# Grants for Students

## Equal Access to Postsecondary Education Require More than a Student Loan Program

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## The MESA Project

The Measuring the Effectiveness of Student Aid Project, or the MESA Project, is a four year research effort being conducted by the Canadian Education Project and the School for Policy Studies at Queen's University on behalf of the Canada Millennium Scholarship Foundation. It has been designed to answer the following four questions:

- After graduating from high school, teenagers coming from low-income backgrounds face a choice as to attend college or university, or not. For those who did attend, how do they compare to those who did not?
- Does providing more funding in a student's first few years of further education attract more low-income students to post-secondary education?
- Does providing more funding in a student's first few years of further education make it more likely for low-income students to stay in and graduate?
- Are low-income students different across Canada?

This paper is part of a series of research papers solicited from some of the leading Canadian researchers in the field of post-secondary education; the researchers were asked to write about issues of access and persistence in post-secondary education in Canada. The requirements for the papers were that the researchers use one of several currently-existing Statistics Canada databases or another source of Canadian data. Each of the papers commissioned during this project is available for downloading from the MESA Project website at www.mesa-project.org.

The findings and conclusions expressed in this paper are those of the authors and do not necessarily represent those of the MESA Project.

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### Abstract

In this paper, we employ data from the Paths on Life's Way data base to examine the impact of student loans on the educational and occupational outcomes and other life activities of the BC high school graduating class of 1988. Multiple forces – both individual and structural – conspired to facilitate or prevent post-secondary participation and completion by these graduates. We focus on three macro forces affecting this cohort as they made the transition from high school and through the next 15 years of post-high school life. First, we locate the analysis in the policy debate, beginning with the "Access for All" initiative that was underway in BC in the mid-1980s, Second, we highlight the BC student financial assistance program available to students as they left high school in 1988 in relation to tuition fees and document how this program evolved over time. Third, we describe the changing nature of the BC post-secondary system from the 1980s onwards. Lastly, we switch our conceptual focus to a life course perspective in order to examine how these forces likely impacted individuals' post-secondary educational opportunities, experiences, and outcomes. By taking into account individual characteristics such as social class, gender, and geographic location, we reveal the different ways individuals negotiated life stages in the face of these forces.

Because our analyses span 15 years, none of the forces described above remained static over time. Changes have occurred to post-secondary structures, policy agendas and directions, and the individuals themselves as they matured and took on new adult roles. Hence, it is a challenge to capture the ongoing dance between structure and agency across time.

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## Introduction

For one who qualifies, a university education is perhaps the best investment a young person can make in her future. Estimates of the private return to a university degree in Canada and elsewhere regularly top 10%.[1] University graduates also benefit in non-financial ways. Apart from pure consumption value, which is difficult to quantify, they enjoy better health (Kenkel, 1991) and spend less time in jail (Lochner and Moretti, 2001). This suggests that university students should be willing to pay the costs of this investment, if necessary by borrowing the money, just as they would pay to invest in any other asset.

Nonetheless, postsecondary education throughout the world is supported through a complex array of private bursaries, government grants, and subsidized student loans, and access is restricted to those who are academically qualified. Why should we be paying students to undertake an investment that is already so profitable for them?

A strong case for public grants to qualified students is based on the belief that educating a talented subset of the population will have external benefits for all members of society. In this regard higher education is linked to participation in community affairs, the democratic process, and volunteer work (Bynner and Egerton, 2000). As well, low skilled US workers earn higher wages if they live in cities that have a higher proportion of university graduates (Moretti, 2004). This could be due to complementarities in production among workers (Johnson, 1984). Finally, the effect of higher education on economic growth seems

sure to be positive, although estimates are imprecise (Bassanini and Scarpenta, 2001).

The externalities argument justifies a subsidy to all qualified students and as well, ceteris paribus, suggests that those students who are expected to generate the greatest external benefits should get the highest subsidies. This may provide a rationale for merit based scholarships, although in practice some of these scholarships go to students who would attend in any case.

There is another argument for grants that is based on achieving a neutral system of taxation. Under a progressive income tax system the returns to a university education are taxed at a higher rate than the opportunity cost - i.e., the wages a potential student would earn if he did not attend university. To correct this distortion, students should be allowed to deduct a portion of the opportunity cost from future income. Some carry-forward deductions are currently available, but simple calculations suggest the amounts are too small (Carmichael, 1999). Since the same effect can be achieved with a subsidy to the cost of a student's education, this provides a justification for grants. Again it is those who stand to benefit the most (and thus eventually have the highest marginal tax rate) who should receive the most.

