credit Cards



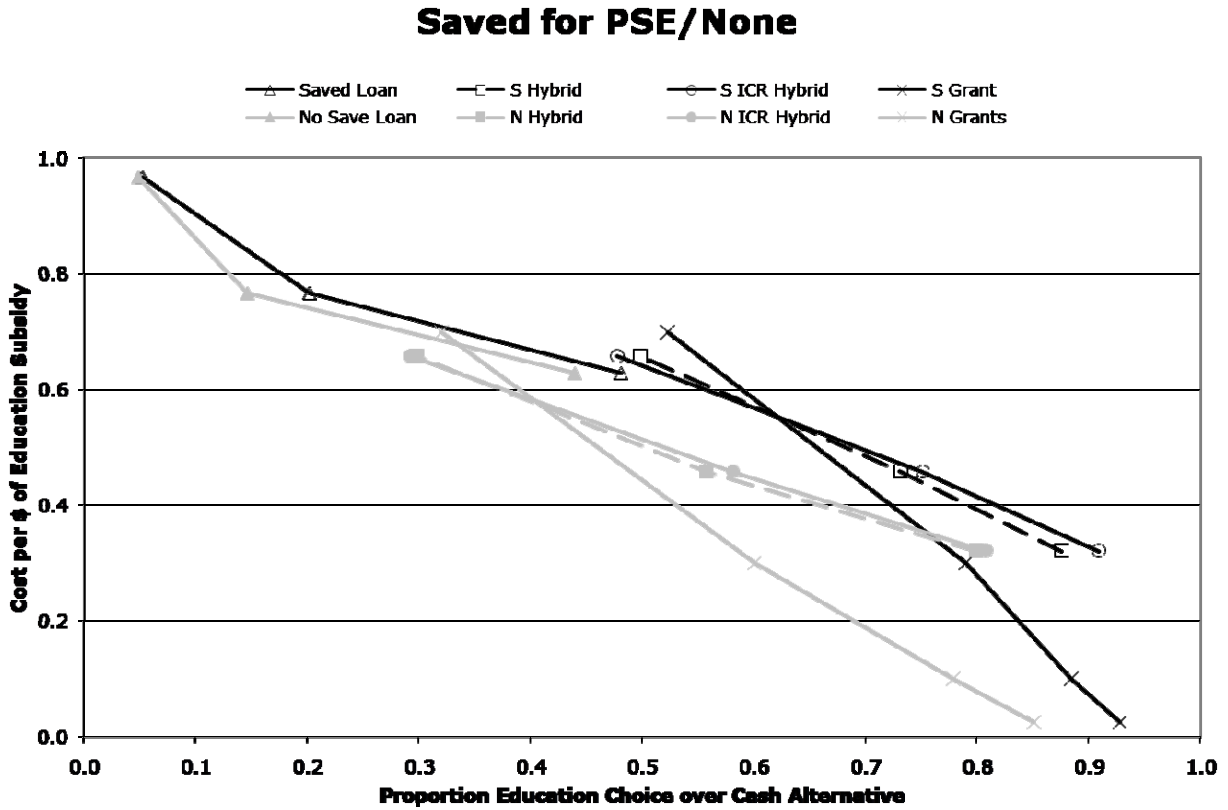
In two separate queries, students were asked if they felt burdened by their family's level of debt and their own debt. In both images of Figure 4.23, responses by those that feel burdened by debt are represented by dark line segments and those that do not feel burdened are represented by lighter line segments. Family debt has little effect on financial aid demand except for a small positive effect on the willingness to accept a loan. Those burdened by their own debt show lower willingness to invest in general and may be sensitive to instruments that are income contingent.

Figure 4.23: Educational Subsidy Demand by Student's Perception of Family Debt and Own Debt



Students were simply asked if they had ever saved any money for PSE. Those that claimed to have saved any money for PSE show a marked increase in the willingness to accept educational financing of all types.

Figure 4.24: Educational Subsidy Demand by Personal Savings and No Savings for PSE



The above figures show that many factors singularly influence the demand for education. What is very clear through the 24 figures is that every partition of the sample whether it is by subgroup, individual characteristics, behaviour, perceptions or attitudes, gives us a downward sloping demand for educational financing. This shows that the price of education is clearly a principle consideration in the willingness to participate in PSE. In the next section, we jointly analyze simultaneously the many potential factors, in addition to price, that influence the demand for PSE financing.



