Equal Education, Unequal Jobs: College Students with Disabilities

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1. Introduction

In both the United States and in Canada, the proportion of students with disabilities who graduate from high school, enrol in postsecondary education and attain a postsecondary credential has markedly increased in recent decades. For example, a comparison of the two cohorts of the National Longitudinal Transition Study indicated that the postsecondary enrolment rate among American special education students rose by 17 percentage points, from 14.6 to 31.9 percent, between 1990 and 2005 (Wagner, Newman, Cameto, & Levine, 2005, p. 4–3). In the Canadian context, McCloy and DeClou (2013, p. 10) report that in Ontario "the percentage of college and university graduates who reported a disability has been increasing since the 1980s, rising from 3 per cent of certificate/diploma graduates and 2.2 per cent of bachelor's degree graduates in 1986 to 8.7 per cent and 6.6 per cent, respectively, for the 2005 graduating class."

Overall, however, there remain significant gaps in the educational attainment of people with and without disabilities. The nationally-representative Participation and Activity Limitation Survey showed a gap of about 12 percentage points in the proportion of Canadian adults, aged 25-64, who possessed a postsecondary degree or certificate (Government of Canada, 2013, p. 27) Just over 50 percent of people with disabilities had a postsecondary degree or certificate while 62 percent of those without a disability had a degree or certificate.

Given the many barriers that face people with disabilities on the path to a postsecondary degree — barriers created by the disability and barriers created by the absence of accommodation by schools — it would not be surprising to find that the postsecondary dropout rate among such students is higher than among students without disabilities. While studies comparing postsecondary students with and without disabilities are not common (Barber, 2012), a few recent studies have nonetheless found that, among people who have enrolled in postsecondary education, those with disabilities graduate at the same rate as those without disabilities (Fichten et al., 2012; Wessel, Jones, Markle, & Westfall, 2009).

In this study, we use a unique data set, funded by the Canada Student Loans Program (CSLP), and generated by a 2009 survey of a large number of former students from across Canada who had borrowed from the CSLP. Included among the roughly 8,000 respondents were about 600 students with disabilities who had received a special grant available to students who provided medical documentation of a permanent disability. Because the survey was conducted six to eight years after the student first received a loan or a grant from the CSLP, we are able to analyze postsecondary graduation as well as early post-schooling labour market outcomes.

Like Wessel et al. (2009), we find that the dropout rates among respondents with and without disabilities are roughly the same. Using a variety of econometric techniques, we show that this finding is robust to the inclusion of other observable variables and to alternative estimation techniques.

The labour market outcomes for those with and without disabilities, however, are not at all the same. For this group of former students with disabilities, whose educational attainment is roughly equal to former students without disabilities, labour force participation is lower and

unemployment higher. The disparities are large and are robust to the econometric techniques that we employ.

Because the survey was conducted by the CSLP, we had access to the loan histories of the respondents. While those with disabilities had the same graduation rates, they borrowed about 50 percent more than those with disabilities from the student loan program. While the effect of increased borrowing on labour market outcomes is unclear theoretically, we find that higher borrowing is associated with a higher risk of unemployment. That is, respondents with disabilities were equally likely to graduate, *ceteris paribus*, but were likely to have more debt and fewer job prospects.

2. Disability and Educational Attainment

Over time, the prospects of postsecondary success for students with disabilities have improved. Studies of past cohorts of students demonstrated that disability negatively affected educational attainment. Studies of more recent cohorts, while not discounting the challenges that students with disabilities face, are more optimistic.

Case, Fertig, & Paxson (2005) analyzed the effect of the number of physician-assessed chronic health conditions on educational attainment, using the 1958 British cohort study.[1] The number of chronic health conditions present at age 7 (and at age 16) was negatively correlated with educational attainment, measured as the number of O-level passes at age 16.[2] When the chronic health conditions were classified as either physical, mental or emotional, or "system" (e.g., respiratory or heart conditions), only the number of mental and emotional conditions was significantly related to educational attainment. This difference between people with physical and non-physical disabilities also appears in the Canadian and US data (Currie & Stabile, 2006, p. 1112).

Wagner, D'Amico, Marder, Newman and Blackorby (1992) reported on the postsecondary completion rates, five years after high school, of their representative sample of American special education students. About 12 percent of the special education students had obtained a postsecondary credential as compared to 18 percent in the general population (Wagner et al., 1992, p. 3–28).