Other arguments for grants are based on considerations of equity. Many students feel that the financial hardships they endure during university make them deserving of direct public support in the form of low tuition fees. Economists generally discount this argument,

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noting that those who qualify to attend university tend to come from richer than average families, are blessed with a greater ability to achieve at school, and will eventually take their place among the financially fortunate in society. There seems to be no reason based on equity for those who do not have the skills to benefit from attending university to be subsidising those who do.

Not every student, of course, comes from a rich family. Grants that are targeted toward students from poorer families are also supported as a way to relax the liquidity constraints that may prevent qualified low-income students from attending university.[2] However, even though these students come from poorer backgrounds, they are still blessed with academic ability and are likely do well after graduation. As a result, many economists argue that the student loan system is a more equitable tool for ensuring access for these students.[3]

There are other arguments for targeted grants (Usher, 2006) based on the idea that some students will have poor information about the benefits of education, or will come from a family background where education is not valued as much as it should be. In this case the ideal solution might be to deliver better information or to intervene directly in the family situation. However, given that these policies are difficult to deliver effectively, grants to poor students may be a "second best" instrument that may encourage attendance.

On the other hand, generous grants may encourage too many people to attend university. The average rate of return to university may be substantial, but there is some evidence that returns for students with marginal academic qualifications are much lower. One interesting study (Ockert, 2003) examined a unique data set from Sweden. In 1982 college applicants were centrally ranked and admission was granted to those with the highest qualifications. There was a group of students at the bottom of the "acceptable" category who were considered equally qualified and who were randomly assigned to the fixed number of places remaining after all the higher ranking applicants were placed. Tuition was free.

Ockert had information on the qualifications of each applicant and labor market histories up to 1996. In his sample the rate of return to an acceptance letter was actually negative -- most marginal applicants would have earned more money had they not been admitted to university, even though the overall average rate of return was positive. However, many of the rejected students did attend university in subsequent years, so these data may partly reflect the option value of a compulsory "gap year" for some students. Obviously the issue of too much attendance can be addressed with academic entrance requirements, but an overly generous grant system that extends to academically marginal students may induce some students to attend when it is not in their own, or society's, best interests for them to do so.

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**2** Advocates sometimes make this argument to justify grants for all students, including those rich enough to face no liquidity constraint. This is a bad argument since the richer students will attend in any case.

**3** The equity argument does depend on the source of the grants. While grants to students from the general public may reduce equity, it is easier to justify grants that come from alumni donations or the higher tuition paid by richer students.

One way to organize these arguments is to note that the economic role of general tuition subsidies and targeted grants is to ensure that the expected private rate of return faced by any student deciding to attend university reflects the true social return of sending him there. The role of a student loan program is to ensure that all qualified students have access to the required funds, if needed, at a cost that reflects the social cost of those funds. Academic screening is used to prevent under-qualified students from wasting their time. These are all "efficiency" arguments - i.e. the goal is to ensure that those people (and only those people) for whom the net social benefit is positive will in fact choose to attend post-secondary education. Equity based arguments for student support are less compelling given the privileged status that university graduates enjoy in society.

In this paper we will suggest another argument for grants - one based on the normative goal of ensuring equal access to education. The argument depends on the fact that the decision to invest in a university education is not purely a financial decision - the kind that might be handled through an investment broker. Rather, it requires that one attend an institution for four years and adopt a lifestyle that one may not enjoy so much as the alternative. This is the source, we believe, of student concerns about "hardship". In particular, we will argue that the "hardship" of attending university will vary with income even when the financial rate of return does not.

In order to make this argument we first need to discuss the meaning of the phrase "equal access to education". We will then make our argument that equal access requires more than a student loan system that will make funds available at the same cost to every student. Then we outline the predictions of this approach, and the relevant empirical evidence from the YITS data. A final section concludes.
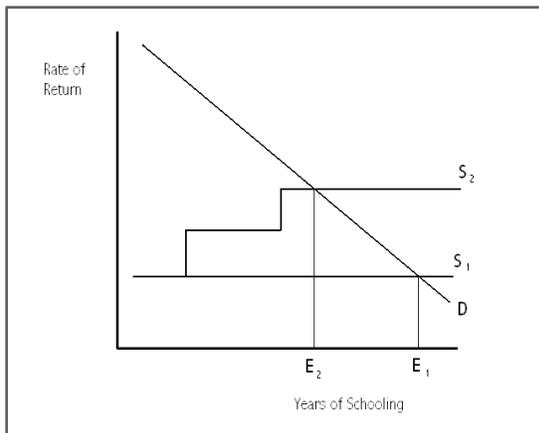
## Equal Access

The phrase "equal access to postsecondary education" has never meant that everyone should go to college or university. One way to illustrate the idea uses the supply and demand analysis of human capital choice that forms the basis of Becker's theory of the distribution of income (Becker, 1975). In this analysis the vertical height of an individual's demand curve for education is given by the marginal rate of return expected from a particular level of schooling. For any individual, successively higher levels of investment eventually bring lower marginal rates of return (if only because education takes time and there is a finite working career) so the demand curve slopes down. Students who are better at school will have more to gain from education, and this will be reflected in a higher demand curve.