## V. Overall Demand for Educational Subsidies: What Matters?

In this section, we use a regression framework to address what matters in the demand for student financial aid and to assess, in particular, the role played by different types of aid. To do this analysis properly, we will want to focus our attention on students who have shown some interest in education and exclude those who never express any interest. We first divide the participants in three distinct groups: those who never chose an educational subsidy, those who show marginal interest and those who show much interest by choosing educational subsidies over cash in almost all occasions. After analyzing the characteristics of these three groups, we select participants that have expressed a minimum of interest for education and investigate the factors affecting their demand for aid. In Section 6, we tackle the question as to whether there is any systematic behaviour representing loan aversion among our subjects.

### WHO IS INTERESTED IN PSE?

Some 9 per cent of participants (113) never chose an educational subsidy offer. Even when such subsidy cost them as low as 2.5 cents per dollar of aid, these participants preferred cash. Next, there are 95 individuals who rarely choose educational subsidies, picking only 1 to 4 educational offers out of 22 opportunities. Finally, at the other spectrum, there are about 7% of participants (73) who chose education over cash offers either every time or almost every time (at least 21 times out of 22 opportunities).

We use three probit models to investigate those who are either out of the market for PSE financing (NEVER), only take education at the lowest prices offered in the study (MARGINAL), and those that take education consistently at least 21 times out of 22 (ALWAYS). Table 5.1 reports the results. Note that for each model, we present two specifications. Specification 1 considers group variables only. Specification 2 adds individual characteristics, attitudes and behaviour variables.

**Table 5.1 : Preference for Educational Subsidies**

Variable	NEVER		MARGINAL		ALWAYS	
	1	2	1	2	1	2
Québec	-0.040	-0.021	-0.259	-0.523	0.00109	-0.0302
	-0.180	-0.0763	-0.620	-1.098	0.00442	-0.107
Manitoba	0.499***	0.671***	-0.465	-0.474	0.00684	-0.0413
	2.919	3.238	-1.551	-1.426	0.0361	-0.194
Saskatchewan	0.955***	0.847***	-0.655	-0.68	-0.913**	-0.934*
	3.781	2.827	-1.496	-1.426	-1.998	-1.763
Rural (Univ > 40 km)	0.285	0.31	-0.279	-0.0698	0.215	0.276
	1.568	1.452	-0.858	-0.197	1.109	1.268
First Nation	0.134	-0.0734	-0.0483	-0.0752	-0.191	-0.121
	0.777	-0.36	-0.173	-0.237	-0.789	-0.436
Single parent	0.218	0.312	-0.291	-0.264	0.0245	-0.129
	1.295	1.59	-0.963	-0.799	0.118	-0.555
Missing value Single parent	0.253	0.335	-0.182	-0.166	0.158	0.00435

Variable	NEVER		MARGINAL		ALWAYS	
	1	2	1	2	1	2
	0.919	1.039	-0.432	-0.373	0.483	0.0119
First generation PSE	0.210*	0.0267	-0.251	-0.228	0.169	0.313**
	1.797	0.192	-1.214	-0.949	1.269	2.08
Immigrant	-0.244	-0.234	-0.282	0.0507	0.385*	0.464*
	-1.031	-0.807	-0.577	0.084	1.726	1.86
Low Income (< 40K)	-0.112	-0.219	0.389	0.521*	-0.134	-0.112
	-0.705	-1.171	1.415	1.696	-0.744	-0.543
Missing value for Low Income	-0.102	-0.502	0.282	0.491	-0.351	-0.147
	-0.383	-1.593	0.687	1.13	-1.062	-0.394
Low Inc Montreal (renters)	0.336	0.427	-0.0564	0.0665	-0.0854	-0.131
	0.75	0.821	-0.067	0.0709	-0.161	-0.21
CEGEP	0.0933	0.247	0.397	0.482	-0.233	-0.258
	0.395	0.873	0.924	1.004	-0.87	-0.815
Adult Student	-0.729**	-0.527	0.206	0.146	1.171**	1.317**
	-2.228	-1.353	0.359	0.227	2.353	2.277
Volunteer outside of class	0.0632	-0.0398	-0.23	-0.165	-0.0474	-0.0463
	0.396	-0.214	-0.795	-0.52	-0.252	-0.22
Female		-0.187		0.279		0.223
		-1.459		1.291		1.525
Numeracy		-0.00183		-0.00013		-0.00102
		-1.57		-0.0664		-0.799
Willingness to Save		-0.261***		0.0659		0.142***
		-5.548		0.903		3.317
Risk Seeking		-0.111***		0.075		0.0326
		-2.95		1.265		0.762
Risk Seeking (2nd frame)		-0.0476		0.136*		0.0571
		-1.065		1.817		1.067
Grades 60 - 80		-0.356*		0.706*		-0.314
		-1.671		1.906		-0.754
Grades > 80		-0.724***		0.907**		-0.0555
		-2.823		2.023		-0.129
Family expectations: University		-0.445***		0.218		0.699***
		-3.402		1.051		2.922
Peers not go to university		-0.0739		-0.0899		0.00136
		-0.553		-0.419		0.00833
Obstacles to prevent PSE		0.0253		0.279		0.132
		0.189		1.253		0.895
Possibility drop out of HS		0.401		-0.503		0.11
		1.608		-0.968		0.265
Skips Class (> once month)		-0.162		0.206		-0.178
		-1.121		0.85		-1.08
Works > 20 hours per week		0.275**		-0.0884		-0.293**
		1.975		-0.366		-2.188
Hesitant to undertake a university education b/c of the amount of debt		0.0176		-0.306		-0.132
		0.132		-1.385		-0.84
Organisation and planning		-0.0149***		0.000946		0.00939*
		-3.409		0.122		1.952

