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Education and Early Labour Market Outcomes in Canada

REPORT

by:
Jorgen Hansen

for:
Learning Policy Directorate
Strategic Policy and Research

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Abstract

Using data from the Youth in Transition Survey (YITS), this paper provides a detailed analysis of the effect of educational attainment on earnings and employment probabilities. Education is treated as a discrete outcome and the heterogeneity of post-secondary education has been dealt with by distinguishing between graduates from short programs (vocational program, apprenticeship program, College/CEGEP) and long programs (Bachelor's degree, graduate-level diploma/degree). The findings show that wages are higher for high school graduates than for high school drop-outs. Further, graduates from short post-secondary programs generally have higher wages than those with high school only while graduates from long post-secondary programs earn higher wages than graduates from short programs. However, the last effect was limited to the female sample. Overall, the effect of education on wages is larger for women than for men. Findings also suggest that post-secondary education graduates are significantly less likely to be unemployed and the effect is larger for longer programs. Among those who experience an unemployment spell, the duration is shorter for those with more education. Higher educated respondents move faster from school to work. The results also indicate that education reduces the inactivity (not being employed nor searching for a job) in the labour market and more so for women than for men. Lastly, the correspondence between main field of study and occupation among post-secondary graduates is lower for graduates from long programs but increase with time since graduation. The wage effect of such correspondence is around 18% and statistically significant.

1. Introduction

It is well recognized that investments in human capital are essential for innovations and economic growth. While human capital encompasses many aspects, formal education is probably the one that has received most attention by economists (other forms of human capital include job training, learning, health etc.). Investigating the individual determinants of higher education and the labour market outcomes associated with such education is important for many reasons. For example, spending on higher education constitutes a large portion of overall government spending. While there are social returns to education that justify subsidies to higher education, there are also private returns that somewhat offset government subsidies. Moreover, the structure of the labour market is constantly changing and has over the last decades become more oriented towards skilled workers. As a consequence, the educational system needs to adapt in order to respond to the changing demands from employers.

While governments at both the federal and provincial levels in Canada recognize the benefits associated with a high-skilled work force, access to higher education may have been restricted during the 1990s when tuition fees rose significantly across Canada (with the exceptions of the provinces of British Columbia and Quebec). Corak et al (2003) report that average tuition fees for undergraduate arts students almost doubled from 1990-91 to 2000 (expressed in $2001, average tuition fees increased from $1,866 in 1990-91 to $3,456 in 2000). The increase across all undergraduate disciplines was similar, see Frenette (2005). Statistics Canada (2001) has also documented an inability of parents to save for their children's education. This is especially the case among low-income households. Less then 20% of households with incomes less than $30,000 were saving for the post-secondary education of their children which should be compared to around 67% among high-income households (households with incomes above $80,000). During the same period, student borrowing levels and debt burdens increased (see Finnie (2002)), partly because of changes in student aid programs.

The rise in tuition fees over the last 10-15 years may have lead potential university students to consider post-secondary education (PSE) outside universities where the fees are generally lower. As noted by Boothby and Drewes (2006), about two-thirds of those with a PSE have acquired such education outside universities (such as community colleges, trades institutions, and other vocational educational programs). Thus, the non-university PSE sector constitutes an important part of the Canadian post-secondary education system. This may be especially true in Quebec with the CEGEP system in place. In other provinces, community colleges and trade schools provide many students with training beyond high school. Thus, PSE in Canada is quite diverse and such program heterogeneity needs to be considered when studying how early labour market outcomes differ for those with and without PSE.

The primary objective with this paper is to provide a descriptive analysis of early labour market outcomes and how such outcomes differ across different levels of education. The empirical analysis will rely primarily on Ordinary Least Squares (OLS) regressions thereby potentially ignoring some of the methodological difficulties associated with estimating returns to education. Thus, the results provided in this paper should not be taken as estimates of causal effects of PSE but instead as descriptions of how PSE is correlated with

different labour market outcomes, such as earnings and unemployment. However, the regression specifications will include a rich set of observable characteristics which may reduce the statistical problems associated with using OLS. In order to estimate the reward to higher education, data drawn from the first three cycles of the older cohort of the Youth in Transition Survey (YITS) will be used. The surveys were conducted in 2000, 2002, and 2004, and targeted individuals who were 18-20 years old in December 1999. A second objective is to assess the correspondence between occupational structure among PSE graduates and the qualifications they obtained during their training. This enables an assessment of how well the educational system performs in terms of providing the skills that are demanded in the labour market.