The height of the supply curve is given by the marginal cost of the funds used to pay for the investment. Higher levels of education require more money and require the individual to access successively more expensive pools of capital, from parental savings to borrowing, and so on. So the supply curve is upward sloping. However, students from richer backgrounds will have greater access to relatively cheap capital, and will have supply curves that are less sloped, or further to the right.

Educational choice is determined by the intersection of supply and demand.

Suppose we have two individuals with the same demand for education. In Figure 1, below, there is a situation of unequal access. One student (number 1) can finance his education with parental savings at a low opportunity cost while the other (number 2) would have to access more expensive student loans and eventually even more expensive private loans in order to achieve the same level of education. The poorer student chooses less education.

**Figure 1.** Unequal Access



Years of Schooling

A natural definition of "equal access" in this framework is a situation where the marginal cost of the funds needed to attend university is the same for every student - i.e., that the supply curves for each student are identical.[4] Students with more to gain will still get more education, but the cost of the funds used will be the same for everyone. One could go further and ask that policies be designed to ensure that the marginal cost of funds be set equal to the social cost, and that students be able to borrow as much as they wish at this

rate - i.e. to make the supply curve perfectly elastic. This is a goal that in principle could be achieved with a generous student loan system - i.e. without the use of grants. This situation is illustrated in Figure 2, below.

**Figure 2.** Equal Access



Years of Schooling
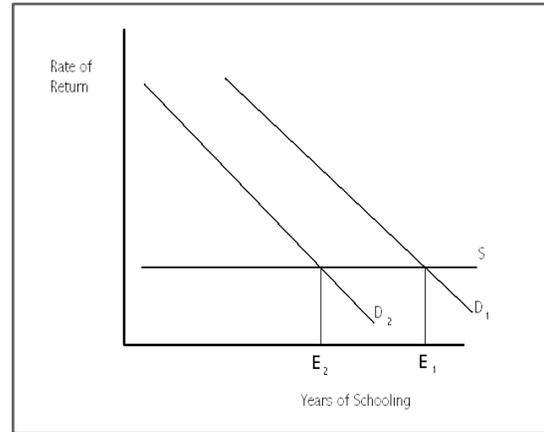
Clearly, under this definition of equal access different students will choose different levels of education, and more educated students will go on to make more money over their lifetime. Nonetheless, two students of equal ability (as measured by the height of their demand curves) will choose the same level of schooling even if their family incomes are different. This happens because a student loan program ensures that the marginal cost of funds is the same for each student.

Of course the rate of interest on a student loan might have to be below market if it is to match the opportunity cost of funds to a particularly wealthy family, and there are further issues if the richer student is making the attendance decision while the parents are footing the bill. However, both of these situations will ultimately support an argument for grants to low-income students. Here we wish

to make a different point, and so we will be considering a situation where two students do face the same cost of funds, but one has a higher family income than the other. What we will argue, quite simply, is that the position of a student's demand curve for education will depend on more than his or her ability at school. In particular, it may also depend on family income.

One reason that a rich student might have a higher demand for education is that attending university brings benefits other than increased future income. Richer people have more money to spend on good things generally, and thus might choose to buy more education, even though they face the same price as everyone else. However, to the extent that education has consumption value, the normative force of any argument for equal access is lessened. If we are to have equal access to education, then why not equal access to expensive cars and bigger houses? Equal access is a good thing, but why should education get special treatment?

Postsecondary education is special, we argue, not because it has some consumption value, but because it is an investment good whose personal or "psychological" rate of return will vary with family income. To see this, consider a pair of potential students who are identical in every respect apart from family income. They have the same family background, the same academic abilities, they face the same alternative employment and afterwards, as a graduate or non-graduate, each expects the same yearly income and other benefits. Importantly, even though their family income

differs, each also receives the same level of financial support from their family *conditional* on their attendance at university or college.