More recently, however, Fichten et al. (2012) surveyed a sample of graduates from three large two-year colleges in Canada. About 12 percent of the respondents self-identified as having a disability. Fichten et al. (2012) found that the employment rates for graduates with disabilities were roughly the same as the employment rates for graduates without disabilities. Wessel et al. (2009) followed more than 10,000 students at one large public university in the US longitudinally and found that those with and without disabilities were equally likely to graduate.

[1] The 1958 British Cohort Study followed the cohort of people who were born on March 3, 1958, collecting information from them (or their parents) at birth and then at ages 7, 11, 16, 23, 33 and 42.

[2] O-levels were subject-specific standardized tests that were given to 15- and 16-year old students in the United Kingdom. They were discontinued in favour of the General Certificate of Secondary Education (GCSE) examinations in 1988.

3. The Canadian Context

Background

The Canada Student Loans Program (CSLP) has created a number of targeted programs for students who face various financial barriers to educational attainment. We are concerned here with students who face barriers related to permanent physical and non-physical disabilities. Below, we briefly discuss the three different grant programs for students with disabilities that are relevant here, those in place from 2002-2005, 2005-2009 and 2009 to the present. In order to receive a grant from any of these programs, students must apply for a CSLP loan and provide documentation of their permanent disabilities.[3]

Students with disabilities are a growing presence on college and university campuses in Canada (McCloy & DeClou, 2013, p. 9). The welcome growth in the numbers of students with disabilities is due, in no small part, to the decades-long trend to toward "inclusive education." In recent decades, there has been a gradual move away from the exclusion and segregation of those with disabilities and toward deinstitutionalization, integration and inclusion into regular classrooms in regular schools (Hanes & Werk, 2011).

The trend toward inclusion has led to an increase in the number of young people with disabilities who have graduated from high school. The proportion of young people with physical disabilities who have graduated from high school is now about the same as the proportion of high school graduates among young people without any disabilities. The proportion of high school graduates among young people with non-physical disabilities, including severe cognitive disabilities such as significant developmental delays, is lower.

Another key enabler of the access to postsecondary education of students with disabilities has been the growth in campus-based services for students with disabilities. Since the late 1980s, disability offices have been created in all Canadian provinces, supported by provincial ministries responsible for colleges and universities. Ontario led the way with funding envelopes dedicated to disability services for both two-year colleges and universities.

It is also the case that the extent to which some kinds of disability are diagnosed has been growing, increasing the number of students who are classified as having a disability without, perhaps, increasing the underlying prevalence of disabilities. Foremost among the disabilities in this category are learning disabilities. Where once there was no advantage to revealing a disability, the existence of on-campus supports may motivate some to identify themselves to disability services offices.

Finally, technological innovation has made it far easier (though still far from easy) for student with disabilities to succeed on campus. Just two examples of the many available technological innovations are:

[3] That documentation can take the form of a medical certificate, a psycho-social assessment or documentation of the receipt of federal or provincial disability assistance.

- speech recognition software (e.g., Dragon Naturally Speaking) that allows users to "dictate" into a microphone, and see their spoken words appear on the computer screen as text; this helps students whose oral language ability is better than their writing skills; and

- personal FM listening systems (e.g., Easy Listener) that transmit a speaker's voice directly to the user's ear. This tool may help the listener focus on what the speaker is saying. The unit consists of a wireless transmitter (with microphone) worn by the speaker and a receiver (with earphone) worn by the listener.

A Brief History of CSLP Grant Programs for People with Permanent Disabilities

To improve the postsecondary participation rate among people with disabilities, federal and provincial governments have created various programs designed to help people with disabilities to break down barriers thought to affect their postsecondary access and persistence. Currently, at the federal level, four major measures exist to assist people with permanent disabilities:

1. *Loans*: people with permanent disabilities are eligible for loans based on full-time attendance under a definition of "full-time" that requires fewer courses than required for students without disabilities.
2. *Grants*: people with permanent disabilities who qualify for a Canada Student Loan may be eligible for the various kinds of grants that are described in more detail below.
3. *Repayment Assistance*: the CSLP Repayment Assistance Plan for Borrowers with a Permanent Disability (RAP-PD) links the size of loan repayments to the borrowers' income, making it easier for borrowers with a permanent disability to manage their student debt.
4. *Loan remission*: the Permanent Disability Benefit provides loan remission for people with severe permanent disabilities.