Overall, the results suggest that completion of a post-secondary program improves labour market outcomes. For females, wage regressions results suggest existence of significant wage premiums associated with graduation from a post-secondary program. Further, average wages of female graduates from long PSE programs are higher than those of graduates from short programs. Regional differences exist with the highest returns (for a Bachelor's degree or above) observed in Western Canada and the lowest in Atlantic Canada. For males, the effect of education on wages is generally smaller than that for females. The results also indicate that education is inversely related to the probability of being unemployed, and for females, of being inactive in the labour market (that is, not employed nor searching for a job). Finally, a majority of PSE graduates appear to find jobs in occupations that match the main field of study. However, the probability of such a match is lower immediately after graduation but increases with time since graduation. This suggest that many recent graduates experience a transition period during which they take jobs, if employed, that may not correspond to the chosen field of study.

The remainder of this paper is organized as follows. The next section presents a brief review of the existing literature. The subsequent section describes the data. Apart from a description of the samples, the section also includes a description of variable definitions and the distribution of educational attainment in Canada. In Section 4 the estimation results are presented and discussed. Finally, Section 5 concludes the paper.

2. Literature Review

Over the last three decades, there has been much work on establishing the economic returns to education [see Card (1999) for a recent survey of results and Heckman et al (2005) for a critical assessment of the existing literature on the returns to education]. It has been reported that the average marginal return is somewhere between 5% and 10%, depending on country and methodology. The average marginal return describes the average effect on wages when increasing educational attainments with one unit (typically a year). While estimates of the average marginal return provide some insight into the link between productivity and education, it ignores some potentially important aspects of how education and productivity are related. For instance, it is likely that the economic returns vary with accumulated education. Most educational systems are structured around a finite number of degrees, such as high school and university degrees. It is thus unlikely that the marginal return associated with the 10^{th} year (occurring while in high school) is the same as that associated with completing the 12^{th} year (normal high school graduation).

Focusing on how the return to education changes with accumulated education, Belzil and Hansen (2002) provide grade specific returns to education using a structural model in which the choice of duration of studies is endogenous. Their results indicate that the marginal returns to education are highly dependent on the duration of studies. The marginal return to years spent in college or university is significantly higher than those to years spent in high school. Belzil and Hansen (2002) also show that the average return to education within this framework is lower than what have generally been found using reduced-form models. The reason for this difference is that the hypothesis of constant marginal returns across different levels of education, assumed in most reduced form studies, is not supported by data.

Among reduced form studies, a number of recent papers have investigated the return to different forms of PSE. Boothby and Drewes (2006) found that while the earnings difference between high school graduates and those with a non-university PSE (community colleges, trades institutions, and other vocational educations) is significant and increased between 1980 and 1995, it is substantially lower than the earnings difference between high school graduates and university graduates (Bachelor's degree). However, since a university education is more costly than a non-university PSE, the difference in earnings premium somewhat overstates the differences in return (the internal rate of return) to respective education.

Hansen (2006) used data from the three most recent Canadian Censuses (1991, 1996, and 2001) to investigate differences in earnings for high school and university graduates. The earnings differences were represented by the internal rates of return between high school and university graduates. When aggregated across disciplines and regions, the results suggested existence of significant returns as well as a modest increase between 1991 and 2001, from 9% to 11%. Moreover, using data from the National Graduates Surveys, Hansen (2006) found that the earnings differences between trade schools/college graduates and university graduates decreased during the 1990s and that there are substantial differences in the returns to a university degree across disciplines.