Children in their late teens may also receive family support whether or not they attend university. Richer ones may own a car, be covered by a family dental plan, or receive a monthly allowance. This *unconditional* family support does not change the financial cost of attending university (since it is received whether the student attends or not) and therefore does not affect the financial rate of return to attendance. Nonetheless, it will affect the lifestyle these young people are able to afford at this stage in their lives.

In this example the financial costs of attending university, by assumption, are the same for each student, as are the expected benefits. However, the personal impact of having less money to spend while attending university will depend on the overall level of unconditional family support. Suppose that attendance at university for each student will require a reduction in yearly expenditure of $5000.00 relative to the alternative of taking a job immediately after high school. The student from a poorer background, while attending school, might face a reduction in yearly expenditure from $10,000 to $5000. The richer student might face a reduction from $20,000.00 to $15,000.00. The financial cost is the same, but the increase in the level of hardship the poorer student faces by attending university will be greater. The level of hardship associated with very low levels of expenditure increases in a nonlinear fashion,

and the first student therefore faces a higher personal cost of attending university.[5] Even though the financial costs and benefits are assumed to be the same, the poorer student may need a higher financial rate of return before she will decide to attend.

This is an effect that works through the demand side of Becker's model. Two students who face the same financial rate of return from attendance, and who are identical in all other respects apart from the unconditional financial support they get from their parents, will not face the same personal or "psychological" rate of return to attendance. Students from richer backgrounds will demand more education because the relative hardship they experience in attending is less. Since this effect works through the demand side, access to a fully efficient loan system that might equalize the financial cost of attendance for rich and poor will not change the result.[6]

At this point the normative issue, quite simply, is: "Is this fair?" Some might argue that there is no normative issue. Rich people have access to more investments than poor people, just as they are able to consume more of every other good. However, inherent in the notion of "equal access" is the belief that university education should be treated as a "merit good", like medical care. Rich people would also demand more medical care, because they can afford it, but Canadians have decided that they would prefer to see this good allocated through triage, according to

need, rather than by willingness to pay. In a similar way, many believe that university education should be allocated according to potential benefit. Indeed, the common definition of "equal access" says precisely that: "Everyone who stands to benefit should have the opportunity to attend."

Postsecondary education, especially for those who have the ability to benefit but are at the margin of attendance due to low family income levels, can be a life-transforming event. Our normative perspective is that the relative hardship a student experiences due entirely to her being born in a poorer family simply should not matter in the making of such an important decision. For those who take this normative position, evidence that hardship is a factor in educational decisions will provide a separate rationale for the use of grants to low income students in order to achieve equal access to education.[7]

### Implications

It has long been known that students from more affluent backgrounds are more likely to attend university. However, when other background influences such as parental education are considered, the effect of parental income falls off sharply. The standard interpretation is that for reasons of nature or nurture, parents who desire education tend to raise children who also desire education. These parents also tend to earn more income. However, higher parental income does not di-

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[5] "I've learned to appreciate every single thing I have and it's hard for me to see people here throwing away hundreds of dollars on clothes and parties and stuff. I just don't get it." (student at Queen's University, quoted in The Journal, Queen's University, Nov 30, 2006.

[6] Our companion paper (Carmichael and Finnie, 2007) directly establishes this result and the implications discussed in the next section.

[7] Canadians generally support the idea that access to health care should not depend on family income. Our definition of "equal access" imposes the same normative condition on access to investments in post-secondary education.

rectly affect the demand for education. Rather, it relaxes the liquidity constraints that might prevent a qualified student from going to university, and therefore leads to higher attendance. In the absence of financial barriers to attendance, i.e. in the presence of a good student loan system, the relationship between income and attendance should disappear.

Our approach is based on the very simple idea that the "value of a dollar" to an individual is higher when the person has less money. All else equal, giving up $5000.00 of expenditure per year is more of a challenge when you have less money to start with. So, if our approach is correct, the effect of family income on attendance will never completely disappear no matter what else is included in the regression. The YITS data, with their particularly rich set of background variables, will allow us to challenge this proposition.

A second implication concerns the effect of student loans on study effort. Holding future income constant, students with larger loans expect to have lower expenditure levels in the future, and the value of an extra dollar of future income is higher. To the extent that study effort leads to higher incomes, it follows that students with larger loans should be putting more effort into their studies. It is more important for them to graduate, and get a well-paying job. This is an implication that can be directly tested with the YITS data.

A final implication is that the effect of changes in the cost of education, including the opportunity cost, will be greater for stu-

dents from poorer backgrounds. Since the value of a dollar is higher for poorer students, a change that affects the amount of money they have to spend, at school or in their alternative, will have a larger affect on behaviour.[8] This is not something we can test with the YITS data directly, but in the next section we will briefly discuss evidence from the literature that supports it.