The Canada Student Grant for Students with Permanent Disabilities (CSG-PD) is a grant of $2,000 per year for students with permanent disabilities.[4] To receive a grant under the current program, students must apply for and be eligible for a Canada Student Loan and must provide proof of the permanent nature of their disability. In general, the grant will be additional to borrowing from the Canada Student Loans program. However, for students whose assessed need is less than $2,000, the grant will eliminate the need to borrow. For example, a student whose assessed need is $1,500 will get a $2,000 CSG-PD and will not need to take out a Canada Student Loan.[5]

The current program was preceded by two earlier iterations. The first, in operation from August, 2002 until August, 2005, was officially named the Canada Study Grant for High-Need Students with Permanent Disabilities (CSG-PDHN) and provided up to $2,000 per year. Unlike the current program, however, the grant was given only to those students whose assessed need exceeded the maximum amount they could borrow. That is, CSG-PDHN was a "last dollar"

[4] The other grant is called the Canada Student Grant for Services and Equipment for Persons with Permanent Disabilities and is discussed briefly below.

[5] According CSLP administrative data, about 7 percent of those who received a grant for students with permanent disabilities in 2009-2010 and 2010-2011 did not borrow from the CSLP.

grant; only students who had received the maximum possible loan amount and who still had demonstrated need could get a CSD-PDHN.

From August, 2005 until August, 2009, the second earlier version of the current program, officially named the Canada Access Grant for Students with Permanent Disabilities (CAG-PD), was in operation. This program also offered up to $2,000 per year but was a "first dollar" grant. That is, the grant was given before any loan needed to be taken so, as with the current CSG-PD, students whose need was less than $2,000 received only the CAG-PD and no loan. Loans were offered only if need was greater than $2,000. On average, therefore, the students with disabilities who received a grant from the 2002-2005 CSG-PDHN program had greater financial need than students with disabilities who received a grant from the 2005-2009 program.

In addition to the grants available from one or another of the above programs, a second grant program provides money to pay for any disability supports that students might need. Currently known officially as the Canada Student Grant for Services and Equipment for Persons with Permanent Disabilities, this program provides up to $8,000 per year to pay for specific supports that particular students might need. The student must document their need for the services and equipment and provide estimates of the cost. Under several different names, this grant program has existed since 1995 and has provided up to $8,000 per year since August, 2002.

4. Data Sources

In this paper, we use data obtained through the CSLP. These data include one survey (the Canada Student Loan and Grant Recipient Survey) and two administrative databases (the Needs Assessment Reports and the CSLP "designation" file). Each of these sources is described in turn below.

The Canada Student Loan and Grant Recipient Survey

Between April and July 2009, Malatest and Associates, on behalf of the CSLP, conducted a survey of a representative sample of people who had first received a CSLP loan or grant, for the first year of a postsecondary program, in one of three loan years (2002-2003, 2003-2004 or 2004-2005).[6] The number of completed responses was 8,027 with 635 disability grant recipients and 7,392 non-recipients. After merging the survey data with the administrative data described below, the number of completed responses was 6,977 with 544 disability grant recipients and 6,433 non-recipients. The survey firm created weights to adjust for nonresponse and the stratified sampling procedure. We use those weights in our analyses of the data.

Needs Assessment Reports (NARS)

The first of our two administrative data sources is the Needs Assessment Reports that form one of several CSLP administrative databases. The Needs Assessment Reports are generated by the

[6] A "loan year" runs from August 1 to July 31 and is the year in which the borrower intends to study. Thus, the 2002-2003 loan year runs from August 1, 2002 to July 31, 2003; students borrowing in order to study during that period are classified as having borrowed in that loan year. A number of measures were taken to achieve high response rates but the overall response rate remained slightly below 50 percent (49.43 percent).

provinces based on information provided by each potential aid recipient at the time they apply for aid, usually in the spring prior to the start of the subsequent loan year.

For research purposes, the NARS information is not as complete as one might hope. For example, we know which respondents received a grant from one of the disability grant programs which in turn implies that they had provided evidence of a permanent disability; however, that evidence was provided to the provinces and not to the CSLP. The nature of the disability (as opposed to its existence) is, therefore, not contained in the NARS data held by the CSLP.

Designation File

Our second administrative database contains information about the loans and grants received by each survey respondent. Information about loan balances, loan repayment and current loan status is updated monthly in the "designation file". With one exception, we capture data from the designation file at two points in time: (1) July, 2009, the last month during which the survey was conducted; and (2) June, 2011, the last month for which data was available to us from the designation file.

5. Dependent and Independent Variables

Using the above data sources, we constructed a set of dependent and independent variables for use in our empirical analyses.