Variable	NEVER		MARGINAL		ALWAYS	
	1	2	1	2	1	2
Owns Credit Cards		-0.0762		-0.76		-0.431
		-0.348		-1.44		-1.58
Personal level of debt to be burden		0.233		-0.404		0.00481
		1.441		-1.432		0.0254
Family's level of debt to be a burden		0.0593		-0.357		0.443***
		0.395		-1.334		2.831
Personal savings for PSE		-0.262**		0.139		0.218
		-1.979		0.597		1.552
Constant	-1.804***	2.050***	0.408	-1.365	-1.516***	-3.582***
	-8.865	3.018	1.128	-1.186	-6.733	-4.306
Pseudo-R <sup>2</sup>	0.0664	0.2803	0.0365	0.1525	0.0346	0.1828
Participants	1248	1248	1248	1248	1248	1248

t-statistics presented below coefficient estimates.

\*\*\*: significant at 1%; \*\*: significant at 5%; \*: significant at 10%. Two tail tests.

The first model of Table 5.1 studies the determinants of those who never took a single educational subsidy. The observed corresponding variable to the latent (unobserved) “no preference for education” is 1 if the participant has refused all educational subsidy choices, that is always choosing the cash alternative for all the 22 choices, and zero otherwise. The Pseudo-R<sup>2</sup> for both specifications, a measure of goodness of fit of the model, shows that the inclusion of individual variables is needed to obtain a relatively good fit. Therefore, we will only comment on the results of Specification 2 for the first model. Results show that there is a greater probability of a participant from Manitoba and Saskatchewan relative to participants from Québec and Ontario to show no preference for education. Similarly, students who work at least 20 hours per week in the labour market have a greater probability of never investing compared with their less labour market engaged peers. However, there is a long list of characteristics and behaviours that reduce the probability to never choose educational financing. Two exhibited behaviours include a WILLINGNESS TO SAVE (\$75 for a year at various interest rates) and a willingness to take on more risk than their peers (RISK SEEKING). Additionally, those with high grades (averages above 80), high family expectations regarding their success at University, a good sense of organisation and planning, and personal savings for PSE all had a lower probability to never choose education.

The MARGINAL model tests if participants who demonstrate marginal interest for educational subsidies differ from those who never chose educational subsidies. Here the dependent variable of the probit regression takes the value of 1 if the participant has chosen 1 to 4 educational subsidy choices and 0 otherwise. Few coefficients are statistically different from zero suggesting that there are some differences among the NEVER and MARGINAL populations. However, no inconsistency is found here with respect to the NEVER results. As before, the group variables, i.e. First Nation, First generation PSE, low income status, explain little of the variance of the dependent variable as seen by the low Pseudo-R<sup>2</sup>.

The last model moves our focus to the other end of the spectrum seeking to characterise those participants who consistently choose the educational subsidies alternatives over cash. In this probit model, the dependent variable is 1 if the participant has chosen at least 21 out of 22

educational subsidies and 0 otherwise. As before, the specification including individual characteristics yields a reasonably good fit. Five important individual factors increase the probability of being in the group of participants who consistently choose educational subsidies over cash: First Generation PSE, Adult students, immigrants, relatively more patient participants (WILLINGNESS TO SAVE), students who are encouraged by their family to obtain a university education and students who consider the family's level of debt to be a burden. But students from Saskatchewan, relative to other provinces, and students who declare working 20 hours or more while in school relative to those less engaged in the labour market are less likely to be among the group of individuals showing very strong preference for educational subsidies.