### The Evidence

In this section we report the results of some empirical tests of these propositions. The one prediction we do not test directly is the final one, as our data do not exhibit much variation in cost variables. However, we note that this is an old issue in the Economics of Education literature.[9] Researchers such as Hoenack (1971), Bishop (1977), McPherson and Shapiro (1991) and others have noted that changes in cost variables such as transportation costs, tuition fees, and student aid all have a larger affect on access for students from lower income families. These older papers do not provide much in the way of a theoretical framework, but to the extent that they are concerned about the distribution of income, they tend to speak in terms of income rather than "hardship" or utility. Even though their (implicit) models are linear, the empirical result is not surprising and could be driven by the financial constraints that prevent poorer students from attending university.

More interesting, perhaps, is the fact that changes in the alternative wage (Corazzine et. al., 1972) also have a greater effect on access

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**8** These three implications are worked out explicitly in our MESA working paper (Carmichael and Finnie, 2007).

**9** We thank the MESA referees for these references.

for lower income students. Changes in the alternative wage do not alter the amount of money one needs to subsist at university, and a change in the alternative wage will change the financial return to education by the same amount for a rich or a poor student. In our approach a change in the alternative wage has a greater effect on the return for a poorer student. It might be expected, therefore, to have a greater effect on behaviour, even in a system that provides unlimited and cheap access to educational loans. While we believe this does have normative implications for the use of targeted grants, it is not a prediction we are able to test directly with the YITS data.

We test the remaining propositions using the two related datasets - the Youth in Transition Survey, Cohorts A and B (or "YITS-A" and "YITS-B"). These data are described elsewhere in this volume. We note here simply that the quality of the background variables is particularly high. We have information on student grades and attitudes, and information about family background is also plentiful and was gathered by interviews with the parents.

### Family Income Effects on Access

Our approach suggests that family income will affect access by affecting the demand for education, rather than by affecting its "affordability". The YITS surveys included questions about the existence of financial constraints that might have affected access. This allows us to examine the effect of family income on a sample of young people who report that they face no financial barriers to post-secondary education.

The dependent variables used in our access models represent a bit of a turning of the usual set-up on its head. This is done in order to facilitate the investigation of the precise hypotheses being entertained. Whereas access models usually consist of using a logit or probit (or sometimes simply a linear probability model) where participating in post-secondary education takes the value of one and not participating is given a zero, here we turn those relationships around and, at least in the first case, accessing PSE is given a value of zero and non-access is given a value of one -- thus simply reversing the nature of the usual relationships (e.g., higher parental income will be expected to have a negative rather than positive effect).

The reason for this approach is to allow us to study the effects of income (and the other variables included in the models) on the different reasons for non-participation -- corresponding to the different implications of our model. We thus use a multinomial logit model set-up where 0 is participation in PSE, 1 is non-access and the individual cites a financial barrier as the reason for his or her non-participation (i.e., affordability is the issue), and 2 is non-access but the person does not cite a financial constraint as the reason for non-participation (in the raw data, of those who did not attend post-secondary education by the final survey, 18% of males and 27.3% of females cited financial barriers as the reason.).

We would thus expect family income to affect the financial constraint non-access outcome if the student financial aid system is not doing a complete job or there is otherwise some set of factors that generate such an income-

financial barrier relationship. We would, however, also expect family income to affect the no financial constraint non-access outcome if income also plays a role in the participation decision, as we have argued it does. Income might also operate through other channels (such as high school outcomes), but we believe the YITS-A dataset is sufficiently rich that such other effects are likely controlled for (e.g., we include grades, the PISA reading score, and other such possible mechanisms through which income could affect access indirectly in certain variants of the models), thus leaving us to at least tentatively conclude that we are in fact estimating "pure" or "direct" income effects.

The results of this estimation are shown in Tables 1 and 2. Table 1 shows the results of the simpler access ("0") versus non-access ("1") model, while Table 2 breaks the latter into those citing a financial barrier ("1") and those who say it was not a lack of financing that stood stand in the way of their participation in PSE ("2").

In each case, two sets of results are presented, one in which the "PSE" outcome includes both college and university students, and a second in which only university students are included among the participants, and college students are excluded from the models. We actually focus on the latter specification because the literature has clearly established that university access is the more highly differentiated PSE outcome where family background and other effects matter more, and hence we expect to find sharper results with this model. Finally, each set of models is estimated with parental education first excluded and then included in order to

show how much of the "raw" or "total" family income effects appear to in fact be parental education effects -- and also to show the general magnitude of these other background effects. In all cases the models also include controls for sex, province, family type, and visible minority and immigration status, although the results for these variables are not reported here.