Our indicator for having a permanent disability comes from the NARS files and is an indicator for whether the student applied for a disability grant. The application for a disability grant must be accompanied by a note from a medical practitioner and, thus, is more than a self-reported measure. It is important to keep in mind that the variable is not whether or not the respondent has a disability; it is whether the respondent chose to document a permanent disability in order to be eligible for a CSLP disability grant.

Based on a series of survey questions that essentially track students through their various postsecondary experiences, we define respondents as "dropouts" if they left their initial program and did not return to school before the survey date, five to seven years later.

For the labour market outcomes, we first identify individuals who are still enrolled in a post-secondary institution in 2009 and exclude them in the analysis. Such an exclusion is not in keeping with standard analyses of labour force participation because those who are "in school" are usually defined as "out of the labour force." However, because we started with a sample of people all of whom were in school, and are interested in their post-schooling labour force status, we think it justifiable to excludethe few who are still in school, five to seven years after starting their first postsecondary program.

For the respondents who had completed their education, we define three categories of labour market outcomes: employed, unemployed, and out of the labour force. The outcomes we examine are the probability that the respondent is:

(1) in or out of the labour force;
(2) employed or not employed (the latter being defined as either out of the labour force or uemployed and looking for work);
(3) unemployed or employed, excluding those who are out of the labour force as is usual in economics analyses of unemployment.

That is, we use the full sample to distinguish between those in and out of the labour force and to distinguish between those who employed or not. Then we analyze an unemployment variable defined in the usual way, as a percentage of those who are in the labour force.

Table 1 presents summary statistics for the four dependent variables used in our analysis. The results are presented for men and women separately and for former students with and without a permanent disability. One immediate difference in the independent variables is that about 60 percent of those without disabilities are women, compared to only 55 perecent of those with documented permanent disabilities (not shown).

The dropout rates are higher for men than women (11.9 percent to 10.1 percent). For both men and women, students with permanent disabilities have *lower* dropout rates than those with no disabilities, although the differences are not statistically significant. Nonetheless, our expectation was that students with a disability would have *higher* to dropout rates; to find no statistical difference is therefore surprising. This then is the starting point for our analysis in the sense that we will first want to see if this lack of difference remains once other variables are controlled.

The differences in labour force outcomes between former students with and without a permanent disability are as we expected. For both men and women, those with a permanent disability are less likely to be employed, more likely to be unemployed, and more likely to be out of the labour force. These differences are all statistically significant at 95% confidence level. Unemployment rates are higher for men than for women, regardless of disability status. The percentage out of the labour force is higher for women than for men, again regardless of disability status.

Table 2 presents the summary statistics for the independent variables. Those who documented permanent disabilities were far less likely — by about 10 percentage points for both men and women — to have been born in Canada than in some other country. But we do not know whether this is because those not born in Canada are less likely to disclose disabilities or whether the "healthy immigrant" effect is at work here. A far greater proportion of those with documented disabilities were from Ontario than were those without documented disabilities (70 percent to 50 percent). We do not know if this is the result of Ontario's progressive policies toward people with disabilities or an artifact of the sampling strategy used. Because we think that disabilities (as opposed to documenting a disability when applying for financial aid) are distributed randomly through the population, difference such as these suggest some sort of self-selection on the basis of observable and unobservable characteristics. At a minimum, therefore, we must estimate multivariate models to see if the simple differences in the means of the dependent variables are robust to the inclusion of observable independent variables.

Table 2 also shows that respondents with permanent disabilities borrowed significantly more from government loan program than respondents without permanent disabilities. Among male

respondents with permanent disabilities, the average amount of government debt was over $20,000; for male respondents without permanent disabilities, the average amount borrowed was just over $13,000. The corresponding averages for female respondents are $23,000 and $14,000. As noted in Section 3, students with permanent disabilities can borrow more easily than those without because the criterion for "full-time studies" (and thus larger loans) is less restrictive.

6. Methodology

Our goal is to estimate models of the probability of dropping out and the probability of being in each of the labour market outcomes. As is typical, an important reason to estimate these models is to see if the bivariate differences reported in Table 1 are robust to the inclusion of additional variables, to variation in the assumptions of the model and to the assumed functional forms. We report estimates using two different techniques — multivariate logit models and propensity score matching models (PSMM). The analyses are done separately for males and females and use weights provided by the CSLP.