## THE DEMAND FOR EDUCATIONAL SUBSIDIES: WHAT MATTERS?

To prepare the foundation for studying the presence of loan aversion, we now examine the participants' willingness to take up educational financing controlling for the different subsidy forms, for prices of these financial instruments, group variables and individual and socioeconomic characteristics of the participants. We first need to consider the sub-sample of the data consisting of individuals interested in PSE. It is important to avoid considering individuals who refuse to take up educational subsidies not because of any preference concerning debt, but because they have no preference for education whatsoever. We therefore restrict our analysis to all participants except those who belong to the NEVER group discussed above. However, since we only observe those who take up educational financing when we restrict our analysis, we may introduce some unknown bias in our estimation.

To deal with this selection bias issue, we use the Heckman procedure (Heckman, 1979). We first estimate a probit regression on the full sample of individuals to estimate the probability of an individual choosing at least one educational subsidy. From the initial probit regression, we are able to compute for each individual the usual Inverse Mills Ratio (IMR). The individual's IMR is used as an additional independent variable in a linear probability model of the choice of educational subsidy in our selected sample of individuals having shown an interest in education. The pooling of individuals choosing among different educational subsidies (grants, loans and hybrids) enables us to account for an individual effect with GLS estimates. The two-step Heckman procedure introduces a heteroscedasticity problem that is easily handled with GLS in a panel setting. For this reason, a panel linear probability model is preferred to a random effects probit model. Because most independent variables in the specification are (0, 1) dummy variables, the predicted values of the linear probability model lie, with a few exceptions, within the unit interval.

The two-equation model is given by the selection equation:<sup>11</sup>

$$y_i^* = x_i d + v_i \quad (1)$$

where  $y_i^*$  is the (unobserved) utility of investing in education, and  $v_i$  an error term.

$$y_i = 1 \text{ if } y_i^* > 0$$

$$y_i = 0 \text{ if } y_i^* \leq 0$$

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<sup>11</sup> The model borrows from Eckel, Johnson, Montmarquette and Rojas (2007).



The second equation is the investment equation:

$$I_{id}^* = k_i a + p_d b + s_d e + g_i f + IRM_t q + v_{id}, v_{id} = c_i + u_{id} \quad (2)$$

where  $I_{id}^*$  is the (unobserved) probability that individual  $i$  will take up education in decision  $t$ ,

$$I_{id} = 1 \text{ if } I_{id}^* > 0$$

$$I_{id} = 0 \text{ if } I_{id}^* \leq 0$$

$x_i$  and  $k_i$  are vectors of individual and socioeconomic characteristics,  $g_i$  is a vector of group variables,  $p_d$  a vector of prices associated with the different subsidies, and  $s_d$  is a vector of different subsidies, with their corresponding coefficient vectors. The IMR is an explanatory variable in equation (2).  $c_i$  is an individual random effect and  $(u_{id}, v_{id})$  has zero mean and is independent of  $(x_i, k_i, p_d, s_d, g_i)$ . The probit coefficient estimate of  $d$  is obtained from (1) and the IMR is calculated. Then  $a, b, e, f$  and  $q$  are obtained from (2) using feasible GLS in a linear probability model.

The dependent variable for equation (1) is an indicator for demand for at least one educational subsidy and is equal to 1 if the student chooses an educational subsidy over cash for at least one decision and 0 otherwise. This specification is the exact opposite specification of the NEVER model summarized in Table 5.1 where the dependant variable was 1 if the student never chooses education and 0 otherwise. We will not report nor comment this regression since the coefficient estimates are the same that the "never choosing education model" with the opposite signs.<sup>12</sup>

The demand for educational subsidies conditional on having chosen at least once educational choice is estimated within the context of a linear probability model. The pooling of the individuals choosing among 22 choices of educational financing vs. cash alternatives creates the opportunity to report an individual effect with GLS estimates. With 1135 individuals that choose at least one educational finance option and 22 decisions, the total amount of observations available to conduct estimations is 24,970. The coefficients can be interpreted directly as marginal probabilities since this is a linear probability model. Specification 1 of Table 5.2 uses only the price variable in addition to the usual constant and the IMR selection variable. The regression coefficient on price is negative and highly significant. The demand for educational subsidies, or the willingness to give up a cash alternative in favour of student aid, increases as the price of the subsidies decreases. Given how parsimonious the specification is, the overall  $R^2$  of 0.3464 indicates a nice fit.