Burbidge et al (2003) reported estimates of the earnings difference between university graduates and non-university graduates for Canada for the period 1981 to 2000. Their findings suggest that the earnings premium associated with a university education decreased for both males and females during the 1990s. They also report higher "returns" for females (ratio of earnings of university graduates to earnings of non-university graduates) than for males, the ratio in 2000 is around 150 for females and 135 for males.

Ferrer and Riddell (2002) used data from the 1996 Canadian Census to estimate the return to different educational degrees. Their specifications recognize the fact that there might be earnings increases associated with increases in years of schooling as well as earnings increases associated with obtaining a degree. Their results suggest significant earnings differences between high school graduates and high school dropouts, the differences are around 12-16 %. The earnings difference between high school graduates and university graduates is also significant and even higher, between 36 and 47 %.

Vaillancourt (1995) presents estimates of internal rates of return to different levels of education using data from the 1986 Canadian Census. The estimated returns to a university education (Bachelor's degree) relative to completion of secondary education are 8.3% for men and 18.8% for women. Vaillancourt (1995) also presents internal rates of return by fields of study and he finds large variations across disciplines with high returns in "Commerce", "Science", "Engineering", and "Health".

Finally, Lemieux (2006) showed that there was a dramatic increase in the return to post-secondary education in the U.S. between 1973 and 2005. Lemieux (2006) also showed that this increase in return to higher education was the main reason for the increased wage inequality during that period. This suggests that the demand for high skilled workers increased substantially during this period while demand for other types of skills changed very little.

To summarize, a number of studies have documented the existence of significant earnings gains associated with acquiring education. It also appears as if the earnings gain is larger for more advanced studies and that the earnings premium associated with high school graduation is lower than that associated with graduation from a PSE program. Finally, the literature has documented that the return to PSE has increased over the last 20 years.

It is clear that much of the literature has focused on the link between education and earnings. However, there are also other aspects of the effects of education that should be considered. For instance, much work has focused on the effect of schooling on hourly wages and less attention has been paid to the effect of schooling on employment rates. One important aspect of education may indeed be that it reduces the likelihood of experiencing unemployment (or non-employment) and therefore increases life-time incomes, even if the effect on hourly wages is relatively small. The basic human capital model predicts that education will be acquired if the expected life-time earnings (discounted to present value) from this exceed those of not acquiring additional education. Thus, in order to assess the returns to education, researchers should not limit their attention to wages only, but also consider effects on employment patterns. For example, Hansen (2006) found that the probability of being unemployed was significantly lower among male university graduates than among trade school/college graduates in the 1990s.

3. Data

3.1 Sample description and variable definitions

The data used in this paper is obtained from the first three cycles of the older cohort of the Youth in Transition Survey (YITS). The YITS contains detailed information on education activities as well as on subsequent labour market outcomes (wages, employment, occupation, industry etc.). Respondents in the YITS were interviewed every two years, with the initial interview conducted by Statistics Canada between January and April 2000.[1] The target population at the initial survey for the older cohort was youth aged 18-20 in 2000. Shaienks et al (2006) reports that in December 2003, 32% were enrolled in school (the vast majority was enrolled in post-secondary school), 45% were working full-time (more than 30 hours per week), 9% were working part-time, while 14% were neither enrolled in school nor worked. Thus, any analysis of labour market outcomes using the YITS needs to acknowledge the fact that many respondents are still in school, and that these may be non-randomly selected from this young population. Ignoring this may substantially bias the results.

The analysis in this paper uses information extracted from all three surveys. In particular, information on high school grade average, if the respondent lived with both biological parents most of the time during high school, parents' education and occupation, and self-assessed scholastic abilities (writing, reading, solving mathematical problems) was obtained from the initial survey. Information on major field of study among post-secondary graduates was obtained from the second and third surveys. Finally, information on educational attainment and labour market outcomes, such as earnings, unemployment, and occupation, were obtained from the most recent survey. In this paper, labour market outcomes will generally be measured in December 2003, which is the most recent date available. More details on the construction of the variables used in this paper are provided below. Because of regional differences in both educational systems and labour market characteristics, the analysis will generally be conducted separately for the following four regions: Atlantic Canada (Newfoundland and Labrador, Nova Scotia, Prince Edward Island, and New Brunswick), Quebec, Ontario, and Western Canada (Manitoba, Saskatchewan, Alberta, and British Columbia).[2] Furthermore, all results will be presented separately for men and women. Finally, sample weights provided by Statistics Canada have been used throughout this paper.