We first estimate simple logit models of the probability of the outcome. The logit model is well understood, is often used in labour economics and provides a useful initial starting point in our analyses.[7] Then we estimate propensity score matching models, which allow for a flexible funtional form in the relationship between the outcomes and independent variables.

Models of Postsecondary Dropout

In the analysis of the probability of dropping out, the dependent variable is as defined in the previous section. In line with the theories of postsecondary persistence, we assume that students are weighing the costs and the benefits of dropping out. An important independent variable is whether the respondent had documented a permanent disability and received a disability grant (PD). Another important independent variable is whether the respondent had a reported a learning problem (LP) on the survey. Those who reported such a learning problem may or may not have a documented disability. We expect that having a disability (PD=1 or LP=1) will increase the likelihood of dropping out because of the higher costs, both explicit and implicit, of attending.

One of the unique features of our data is the presence of information on the level of student debt held by respondents. We have measures both of government student loan debt and non-government student loan debt. A priori, it is not clear how the amounts borrowed will affect labour force status: will heavy borrowers be more likely to be in paid employment or will they be more likely to stay out of the labour force and out of paid employment?

Also included as independent variables are the type of postsecondary institution attended (two-year college, university, two-year proprietary college). Even though we do not have strong expectations about the effect of institutional type, we know that the institutional supports for students with disabilities are stronger in universities as opposed to colleges.

[7] As discussed below, we also estimated models allowing the variance of the error terms to differ between those with and without permanent disabilities.

Self-reported grades in the first postsecondary program are included and we expect that students with higher grades are less likely to dropout because they have a lower cost of continuing to attend and higher expected gains.

Variables associated with the respondent's socioeconomic status include mother's education and father's education. We do not have data on family income, either before or during postsecondary education. However, almost all respondents will have had relatively low family income because, to be eligible for the Canada Student Loan Program, family income must be in the lower half of the income distribution. Family socioeconomic status may play a role because families with higher socioeconomic status may be able to provide a higher level of support for their children.

Indicators were included for being a visible minority, Aboriginal, not having been born in Canada and having been dependent on parents at time of application. Also included were the respondent's age, whether he or she had ever attended school part-time or had ever worked while in school. Completing the list of independent variables were age in years, and indicators for the province in which grant was issued and the year of first loan.

As is typical in the analysis of dichotomous dependent variables, we assume that a student drops out of school if a latent variable is above a critical level:

$$\text{Prob}[\text{Dropout} = 1] = \text{Prob}[y^{*} > y^{crit}]$$

where

$$y_i^{*} = \alpha_0 + \alpha_1 PD_i + \alpha_2 LP_i + \boldsymbol{\alpha'}\mathbf{X_i} + \sigma\varepsilon_i$$

where PD and LP were defined above and X represents a vector of other observable indepndent variables.

The standard logit model estimates ;

$$\Pr(y = 1) = \ln[\Pr(y=1)/(1-\Pr(y=1))] = \beta_0 + \beta_1 PD_i + \beta_2 LP_i + \boldsymbol{\beta'}\mathbf{X_i}$$

where y is the outcome of interest and the β coefficients are the α coefficients divided by σ. We cannot, however. estimate σ or the αs separately.

The usual assumption made is that σ is constant and identical across all observations. After estimating the standard logit model under that assumption, we thought to relax this assumption because respondents with permanent disabilities might differ from those without permanent disabilities in the distribution of their unobserved characteristics. We therefore estimated heteroskedastic logit models to see if those with and without disabilities had the same error structure and, if so, whether relaxing this assumption would affect the other coefficients.[8] We could not, however, reject the hypothesis that those with and without permanent disabilities had the same error structure and we therefore do not report results from those models.

[8] See, in particular, Williams (2009). More generally, see Amemiya (1985).

To relax the assumptions about the form of the model, we estimated propensity score matching models. The basic idea of a matching model is to find a "match" for each observation in the "treatment" group (i.e., respondents with a permanent disability) in the "control" group (i.e., respondents without permanent disabilities) and then compute the mean difference in the outcomes of the matched pairs. The main advantage of this approach is that limited functional form assumptions are necessary. However, outcomes and selection are assumed to be independent, conditional on observed variables. Under that assumption, and if unobserved characteristics are uncorrelated with the observed characteristics, the propensity score matching model will estimate the true effect.