Specification 2 adds the subsidy type -- Grants, Loans, Hybrid -- with the Income Contingent Loan hybrid as the reference. It is interesting to note that the three added variables do not significantly increase the overall goodness of fit of the model ( $R^2 = 0.3587$ ) relative to the first specification. In other words, relative to price, the subsidy types do not explain very much of the demand for educational financing.

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<sup>12</sup> To obtain the IMR variable, we only used the variables with statistically significant coefficient estimates in specification (2) of the never choosing education probit model of Table 5.1.

With Specification 3, we assume that the subsidy types not only affect the intercepts of the demand curve, but also the slope of the curve.<sup>13</sup> Through these two effects (Subsidy and Price x Subsidy), we can see that a grant subsidy generates more demand than loans only when the price per dollar of subsidy is above 51.7 cents.<sup>14</sup> The price per dollar of funding must reach a relatively high level before a significant difference on the demand for educational financing occurs between the two forms of subsidy in favour of grants. In a similar way, compared to loans, the hybrid subsidy increases the demand for educational subsidies when the price is above 69.3 cents per dollar of educational financing. Compare to Specification 1, the overall R<sup>2</sup> increases by 7.9 per cent, reaching 0.3738.

**Table 5.2: The demand for educational subsidies**

	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
VARIABLE	Price	+ Subsidy types	+ P x Subsidy types	+ Group Variables	+ Individual Characteristics
Inverse Mills Ratio	-0.619***	-0.619***	-0.619***	-0.644***	-0.11
Price	-15.9	-15.9	-15.9	-15.08	-1.262
Grant	-1.039***	-1.084***	-1.614***	-1.620***	-1.622***
	-124.8	-91.84	-53.01	-52.74	-45.86
Price x Grant		-0.131***	-0.468***	-0.468***	-0.468***
		-20.27	-27.75	-27.75	-27.79
Loan			0.785***	0.785***	0.785***
			23.11	23.11	23.15
Price x Loan		-0.0893***	-0.300***	-0.300***	-0.300***
		-12.31	-9.415	-9.415	-9.43
Hybrid			0.462***	0.462***	0.550***
			10.05	10.05	11.7
Price x Hybrid		-0.0111*	-0.0470**	-0.0470**	-0.0470**
		-1.74	-2.093	-2.093	-2.097
Québec			0.0717*	0.0717*	0.0717*
			1.666	1.666	1.668
Manitoba				-0.0528**	-0.038
				-2.013	-1.469
Saskatchewan				0.0241	-0.0267
				1.116	-1.21
Price x Saskatchewan				-0.0592	-0.129***
				-1.537	-3.375
Rural (Univ > 40 km)				0.0323	0.0357
				1.24	1.36
First Nation				0.018	0.000891
				0.79	0.0412
				-0.0511*	-0.0545**

<sup>13</sup> There is practically no difference in behavior between the hybrid loan and an ICL-hybrid loan, the reference variable.

<sup>14</sup> The differential effect on the demand for education between a grant and a loan is:  $(-0.468 + 0.785 \times \text{Price of } \$1 \text{ funding}) - (-0.300 + 0.462 \times \text{Price of } \$1 \text{ funding}) = -0.168 + 0.323 \times \text{Price}$ . The differential is positive if Price is greater than 51.7 cents per dollar of educational financing.

	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
VARIABLE	Price	+ Subsidy types	+ P x Subsidy types	+ Group Variables	+ Individual Characteristics
Price x First Nation				-1.813 0.0392	-2.003 0.0321
Single Parent				1.32 -0.0244	1.079 -0.027
Missing Value Single Parent				-1.086 0.0459	-1.266 0.0216
First generation PSE				1.352 -0.00906	0.669 -0.00285
Immigrant				-0.613 0.0603*	-0.202 0.103***
Price x Immigrant				1.932 -0.0242	3.372 -0.052
Low Income (< 40K)				-0.738 -0.0106	-1.572 -0.00577
Missing value Low Income				-0.553 -0.00072	-0.31 0.00873
Low Inc Montreal (renters)				-0.0222 0.00495	0.284 0.00452
CEGEP				0.0956 0.00994	0.0917 -0.0285
Adult Student				0.363 0.107**	-1.05 0.0972**
Volunteer outside of class				2.374 -0.0145	2.246 -0.00937
Female				-0.676	-0.462 0.0521***
Numeracy					4.089 0.000137
Willingness to Save					1.187 0.0468***
Price x Willingness to Save x Loan					8.579 -0.0335***
Risk Seeking					-8.484 0.00224
Risk Seeking (2nd frame)					0.539 0.00184
Grades 60 - 80					0.4 -0.117***
Grades > 80					-3.053 -0.0598
Family expectation: Univ.					-1.412 0.0223
Price x Family expectation					1.069 0.0360*