The most interesting and general finding from Table 1 is that family income is indeed significantly related to non-participation in PSE. These income effects are significantly attenuated when parental education is added to the model (the second column in each set of results). Still, significant income effects remain. So, for example, when only the sharper university versus no PSE comparison is made (the left hand columns) the top two family income categories are associated with 11 and 21.9 percent lower probabilities of not participating in university when parental education is excluded, while these effects fall to a considerably lower, but still significant (and important) 4.8 and 9.3 percentage points when parental education is added. These results hold, if perhaps not quite as strongly, when college students are included and grouped with university students in the PSE participation group -- as expected.

We then turn to what is perhaps the even more interesting proposition: that family income affects participation for both i) those who face financial barriers to their participation in PSE, which the student financial aid system is of course meant to rectify, and ii) those who are not financially constrained from going to PSE but do not participate anyway (for other reasons). The results re-

ported in Table 2 show the effects of family income on each of these outcomes.

The results suggest, first, that the student financial aid system does indeed seem to be doing a good job in the sense that being constrained from going to PSE due to the financial barriers is only relatively weakly related to family income, with most of the income-related coefficients in the first equation ("Financial Barrier") not statistically significant, and those that are significant being relatively small in magnitude, especially once the parental education variables are added.

Family income is, however, in general significantly related to not going to PSE even when the person is not financially constrained from going (the "Financial situation not a barrier" equations). This is especially true, again, when the university option is isolated. The implication of this finding is that the student financial aid system might need to go beyond pure "affordability" criteria if it wants to level the PSE access playing field for young people from lower income families.

## Student Loans and Effort

Finally, we turn to the effects of having a student loan on effort. Effort is measured as the number of hours spent on schoolwork out of class, and is estimated using a Tobit framework since the endogenous variables is censored at zero (although a simple OLS approach generated very similar findings). The same different sets of controls are included as in the preceding persistence models, but again we report only the student financial aid variables.

The findings are in fact interesting, if only because the coefficients on the student loan variables conform to the predictions of the model. University students with loans spend, on average, in the range of .5 or .6 more hours per week (outside of class) on their school work than do those without loans -- and this on a mean value of around 10 hours per week. For college students, the effects are slightly smaller, in the range of .3 or .4 hours, but this would be expected in a context where mean hours are also lower, and the effects are still statistically significant. Note that the final regression includes measures of high school grades and engagement as well as university grades and engagement, and the effect of loans on effort is strongest in this regression. We may thus conclude that this first evidence is in fact consistent with the predictions of our model regarding student loans and student effort.

## Conclusions

The general arguments in favour of public grants for the support of postsecondary education are well known. The strongest argument is based on the belief that education for a relatively gifted subset of the population provides external benefits to all of society, and should be encouraged. This argument does not suggest that education should be free, however, since the personal benefits of higher education are substantial and the incentive for good students to pursue higher education is already very high. Other arguments in favour of grants suggest that they help provide a neutral tax system, or may serve as a second best response to informational issues about the benefits of education that may be of particular importance for

poorer students. Further arguments for grants, or for education to be "free", are normally dismissed by economists as ideological statements about the appropriate role of the state in society (if they come from colleagues in academe) or as self serving calls for undeserved public transfers (if they come from students). Of course students are not the only group asking for more government transfers. At this point, however, recognizing that university students are a group favoured by our market economy, most economists will argue that further support should come in the form of loans.

This paper has argued that family income will affect access to education through its effect on the personal rate of return to schooling. We can illustrate the main idea with reference to a pair of potential students who are identical in every respect but family income. The first student is from a richer family and owns a car, has a wardrobe full of clothes, is covered by her parents' dental plan, and may receive a monthly allowance. These benefits are hers whether or not she goes to university. The other has none of this. Even though these students have the same ability, face the same alternative wage and the same financial rate of return to university, the first may be more likely to attend. The second, even though she will experience the same decrease in expenditure levels to attend university, may experience a greater increase in hardship relative to her alternative. Attending university might bring her close to a subsistence level of expenditure that could be quite difficult to endure.

The idea has positive implications for the effect of income on access. In particular, even among students who are unconstrained by financial barriers we would expect to see a positive relationship between family income and access to higher education. This relationship should survive the addition of any number of parental and family background variables, and even the amount of conditional financial support received by the student from his family. It is a pure income effect on behaviour. A second implication is that students with outstanding loans can be expected to work harder to graduate. Data from the YITS-A and YITS-B surveys provides support for these predictions. The model also predicts that the response of poorer students to changes in costs, including opportunity costs, will be larger. This implication also has empirical support, although we have not tried to find it in the YITS data.