Estimating a propensity score matching model involves four steps. First, the propensity score — here the probability of being a respondent with a documented permanent disability — is estimated. An extensive set of variables that are thought to affect both selection into the group and the outcome are included in the estimation of the propensity score. We estimated the propensity score using type of school, mother's education, father's education, age, visible minority status, aboriginal status, dependant at time of application, not being born in Canada, part-time studies, average grades, worked while in school, province, and year of loan. Second, a common support is imposed by restricting the sample to those students with a propensity score above the highest minimum of the sub-groups and below the lowest maximum of the sub-groups. Third, a match for each observation in the treatment group is chosen from the control group using one of several available methods. We used three methods. First, we use a kernel-based matching method where the match is a kernel-weighted average of control unit outcomes. Then we use two radius methods where observations from the control group with a propensity score within a specified range of the propensity score of the observation from the treatment group are used to construct a match. The two ranges we chose were 0.005 and 0.001. Fourth, we calculated the mean of the differences between the treatment and controls, along with the bootstrap standard errors.

A question that has sometimes been raised about students with disabilities is whether some actively sought to be categorized as having a permanent disability in order to benefit financially from grants aimed at people with disabilities or to benefit from the available accommodations (e.g., additional time on examinations). To the extent that this selection is based on unobservable characteristics, the equality in dropout rates may mask a lower dropout rate of those with "true" disabilities. While this seems unlikely, we experimented with a technique developed by Altonji, Elder and Taber (2005). In their context, the question was whether the seemingly positive impact of attending a Catholic high school on high school graduation rates masked the equality between Catholic and public high schools in facilitating high school graduation. Applying the Altonji, Elder and Taber technique, we found no evidence of such endogeneity. However, our data do not meet one of the prerequisites of using their approach — that we have a set of observable independent variables that explain for a large part of the outcome — and so we do not report the results or emphasize the point.

Models of Labour Force Status

Our analysis of the labour market outcomes — labour force participation, employment and unemployment — follows the same pattern: simple logits followed by PSMM models. We included as independent variables, in addition to having a permanent disability, the same variables as in the dropout model except that we did not use the province in which the grant was issued, but rather the current province of residence. In addition, we included the current total education debt owed to the government and total education debt owed to non-governmental entities.

We treat "highest degree attained" as an independent variable in the labour force status models. These is clear issue in doing so because dropout (which clearly influences highest degree attained) is the first dependent variable that we analyze. In addition, there are clearly unobserved characteristics that will affect both dropout and labour force status. Dealing with the potential endogeniety of "highest degree attained", however, lies beyond the scope of the paper.

7. Results

Multivariate Logit Models

Table 3 present the multivariate results from the simple logit models of the probability of dropping out and of being in each three labour market statuses — in the labour force, employed and unemployed. We limit the results presented in Table 3 to the effects of having a permanent disability and reporting a learning problem. However, we note other results of interest in the text.

Dropout

Our expectation was that students with a permanent disability would be more likely to dropout for the reasons outlined above. However, in Table 1, we saw that the dropout rates were actually slightly *lower* for those with permanent disabilities. In the first panel of Table 3, we see that, holding constant relevant observable variables, the effect of having a permanent disability is not statistically significant among male respondnts. Among women, however, those with a permanent disability are 4.9 percentage points *less* likely to dropout than students without a disability. In Table 1, the difference (8.95 to 10.09) favouring women with a permanent disability was only 1.1 percentage points.

Women reporting a learning problem on the survey were more likely to dropout than those without a learning problem by 6.9 percentage points. By contrast, there was no statistically significant difference between male respondents with and without a self-reported learning problem.

Labour Force Participation

Among male respondents, those with a documented permanent disability were not any more or less likely to participate in the labour force. Among female respondents, however, those with a

documented permanent disability were a statistically significant 3.7 percentage points less likely to be in the labour force than those without a permanent disability. The existence of a self-reported learning problem did not have a significant effect of labour force participation among men or women.

Employment

For both men and women, respondents who had received a grant based on their documentation of a permanent disability were *less* likely to be employed. The point estimates seem very similar for both males and females with marginal effects of 8.3 and 9.5 percentage points, respectively. Both effects are statistically significant at the 95% level. As with labour force participation, the presence of a self-reported learning problem had no statistically significant effect on employment.[9]

Unemployment

Both male and female respondents with documented permanent disabilities were more likely to be unemployed, by statistically significant 8.0 and 6.5 percentage points, respectively. Unemployment is defined here in the usual way that economists define it — not employed but actively looking for work. The amount of government education debt had a statistically significant and positive impact on the likelihood of unemployment for both men and women. Because respondents with permanent disabilities had considerably more government education debt, the effect of that debt was to make it more likely that they were unemployed. The theoretical pathways through which more debt translate into higher probabilities of unemployment are unclear so we advise readers not to draw any strong conclusions based on this finding.