	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
VARIABLE	Price	+ Subsidy types	+ P x Subsidy types	+ Group Variables	+ Individual Characteristics
Peers not go to university					1.846
Obstacles to prevent PSE					0.00629
Possibility drop out of HS					0.448
Skip Class (> once month)					-0.00447
Price x Skip Class					-0.342
Works > 20 hrs per week					-0.0289
Hesitant to undertake a university education b/c of the amount of debt					-0.865
Price x Debt (Hesitant...)					-0.019
Organisation and planning					-1.164
Owns Credit Cards					-0.0368**
Personal level of debt to be a burden					-2.155
Family's level of debt to be a burden					-0.0270**
Personal Savings for PSE					-2.09
Constant	1.184***	1.271***	1.537***	1.560***	0.0103
Rho	0.2534	0.2592	0.2664	0.2628	0.0635
Overall R-sq	0.3464	0.3587	0.3738	0.3795	-0.0313*
Observations	24970	24970	24970	24970	-1.796
Number of students	1135	1135	1135	1135	0.00172***
					3.582
					0.0203
					1.012
					-0.0241
					-1.357
					0.0424***
					2.783
					0.0370***
					2.885
					1.196***
					11.69

t-statistics presented below coefficients.

\*\*\*: significant at 1%; \*\* significant at 5%; \* significant at 10%. Two tail tests.

With Specification 4, group variables are added to the subsidy variables of Specification 3. There is little impact on the coefficients of the subsidy and price variables, meaning that the specification is robust. Participants from Québec demand less educational financing than participants from other provinces. FIRST NATION participants reveal a lower demand for

educational financing. Adult students and immigrants demand more educational financing than their counterparts. However, these 18 group variables add little to the goodness of fit measure with a new  $R^2$  of just 0.3795 (compared with 0.3738 for Specification 3).

The overall  $R^2$  increases to 0.4043 with Specification 5. We add over 20 individual characteristics to the variables used in Specification 4. Again, the results on the subsidy and price variables remain robust. Among the group variables, participants from Saskatchewan and the FIRST NATION subgroup invest less in educational subsidies relatively to others while immigrants and older student invest more. Female students invest more than males. A key variable in terms of effect and statistical importance is the willingness to save: more patient participants invest significantly more in education. Showing a good sense of organisation and planning, already saving for one's education and being concerned by the level of family's debt are factors that increase the probability of investing in educational subsidies. Participants working 20 hours or more while in school invest less in education relatively to those less engaged in the labour market. The results on grades are less straightforward as students with midrange grades (Averages of 60-80), are less likely to invest in educational subsidies relative to those with higher and lower grades.

Some cross variables between subsidy characteristics and individual characteristics were included in Specification 5. The negative coefficient estimate of the cross-variable PRICE X WILLINGNESS TO SAVE X LOAN indicates that when a loan is involved, less patient participants react less to a price increase than more patient students. The less patient participants discount more the future repayment of the loan than their more patient counterparts. The negative coefficient estimate of the cross-variable PRICE X SKIP CLASSES indicates that a student who skips class often will react more to an increase in subsidy price relative to students committed to attending classes. Although less statistically significant, we note the positive coefficient estimate in the cross variable PRICE X FAMILY EXPECTATION and the negative coefficient estimate on PRICE X DEBT (HESITANT TO UNDERTAKE UNIVERSITY EDUCATION BECAUSE OF DEBT).

In the results presented thus far, there is little evidence that debt aversion exists. The different categories of subsidies have little effect on the demand for educational subsidies. The level of family debt has been seen as a concern by some participants but its effect in the specifications presented above have run opposite to debt aversion with those affected showing an overall increased preference for educational subsidies. The next section further examines the presence of systematic debt averse individuals in the sample.



## VI. Loan Aversion

We noted in the previous section that once the price of the educational subsidy is accounted for, demand for student financial aid is not much affected by the type of aid, and the family level of debt actually influence financial aid take-up positively, the opposite of debt aversion. Participants were asked if their personal level of debt was a burden. In the descriptive section, this variable seemed to split the sample with lower demand for those who felt such a burden, especially at low prices. However, this variable was not significant in any of the specifications presented thus far. This means that the statement of being burdened by personal debt does not indicate an impact on the demand for educational subsidies when other factors are taken into account. In this section, we attempt to isolate a sub sample of the participants that seem to behave in a particularly loan averse way.