The idea also has normative implications for the design of programs to provide equal access to post-secondary education. In particular, a student loan program will have no effect on the empirical implications of the model - even an ideal loan system will not provide equal access. Equal access also requires that we provide grants to students from poorer backgrounds.

While not discussed here, there are many student support programs that essentially combine loans with targeted grants. Income contingent loan programs combine loans with public grants (i.e. debt forgiveness) to those students who end up earning less money over their lifetime. A graduate tax is like an income contingent loan system where the grants come from the more successful students, who end up paying more for their education than graduates who earn less money.

These programs have advantages, but differ from the loan / grant programs discussed here in that the recipients of grants are those who experience lower personal lifetime income, rather than those whose parents are poor. Since the arguments here depend on the hardship caused by low parental income, they support the idea that grants should be given directly to those students whose parents are poor.

Finally, it is of course one thing to suggest that a grant be given, but quite another to suggest how large it should be. We are some way yet from addressing this second issue.

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## Appendix

**Table 1**. Access Models: Simple Case of Participation Vs. Non-Participation

| | University Only | | College and University | |
|---|---|---|---|---|
| | 1 | 2 | 1 | 2 |
| **Parent/guardian's Education (HS completed)** | | | | |
| Less than HS | | 0.1302♦ | | 0.1425♦ |
| | | [0.0239] | | [0.0254] |
| Some PSE | | -0.0857♦ | | -0.0751♦ |
| | | [0.0277] | | [0.0242] |
| Trade/College | | -0.0906♦ | | -0.0696♦ |
| | | [0.0189] | | [0.0169] |
| University-below BA degree | | -0.2603♦ | | -0.1781♦ |
| | | [0.0330] | | [0.0288] |
| University-BA | | -0.3340♦ | | -0.2286♦ |
| | | [0.0195] | | [0.0166] |
| University-Grad | | -0.4127♦ | | -0.2841♦ |
| | | [0.0222] | | [0.0198] |
| Other/unknown | | 0.2299▪ | | 0.3124▪ |
| | | [0.1066] | | [0.1383] |
| **Parental Income Level ($50000 to $75000)** | | | | |
| Extremely low ($0-$5000) | 0.0985 | 0.1021 | 0.0973 | 0.0874 |
| | [0.0744] | [0.0721] | [0.0653] | [0.0653] |
| $5000 to $25000 | 0.1880♦ | 0.0895♦ | 0.1504♦ | 0.0709♦ |
| | [0.0274] | [0.0286] | [0.0264] | [0.0262] |
| $25000 to $50000 | 0.1137♦ | 0.0570♦ | 0.0779♦ | 0.0376▪ |
| | [0.0183] | [0.0180] | [0.0167] | [0.0165] |
| $75000 to $100000 | -0.1096♦ | -0.0476♦ | -0.0789♦ | -0.0393▪ |
| | [0.0179] | [0.0171] | [0.0155] | [0.0154] |
| $100000 and up | -0.2178♦ | -0.0930♦ | -0.1574♦ | -0.0843♦ |
| | [0.0185] | [0.0201] | [0.0159] | [0.0175] |