[1] The YITS was conducted by Statistics Canada with the co-operation and support of Human Resources and Social Development Canada.

[2] Disclosure rules prevent analysis at provincial levels for this sample. The information refers to the region where the respondent resided at the most recent interview (cycle 3).

3.2 Educational attainment

Considering educational attainment, Table 1 reports the highest certificate, diploma or degree the respondent has attained or graduated from as of December 2003. The upper panel shows entries for males while the lower panel shows entries for females. Starting with males, between 26% and 37% had not attained any PSE at this date. The proportion is highest in Western Canada (36.8%) and lowest in Ontario (26.3%), with Atlantic Canada and Quebec both close to 30%. Among those with no PSE, around a third had not completed high school (labeled High School Leaver in the table) in all regions except Quebec. In Quebec, over half (56%) of those with no PSE had not completed high school, suggesting a substantially higher high school drop-out rate among males in Quebec than in the rest of Canada.

Around 12% of respondents in all regions had started a post-secondary education but had left it prior to obtaining a certificate, diploma or degree (labeled PSE Leaver in the table). Further, around 30% were attending a post-secondary program in December 2003.[3] The attendance rate is highest in Ontario (33.6%) and lowest in Atlantic and Western Canada (28.3%). The higher attendance rate in Ontario, relative to Atlantic and Western Canada may partly be due to normal high school completion after grade 13 in Ontario compared to grade 12 in Atlantic and Western Canada.[4]

Considering post-secondary graduates, the entries in Table 1 (as well as throughout the paper) distinguish between high and low levels of PSE. High PSE graduates refer to graduates with a Bachelor's degree, a first professional degree, or a graduate-level diploma/degree (Master's or Ph.D.). Low PSE graduate refers to graduates from a vocational program, private business or training institute, apprenticeship program, or from a College or a CEGEP program. The post-secondary graduation rates vary from 23.6% (Western Canada) to 29.4% (Atlantic Canada).

[3] Respondents who had graduated from one post-secondary program and were attending an additional post-secondary program in December 2003 were coded as post-secondary continuer.

[4] However, since September 2003, students in Ontario graduate high school after completion of grade 12.

Table 1
Educational attainment, by gender and region

Post-Secondary Education (PSE) Status	Region				
	Atlantic	Quebec	Ontario	Western	All regions
	Males				
No PSE	0.299	0.294	0.263	0.368	0.306
High School Leaver	0.101	0.167	0.080	0.138	0.121
PSE Leaver	0.123	0.128	0.138	0.114	0.127
PSE Continuer	0.283	0.305	0.336	0.283	0.308
PSE Graduate	0.294	0.273	0.263	0.236	0.259
High PSE	0.077	0.052	0.097	0.077	0.078
Low PSE	0.217	0.221	0.166	0.159	0.181
	Females				
No PSE	0.175	0.178	0.168	0.266	0.201
High School Leaver	0.043	0.087	0.063	0.072	0.070
PSE Leaver	0.135	0.116	0.107	0.105	0.111
PSE Continuer	0.299	0.373	0.389	0.303	0.352
PSE Graduate	0.391	0.333	0.336	0.326	0.336
High PSE	0.161	0.096	0.120	0.133	0.121
Low PSE	0.230	0.237	0.216	0.193	0.215

Source: Calculations based on survey data from the oldest cohort in the Youth in Transition Survey (YITS), cycle 3.

Notes: Entries were calculated using information on overall post-secondary status and highest certificate, diploma or degree attained as of December 2003. High School Continuer refers to respondents who had not completed a high school diploma or its equivalence in December 2003. PSE Leaver refers to respondents who had attended PSE prior to December 2003 but had left PSE before graduation. PSE Continuer refers to respondents who were enrolled in PSE program in December 2003. Finally, High PSE refers to graduates from a post-secondary program at a Bachelor's degree level or higher, while Low PSE refers to graduates from college/CEGEP, apprenticeship programs or other forms of post-secondary training.