By design, a participant who always chose a grant and never a loan is insensitive to prices and completely sensitive to subsidy type. This behaviour appears consistent with a truly loan averse participant: the participant clearly cares for PSE since grants are always accepted over cash, but he or she has no willingness to borrow to meet the same aim. Among the 1248 participants in our study, 152 or 12.2% of them made exactly that choice. For ease of discussion, let's call this sub sample "strictly grant seeking." Who are these participants?

We use a probit regression where the dependent variable is 1 if the participant always chooses grants but never a loan and 0 otherwise. The results are presented in Table 6.1. Specification 1 considers group variables only. Specification 2 adds individual variables to Specification 1. The Pseudo-R<sup>2</sup> for both specifications shows that the inclusion of individual variables is needed to obtain a relatively good fit. Therefore, we will only comment on the results of Specification 2.

**Table 6.1: The probability of choosing always grant and never loan**

Variable	MODEL 1 Group Variables	MODEL 2 + Individual Char.
Québec	0.0414	0.0976
	0.208	0.446
Manitoba	0.0898	0.0752
	0.606	0.473
Saskatchewan	-0.303	-0.157
	-1.087	-0.524
Rural (Univ > 40 km)	-0.239	-0.224
	-1.338	-1.186
First Nation	-0.497**	-0.430*
	-2.223	-1.825
Single Parent	-0.196	-0.171
	-1.07	-0.875
Missing value Single Parent	-0.233	-0.287
	-0.926	-1.06
First generation PSE	-0.318***	-0.257**

Variable	MODEL 1 Group Variables	MODEL 2 + Individual Char.
	-2.671	-2.008
Immigrant	-0.0339	-0.0364
	-0.163	-0.168
Low income (< 40K)	-0.083	0.0464
	-0.54	0.277
Missing value for Low Income	0.215	0.329
	0.936	1.308
Low Inc Montreal (renters)	-0.918*	-0.941*
	-1.79	-1.727
CEGEP	-0.117	-0.195
	-0.557	-0.837
Adult Student	-0.077	-0.336
	-0.195	-0.762
Volunteer outside of class	0.156	0.215
	1.032	1.343
Female		0.142
		1.324
Numeracy		-0.00015
		-0.151
Willingness to Save		0.0777**
		2.416
Risk Seeking		-0.00546
		-0.176
Risk seeking (2nd frame)		-0.0449
		-1.172
Grades 60 - 80		-0.128
		-0.413
Grades > 80		0.237
		0.741
Family expectation: Univ		0.428***
		2.959
Peers not go to university		0.0698
		0.579
Obstacles to prevent PSE		-0.0717
		-0.663
Possibly drop out HS		-0.74
		-1.643
Skips Class (> once month)		-0.102
		-0.849
Works > 20 hours per week		0.0889
		0.843
Hesitant to undertake a university education b/c of debt		-0.0833
		-0.696
Organisation and planning		7.75E-05
		0.0217



Variable	MODEL 1 Group Variables	MODEL 2 + Individual Char.
Owns Credit Cards		0.270*
		1.721
Personal level of debt to be a burden		-0.0705
		-0.435
Family's level of debt to be a burden		-0.206
		-1.513
Personal savings for PSE		0.287***
		2.731
Constant	-1.096***	-1.761***
	-6.171	-2.937
Pseudo-R <sup>2</sup>	0.0386	0.1227
Participants	1248	1248

t-statistics presented below coefficient estimates.

\*\*\*: significant at 1%; \*\*: significant at 5%; \*: significant at 10%. Two tail tests.

The probability of being STRICTLY GRANT SEEKING (jointly always accepting a grant and never a loan) is lower for a FIRST NATION person and for a low income participant from Montréal. It is also lower for first generation PSE participants. The probability is higher for those students who are patient (WILLINGNESS TO SAVE), benefit from the support of the family (FAMILY EXPECTATION: UNIV), have already saved for the post secondary education and own credits cards.