Propensity Score Matching Models

As discussed above, propensity score matching models (PSMM) essentially use observable characterstics to match respondents with a permanent disability to respondents without a permanent disability. A variety of methods are available to do this matching. We focus here on one method, called kernel-based matching, which matches each respondent with a permanent disability to a set of respondents without disabilities who have similar propensity scores, with the greatest weight being assigned to the one with the closest propensity score. The other matching methods yielded broadly similar results.

[9] The similarity in the results in the labour force participation and employment models is not surprising, of course. The only difference between the two dependent variables is in how the unemployed — those in the labour force but not employed —are treated. In the labour force participation model, they are counted with the employed respondents as in the labour force. In the employment model, they are included with those out of the labour force as not being employed.

Dropout

For both males and females, the kernel-based PSMM did not find a statistically significant difference in the likelihood of dropping out of school. For males, these results support the estimates from the logit models discussed above. In contrast to the logit models discussed above, however, there is also no statistically significant difference in dropout rates for female respondents with and without permanent disabilities..

Labour Force Participation

For men, the PSSM did not suggest any significant differnece in labour force participation. But there was a statistically significant gap for female respondents; those with permanent disabilties were 6.6 percentage points less likely to be in the labour force. The latter result is consistent with the above logit results.

Employment

For both men and women, the PSSM find large gaps between the employment rates of respondents with and without permanent disabilities. The gap is about ten percentage points for men and 15 percentage points for women and is statistically significant in both cases.

Unemployment

For both men and women, the PSSM find that students with a permanent disability are more likely to be unemployed. The estimates of the difference is about ten percentage points for men, while for women the difference is estimated to be 12 percentage points.

8. Discussion

In this paper, we have analyzed a unique survey conducted in 2009 by the Canada Student Loans Program (CSLP). The survey contains information on the completed educational attainment of a broad cross-section of those who used the Canada Student Loan Program while in school some years before. The sample includes a relatively large number of former students who had qualified for a grant because they had documented a permanent disability.

Two recent studies (Fichen et al., 2012 and Wessel et al., 2009) suggest that the educational attainment of postsecondary students with disabilities was similar to that of students without disabilities. We find the same result in our sample. The similarity in dropout rates was robust to several different multivariate techniques.

The survey conducted in 2009 asked respondents about their labour force status. Because they had first borrowed from the CSLP in the 2002-2004 period, most respondents were no longer in school. We could therefore compare the post-schooling labour force status of the respondents with and without disabilities. We find statistically significant differences in labour force participation, employment and unemployment. Despite their similar educational attainment,

those with documented permanent disabilities were less likely to be in the labour force, less likely to be employed and more likely to be unemployed.

Another unique feature of our data is that we can use information on the total amount of student loan debts accumulated by the respondents. Descriptively, we see that those with permanent disabilities borrowed much more ($7,000-$9,000 more) that respondents. When we include the amount borrowed in models of labour force status, it does not affect labour force participation but raises the likelihood of unemployment.

Our story is really one of an underpublicized success — the rising number of students with disabilities in postsecondary institutions and their equal likelihood of graduation — and a persistent problem — the continued disadvantage that people with disabilities, even those with the same educational attainment as people without disabilities, face in the labour market.

The equality of educational attainment should not be seen as a rationale for cutting back support for students with disabilities. It is likely that the support provided by campus-based disability offices plus the financial support provided by government has allowed students with disabilities to feel more comfortable on campuses. Their success is probably due in part to those supports and in part to the far superior technological aids that are now available.

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Table 1			
Variable Means for Dependent Variables:			
Full Sample and by Disability Categories by Gender			
	Females		
	Full Sample	Disability Grant	No Disability
Dependent Variables			
Dropout	10.07	8.95	10.09
Workforce Status[a]			
Employed	81.60	66.53	81.77
Unemployed	9.05	18.11	8.95
Out of the Labour Force	9.35	15.35	9.28
Sample Size			
	Males		
	Full Sample	Disability Grant	No Disability
Dependent Variables			
Dropout	11.86	11.14	11.87
Workforce Status[a]			
Employed	80.91	68.00	81.09
Unemployed	14.61	25.54	14.45
Out of the Labour Force	4.49	6.46	4.46
Sample Size			

Table 2

Variable Means for Independent Variables:
Full Sample and by Disability Categories by Gender