Average marginal effect shown. Standard errors in brackets

♦ p<0.01, ▪ p<0.05, * p<0.1

**Table 2.** Access Models: Reasons for Non-Participation

| | University Only | | | | College and University | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 1 | | 2 | |
| | Financial barrier | Financial situation not a barrier | Financial barrier | Financial situation not a barrier | Financial barrier | Financial situation not a barrier | Financial barrier | Financial situation not a barrier |
| **Parent/ Guardian's Education (HS completed)** | | | | | | | | |
| Less than HS | | | 0.0265 | 0.1037◆ | | | 0.0289 | 0.1136◆ |
| | | | [0.0247] | [0.0295] | | | [0.0188] | [0.0332] |
| Some PSE | | | -0.019 | -0.0672* | | | -0.0174 | -0.058 |
| | | | [0.0188] | [0.0361] | | | [0.0136] | [0.0354] |
| Trade/College | | | -0.0119 | -0.0789◆ | | | -0.0095 | -0.0605▪ |
| | | | [0.0123] | [0.0236] | | | [0.0092] | [0.0236] |
| University-below BA degree | | | -0.0572◆ | -0.2033◆ | | | -0.0401◆ | -0.1384◆ |
| | | | [0.0182] | [0.0504] | | | [0.0143] | [0.0469] |
| University-BA | | | -0.0620◆ | -0.2722◆ | | | -0.0426◆ | -0.1863◆ |
| | | | [0.0099] | [0.0259] | | | [0.0079] | [0.0244] |
| University-Grad | | | -0.0918◆ | -0.3218◆ | | | -0.0663◆ | -0.2185◆ |
| | | | [0.0085] | [0.0365] | | | [0.0071] | [0.0346] |
| Other/unknown | | | -0.0831* | 0.3187◆ | | | -0.0568 | 0.3774◆ |
| | | | [0.0473] | [0.1107] | | | [0.0360] | [0.1396] |
| **Parental Income Level ($50000 to $75000)** | | | | | | | | |
| Extremely low ($0-$5000) | 0.0723 | 0.024 | 0.0746 | 0.026 | 0.0637 | 0.0312 | 0.0628 | 0.0227 |
| | [0.0536] | [0.0772] | [0.0542] | [0.0729] | [0.0428] | [0.0771] | [0.0424] | [0.0739] |
| $5000 to $25000 | 0.1045◆ | 0.0813▪ | 0.0824◆ | 0.0049 | 0.0831◆ | 0.0648* | 0.0647◆ | 0.0037 |
| | [0.0256] | [0.0334] | [0.0243] | [0.0326] | [0.0202] | [0.0344] | [0.0190] | [0.0332] |
| $25000 to $50000 | 0.0616◆ | 0.0497▪ | 0.0506◆ | 0.0041 | 0.0459◆ | 0.0296 | 0.0384◆ | -0.0032 |
| | [0.0132] | [0.0247] | [0.0127] | [0.0234] | [0.0102] | [0.0247] | [0.0098] | [0.0237] |
| $75000 to $100000 | -0.0092 | -0.1009◆ | 0.0021 | -0.0502▪ | -0.0055 | -0.0739◆ | 0.0019 | -0.0417* |
| | [0.0095] | [0.0262] | [0.0099] | [0.0246] | [0.0075] | [0.0247] | [0.0078] | [0.0243] |
| $100000 and up | -0.0392◆ | -0.1785◆ | -0.0182* | -0.0747▪ | -0.0285◆ | -0.1289◆ | -0.0158▪ | -0.0685▪ |
| | [0.0079] | [0.0294] | [0.0095] | [0.0298] | [0.0064] | [0.0273] | [0.0073] | [0.0285] |

Average marginal effect shown. Standard errors in brackets

◆ p<0.01, ▪ p<0.05, * p<0.1

**Table 3.** Student Financial Aid and Hours Spent on School Work Outside of Class

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| | Tobit (1) | Tobit (2) | Tobit (3) | Tobit (4) | Tobit (5) |
| **College** | | | | | |
| Scholarships | 1.263◆ | 0.972◆ | 0.486▪ | 0.479▪ | 0.533▪ |
| | [0.23] | [0.23] | [0.22] | [0.22] | [0.22] |
| Grants | 0.357 | 0.255 | 0.11 | 0.036 | 0.0188 |
| | [0.29] | [0.28] | [0.27] | [0.27] | [0.27] |
| Student Loans | 0.400▪ | 0.365▪ | 0.255 | 0.256 | 0.228 |
| | [0.18] | [0.18] | [0.18] | [0.18] | [0.18] |
| **Constant** | 10.150908 | 8.9306622 | 8.8192717 | 9.0656924 | 9.5413583 |
| **# of Observations** | 7147 | 7147 | 7129 | 7129 | 7129 |
| **University** | | | | | |
| Scholarships | 1.868◆ | 1.893◆ | 0.903◆ | 0.678◆ | 0.640◆ |
| | [0.22] | [0.22] | [0.22] | [0.23] | [0.22] |
| Grants | 0.396 | 0.479* | 0.394 | 0.358 | 0.281 |
| | [0.27] | [0.27] | [0.26] | [0.26] | [0.25] |
| Student Loans | 0.524▪ | 0.447* | 0.539▪ | 0.642◆ | 0.639◆ |
| | [0.25] | [0.26] | [0.25] | [0.25] | [0.24] |
| Constant | 12.393008 | 12.326585 | 11.530606 | 11.497167 | 10.456201 |
| # of Observations | 5253 | 5253 | 5235 | 5235 | 5235 |

**Note:** Only the results for the student financial aid variables included in the models are reported. The others variables are listed below.

1): Includes only the student financial aid variables and transition year variables.

2): Adds basic background variables, such as gender, visible minority status, region of schooling, family structure, and parental education.

3): Adds high school grade and high school engagement variables.

4): Adds PSE grade variables.

5): Adds PSE engagement variables.