These results can hardly support the idea that student loans keep at-risk students from investing in education. If the probability of being STRICTLY GRANT SEEKING were *higher* for FIRST NATION participants, those from a low income or a first generation PSE family then there would be reason to believe in the presence of debt aversion. As it is, these three at-risk groups are less likely to be categorized as STRICTLY GRANT SEEKING. The positive coefficients estimates of the other variables are also puzzling. All these variables, Willingness to Save, Family Expectation: Univ, Personal savings for PSE, are showing a consistent positive effect on the probability of being STRICTLY GRANT SEEKING. One potential explanation is that for some participants a loan is not needed to pursue PSE, but a grant, no matter the price, is always welcome. This could be the case of participants who can rely on other sources of financing than student financial aid to pursue PSE, such as parent's income.

Owning credit cards and choosing all grants but never a loan is hardly consistent with loan aversion either as it is difficult to explain why a person would be averse to debt for educational investment but not for generalized debt. However, this credit card result is consistent with Prelec and Loewenstein's prediction of debt aversion in situations of planned (student loans) and unplanned debt (credit cards) (1998). Basically, they predict using the assumptions of prospective accounting and coupling that individuals will take on debt in emergency like situations (credit cards) but when they think about taking on debt, even for investment purposes, the thought of paying the loan back after consumption (investment) has occurred will cause people to take on planned debt less often.



## VII. Discussion

To investigate the determinants of the demand for educational subsidies, we excluded participants who always selected the cash alternative and never took a single educational subsidy when presented with 22 possibilities to do so. After controlling for the selection bias, Price comes out as the key determinant in the demand for educational subsidies, with the different forms of subsidies not playing much of a role.

At the group level, being an immigrant is a particularly important factor to positively influence the demand for educational subsidies, while being from a First Nation family depresses this demand.

WILLINGNESS TO SAVE, family expectations and good grades were among the factors that characterize the participants showing a positive preference for educational finance. Investing requires patience. There is some practiced anticipation before reaping the reward of the investment. Among a relatively small number of individual characteristics, participants showing patience (WILLINGNESS TO SAVE) is the key factor to predict who is likely to invest in educational subsidies.

What happened to our measures of NUMERACY? Why did they not enter into the regressions models in a convincing way? In fact, numeracy is correlated with many variables. Most importantly, NUMERACY is positively correlated with WILLINGNESS TO SAVE and good grades. NUMERACY and having a member of the immediate family attend PSE (complement to FIRST GEN PSE) correlate. NUMERACY and PERSONAL SAVINGS FOR PSE correlate. And those in the FIRST NATION subgroup had no representation on the high end of the NUMERACY score.<sup>15</sup> The relationship between WILLINGNESS TO SAVE and NUMERACY deserves further attention.

All and all, our findings do not support the idea that loan aversion is a barrier for particular subgroups, especially at risk groups represented in our sample.

The key finding of this study is: *Price matters*. Since the price matters so much in explaining the demand for educational subsidies, it suggests an obvious policy tool to attract more students in PSE. The answer is a simple one: decrease the cost of accepting educational subsidies. Loans can be further subsidized as we did in this study by pairing them with grants. Larger loans are more heavily subsidized than small loans. Loans could be in part forgiven. More grants could be given to aspiring students and graduates. Any of these suggestions would lower the cost of educational subsidies to the receiver, but not to the donor.

A complementary line of policy instruments to “lowering the price” could be to bolster the “willingness to pay” for education. A slew of policies already in place works towards this aim. Correcting misperceptions about returns to education in general, pointing to the stability of employment with a tertiary degree, and the increase in opportunities available to university graduates are all included in PSE promotional materials. The benefits to university education are found across the board, for young and old learners as well as for all racial and ethnic groups.

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<sup>15</sup> In our sample 72% of our participants declared that one of their parents had postsecondary education and among those scoring greater than 400 on the numeracy assessment, 87% have at least a parent with PSE. 80% of those scoring 400+ on the numeracy test recognize the support of their parents for a university education while they represent 74% of the total sample. 45.67% of participants declared saving for their education and they are represented at 53.33% in the 400+ numeracy group.

An individual characteristic that increases the willingness to pay for education is an individual's willingness to investment in general. What developmental factors encourage good savings behaviour in general? Does attaining good numeracy skills as an adolescent increase the likelihood of good investment behaviour as an adult? There has not been enough research in this area to establish a causal connection.

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# Appendices

## **Appendix A: Choices**

## **Appendix B: Surveys**

## **Appendix C: Recruitment Materials**

- **Talking Points for School Contacts**
- **Student Packets (FAQs, Web Survey Instructions, Letter for Parents)**

## **Appendix D: Experimental Session Supporting Materials**

- **Participant Instructions**
- **Categories of Payment**
- **Practice Booklet**
- **Receipt**