Regarding females, the entries in the lower panel suggest that females acquire more schooling than males. High school drop-out rates are substantially lower among females, around half those for males in most regions. The drop-out rate from PSE, as well as the attendance rate, is similar to that of males while post-secondary graduation rates are substantially higher. Again, Atlantic Canada shows the highest graduation rate.

3.3 Differences between PSE graduates and high school graduates

Table 2 provides a profile of post-secondary students in Canada by highlighting differences in selected observable characteristics between post-secondary graduates and high school graduates.[5] The gender difference in post-secondary graduation is again shown as males dominate the high school graduate category while females dominate the PSE category. There are only small regional differences in this gender gap. The variable nuclear equals one if the respondent lived with both biological parents most of the time during high school and has been found to be an important determinant of school attendance in previous studies, e.g. Belzil and Hansen (2002) and Belzil and Hansen (2006). However, it appears from Table 2 that living with both biological parents during high school is not a major determinant of PSE graduation since the differences between high school graduates and post-secondary school graduates are small across all regions. Differences in parents' education, both mother's and father's, may also explain whether or not a student chooses to acquire a post-secondary degree. Previous literature has documented significant intergenerational correlations in educational attainment, both in Canada and elsewhere. Such a relationship can also be observed in Table 2 for most regions although somewhat weak, with the exception of Ontario. The weak correlation between parents' education and the respondent's education in Table 2 may partially be due to the fact that high school drop-outs were removed from the sample as well as the fact that those enrolled in PSE but who have not yet graduated are included in the high school graduate category.

[5] High school drop-outs were removed from the sample used to construct Table 2.

Table 2
Differences in selected characteristics between high school graduates and PSE graduates, by region

	Atlantic		Quebec		Ontario		Western		All regions	
	HS	PSE	HS	PSE	HS	PSE	HS	PSE	HS	PSE
Male	0.55	0.44	0.52	0.47	0.53	0.44	0.55	0.42	0.54	0.44
Nuclear	0.86	0.93	0.92	0.96	0.89	0.90	0.86	0.89	0.88	0.91
Mother's education										
Less than high school	0.19	0.17	0.21	0.16	0.12	0.13	0.13	0.10	0.15	0.13
High school	0.43	0.35	0.37	0.32	0.37	0.36	0.42	0.36	0.39	0.35
More than high school	0.38	0.48	0.42	0.53	0.50	0.51	0.45	0.53	0.46	0.52
Father's education										
Less than high school	0.25	0.25	0.26	0.22	0.15	0.15	0.20	0.17	0.19	0.18
High school	0.34	0.32	0.24	0.22	0.28	0.29	0.32	0.26	0.29	0.27
More than high school	0.41	0.43	0.50	0.56	0.56	0.56	0.49	0.57	0.52	0.55
High school grade average										
80% +	0.37	0.48	0.31	0.49	0.38	0.47	0.32	0.49	0.35	0.48
Less than 80%	0.63	0.52	0.69	0.51	0.62	0.53	0.68	0.51	0.65	0.52

Source: Calculations based on survey data from the oldest cohort in the Youth in Transition Survey (YITS), cycle 1 (the initial survey).

Note: Information on high school grade average refers to self-reported overall grade average in the last year of high school. Sample restricted to those with high school degree and/or a post-secondary degree (high school drop-outs were removed).

The last entries in Table 2 illustrate the link between high school grade average and PSE status. As expected, students with average high school grades above 80% are much more likely to have graduated from a post-secondary program than those with lower grade averages.

3.4 Major field of study among PSE graduates

As discussed above, PSE in Canada is heterogeneous and some of that heterogeneity is displayed in Table 3 which shows the major field of study among post-secondary graduates, separately for males and females and by region.[6] The entries display substantial differences between males and females. For instance, females are more concentrated in the humanities/social sciences and business, while males are heavily concentrated in mathematical sciences/engineering. This gender segregation is relatively constant across regions and has been observed elsewhere, e.g. Drewes (2006) and Hansen (2006).