	Males			Females		
	Full Sample	Disability Grant	No disability	Full Sample	Disability Grant	No disability
Age (years) (SE)	22.71	23.41	22.72	23.41	23.88	23.41
Government Education Debt	13482	20603	13372	14636	23121	14526
Visible Minority	26.44	23.94	26.40	21.28	19.70	21.26
Aboriginal	4.88	4.23	4.87	6.37	6.82	6.37
Not Born in Canada	29.46	18.25	29.29	25.11	13.93	24.97
Language Not English	25.48	16.55	25.35	20.30	10.55	20.17
Dependent on Parents	56.99	60.45	57.05	52.63	60.12	52.72
Institutional Type						
College	47.14	50.40	47.19	44.29	51.83	44.39
University	39.50	45.83	39.60	38.47	45.92	38.56
Private Vocational	13.36	3.78	13.21	17.24	2.25	17.05
Ever studied Part-time	7.14	7.80	7.15	6.31	16.46	6.44
Working While in School	44.68	38.85	44.59	48.64	39.08	48.52
Mother's Education						
No PS Degree	49.72	42.07	49.60	49.52	54.75	49.59
College	21.69	28.07	21.79	27.17	24.90	27.14
University	2.52	20.35	21.50	17.90	15.98	17.87
Missing	7.08	9.51	7.11	5.41	4.37	5.40

Table 2 (continued)

Variable Means for Independent Variables:

Full Sample and by Disability Categories by Gender

	Males			Females		
	Full Sample	Disability Grant	No disability	Full Sample	Disability Grant	No disability
Father's Education						
No PS Degree	45.02	35.91	44.89	48.58	46.81	48.55
College	19.13	24.18	19.21	21.14	25.05	21.19
University	27.83	26.61	27.81	20.48	17.67	20.44
Missing	8.02	13.30	8.10	9.80	10.47	9.81
Learning Problem	1.39	18.48	1.65	1.36	22.88	1.63
Grades in First Program						
A's	28.68	22.41	28.59	38.51	21.97	38.30
B's	48.14	48.29	48.14	44.81	57.60	44.97
C's	12.48	19.71	12.59	8.25	11.42	8.29
D's	1.24	0.95	1.23	1.03	1.75	1.04
Other	0.54	1.66	2.95	1.56	2.15	1.57
Missing	6.49	6.98	6.50	5.84	5.10	5.83
Province at Application						
PEI	1.07	1.34	1.07	0.79	0.53	0.78
NB	3.87	0.82	3.83	4.48	1.69	4.44
NS	5.72	8.84	5.77	5.56	9.02	5.61
NL	3.80	0.88	3.75	3.11	0.29	3.07
On	51.46	69.49	51.74	50.08	68.40	50.31
MB	2.34	1.01	2.32	2.31	1.16	2.30
Sask	4.24	6.17	4.27	4.89	5.83	4.91
AB	10.51	3.92	10.41	10.19	5.98	10.14
BC	16.99	7.54	16.85	18.59	7.10	18.44

Table 3
Estimated Marginal Effects from Multivariate Logit Models of Postsecondary Dropout, by Gender

	Males	Females
Dependent Variable		
Dropout		
Documented Permanent Disability	-0.021	**-0.048**
Self-Reported Learning Problem	0.028	**0.069**
Pseudo-R^2	0.1291	0.1154
Labour Force Participation		
Documented Permanent Disability	0.002	**-0.037**
Self-Reported Learning Problem	-0.003	-0.045
Pseudo-R^2	0.095	0.051
Employment		
Documented Permanent Disability	**-0.083**	**-0.095**
Self-Reported Learning Problem	0.038	-0.035
Pseudo-R^2	0.081	0.052
Unemployment		
Documented Permanent Disability	**0.080**	**0.065**
Self-Reported Learning Problem	-0.041	-0.002
Pseudo-R^2	0.075	0.087

Effects in bold are different from zero at the 95% level of significance.

The dropout model controls for type of institution, mother's and father's education, age, visible minority, aboriginal status, immigrant status, part-time student when studying, average grades, worked while in school, province of residence, and loan year.

All labour market models control for type of institution, mother's and father's education, highest level of education, age, visible minority, aboriginal status, immigrant status, part-time student status, grades, worked while in school, province, loan year, government and non-government education debt in 2009.

Models for labour force participation and employment are based on a sample of respondent who were not in school at the time of the survey. Models for unemployment are estimated on the sample of respondents who were in the labour force.