[6] Disclosure rules by Statistics Canada prevent a more disaggregated description of major field of study for this sample.

Table 3
Major field of study among PSE Graduates, by gender and region

	Atlantic		Quebec		Ontario		Western		All regions	
	Males	**Females**	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
Arts/Communications Technologies	0.036	0.024	0.069	0.105	0.102	0.088	0.035	0.039	0.068	0.072
Humanities/Social sciences/Education	0.086	0.234	0.111	0.283	0.137	0.298	0.140	0.272	0.128	0.281
Business	0.094	0.337	0.165	0.275	0.138	0.233	0.137	0.201	0.140	0.242
Physical and life sciences/Technologies	0.039	0.058	0.035	0.048	0.017	0.029	0.041	0.085	0.030	0.053
Math sciences/Engineering/ Agriculture	0.616	0.133	0.511	0.104	0.393	0.061	0.538	0.109	0.483	0.091
Health	0.009	0.129	0.041	0.122	0.072	0.180	0.049	0.224	0.053	0.175
Personal and transportation services	0.095	0.056	0.048	0.037	0.096	0.094	0.043	0.056	0.069	0.067
Other	0.025	0.030	0.020	0.025	0.044	0.017	0.018	0.013	0.029	0.019

Source: Calculations based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Entries were calculated using information on respondent's first main field of study or specialization. Sample is limited to respondents who had graduated from a valid post-secondary program by December 2003. Respondents who completed/attended PSE before January 2000 were removed as the field of study was not determinable.

3.5 Occupation and post-secondary education

Using information on the most recent job held between January 2002 and December 2003, Table 4 shows the distribution of occupation by PSE status. To allow for a transition period between school and work for post-secondary graduates, the sample used for Table 4 removed respondents who attended a post-secondary program after December 2001. Occupations have been aggregated into five categories: management/business; natural sciences/health; social sciences/education/government/art; sales/service; and trades/primary production/processing. Although these categories are quite general, the first three categories can probably be regarded as containing mostly high skill occupations while the last two categories mainly contain low skill occupations.[7] With little regional variation, post-secondary school graduates are less likely to work in sales/service or trades/primary production/processing than respondents without a post-secondary degree.

[7] Naturally, a number of exceptions apply. For example, many engineers would be employed in the last category, trades/primary production/processing.

Table 4
Occupation in most recent job, by PSE status and region

	Atlantic		Quebec		Ontario		Western		All regions	
	No PSE	PSE	No PSE	PSE	No PSE	PSE	No PSE	PSE	No PSE	PSE
Management/Business	0.140	0.271	0.122	0.189	0.187	0.234	0.148	0.196	0.154	0.213
Natural sciences/Health	0.048	0.152	0.071	0.196	0.045	0.142	0.058	0.189	0.056	0.173
Social sciences/Education/Government/Art	0.036	0.051	0.036	0.132	0.051	0.117	0.043	0.083	0.043	0.105
Sales/Service	0.394	0.326	0.352	0.215	0.355	0.377	0.367	0.316	0.361	0.305
Trades/Primary production/Processing	0.382	0.201	0.419	0.267	0.363	0.131	0.385	0.216	0.385	0.204

Source: Calculations based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Entries were calculated using information on respondents' occupation on the most recent job held between January 2002 and December 2003. Sample is limited to respondents who had at least one job between January 2002 and December 2003. Respondents who graduated from PSE after December 2001 were removed.

3.6 Major field of study and occupational choices

In order to analyze the link between major field of study and occupational choices for post-secondary graduates, Tables 5a and 5b present occupational distributions by major field of study for males and females, respectively. For males whose major field of study was humanities/social sciences, 32.6% worked in occupations classified as social sciences/art, occupations that presumably correspond well to the field of humanities/social sciences. Almost as many, however, worked with sales (31.2%) and 20% worked in management/business occupations. As expected, the fraction working in this occupation is higher for respondents with business as their main field of study (39.8%). A large fraction of these respondents also worked in sales (29.7%). Respondents whose major field of study was math sciences/engineering/agriculture or health are predominantly working in natural science/health occupations (around 40%). For the former group, almost as many (38%) worked in trades/primary production/processing occupations.

For females, a similar pattern is observed although the correspondence between major field of study and occupation appears even stronger. For instance, 57% of female respondents whose main field of study was business worked in management/business. Overall, there is a fairly strong correspondence between major field of study and occupation among respondents in this sample.

Table 5a
Major field of study and occupations among male PSE graduates

	Occupation				
Major field of study	**Management/ Business**	**Natural sciences/ Health**	**Social sciences/ Art**	**Sales**	**Trades/Primary production/ Processing**
Humanities/Social sciences/Education	0.200	0.041	0.326	0.312	0.122
Business	0.398	0.073	0.118	0.297	0.115
Physical and life sciences/Technologies	0.081	0.319	0.243	0.226	0.132
Math Sciences/Engineering/Agriculture	0.050	0.381	0.054	0.134	0.380
Health	0.039	0.414	0.232	0.169	0.145
Personal and transportation services	0.089	0.060	0.055	0.586	0.211
Other	0.195	0.171	0.164	0.271	0.199

Source: Calculations based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: See notes to Tables 3 and 4.

Table 5b
Major field of study and occupations among female PSE graduates

	Occupation				
Major field of study	**Management/ Business**	**Natural sciences/ Health**	**Social sciences/ Art**	**Sales**	**Trades/Primary production/ Processing**
Humanities/Social sciences/Education	0.210	0.028	0.366	0.374	0.022
Business	0.566	0.026	0.121	0.279	0.009
Physical and life sciences/Technologies	0.098	0.261	0.231	0.306	0.103
Math Sciences/Engineering/Agriculture	0.187	0.260	0.128	0.306	0.120
Health	0.120	0.515	0.114	0.232	0.020
Personal and Transportation Services	0.234	0.062	0.132	0.513	0.059
Other	0.195	0.171	0.164	0.271	0.199

Source: Calculations based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: See notes to Tables 3 and 4.

3.7 Labour force status and educational attainment

The entries in Table 6 show the proportion of sample respondents who were either employed, unemployed (looking for work) or neither employed nor unemployed in December 2003. The sample excludes full-time students and self-employed workers. Thus, the category Home (neither employed nor unemployed) contains individuals who were not active in the labour market. To illustrate the effect of education on labour force status, the proportions in each category is showed separately for four levels of education: high school drop-outs, high school graduates with no further schooling, graduates from low PSE, and graduates from high PSE. Proportions for males are shown in the first column while proportions for females are presented in the second column.

Table 6
Labour Force Status, by educational attainment

	Males	Females
	High school drop-out	
Employed	0.836	0.629
Unemployed	0.095	0.063
Home	0.069	0.307
	High school only	
Employed	0.856	0.816
Unemployed	0.067	0.051
Home	0.077	0.133
	Low PSE	
Employed	0.898	0.879
Unemployed	0.056	0.041
Home	0.047	0.080
	High PSE	
Employed	0.835	0.861
Unemployed	0.093	0.062
Home	0.071	0.077

Source: Calculations based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Entries were calculated using information on labour force status and highest education attained (or graduated from) as of December 2003. Full-time students and self-employed workers were removed from the sample. The Home category is defined as a residual state and includes all respondents who were not employed or unemployed in December 2003.

Among high school drop-outs, 83.6% of males were employed while that number is only 62.9% for females. The fraction being unemployed are 9.5% and 6.3% for males and females, respectively. Finally, the proportion of high school drop-outs that were classified as being home is 6.9% for males and 30.7% for females. The importance of high school completion is illustrated in the second panel of results for those with a high school diploma but with no additional education. Although the employment rate for males is similar to that of high school drop-outs, that is not the case for females, whose employment rate among high school graduates is 81.6%, close to that of males. Further, for both men and women, the unemployment rate is lower and the proportion of women being classified in the home state is substantially lower (13.3%).

The employment rate is even higher among those with low PSE, both for men and women, and again there is only a small difference between males and females. Both the unemployment rate and the home rate are lower than for the high school only category. Finally, for those with high PSE, the employment rate for males is lowest of all educational levels, even below that of high school drop-outs. In fact, both the employment rate and the unemployment rate for males with high PSE are very similar to those of males with incomplete high school. For females, the employment rate is slightly lower than that of women with low PSE and the unemployment rate is higher. However, the home category is low at 7.7%, much below that of female high school drop-outs. The relatively high unemployment rate among those with high PSE might be explained by the fact that, given the young sample, these individuals have had little time to establish themselves on the labour market after completing their studies. The figures in Table 6 do not control for differences in time since last in school which may substantially affect the proportion being employed in any educational category.

Table 7 Labour Force Status after finishing school						
Time since last in school (months)	Females			Males		
	Employed	Unemployed	Home	Employed	Unemployed	Home
	High school drop-out					
1	0.654	0.104	0.242	0.651	0.108	0.241
3	0.708	0.105	0.187	0.667	0.101	0.231
6	0.679	0.130	0.192	0.687	0.102	0.211
12	0.721	0.102	0.178	0.764	0.047	0.189
24	0.721	0.077	0.202	0.769	0.062	0.170
	High school only					
1	0.746	0.106	0.148	0.739	0.104	0.157
3	0.759	0.118	0.123	0.785	0.090	0.125
6	0.799	0.078	0.122	0.813	0.072	0.115
12	0.799	0.096	0.106	0.836	0.064	0.099
24	0.844	0.069	0.087	0.823	0.065	0.111
	Low PSE					
1	0.807	0.080	0.113	0.808	0.060	0.132
3	0.850	0.062	0.089	0.853	0.053	0.094
6	0.877	0.055	0.068	0.863	0.047	0.090
12	0.887	0.033	0.080	0.901	0.033	0.066
24	0.877	0.051	0.072	0.909	0.031	0.060
	High PSE					
1	0.757	0.111	0.132	0.654	0.151	0.195
3	0.827	0.098	0.075	0.746	0.101	0.153
6	0.859	0.069	0.071	0.834	0.086	0.080
12	0.903	0.061	0.036	0.911	0.040	0.049
24	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Source: Calculations based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycles 1-3.

Note: Entries were calculated using information on labour force status and highest education attained (or graduated from) from January 1999 to December 2003. The Home category is defined as a residual state and includes all respondents who were not employed or unemployed.

However, the longitudinal nature of the YITS survey enables a detailed analysis of the transition from school to work. In Table 7, the proportion of former students that are employed, unemployed, and home are shown as a function of time since they were last enrolled in school. The entries in the table show a clear relationship between educational attainment and subsequent labour market success. The employment rate is generally higher for those with more education and the unemployment rate is lower. For example, one month after leaving school, 65.4% of female high school dropouts were employed while this figure is 80.7% for females who had graduated from a low PSE program. Similar figures can be observed for males, 65.1% of high school dropouts were employed compared to 80.8% for low PSE program graduates. However, the employment rates for high PSE graduates one month after school are lower than those for low PSE graduates.

The entries also show that the employment rate increase with time. This is especially true for graduates from a high PSE program. Because of sample size limitations, it is only possible to follow these graduates for 12 months after school. For these graduates, the employment rates increase from 75.7% one month after school to 90.3% for females, and from 65.4% to 91.1% for males. Thus, time since last in school is an important factor to consider when comparing labour market outcomes across different levels of education for these young respondents. Once we control for differences in such time, we find that more educated respondents are more likely to be employed and less likely to be unemployed than less educated respondents. Finally, the entries in Table 7 suggest that while the employment rates increase during the first year out of school, they do not change much during the second year. This is true for all levels of education from high school drop-outs to graduates from a low PSE program.[8] Thus, students who are unable to find a job during the first year after finishing school may find it difficult to enter the labour market in subsequent years.

Table 8
Unemployment after leaving school

	Females	Males
	High school drop-out	
Unemployment duration (months)	7.826	5.225
	(0.820)	(0.619)
Proportion ever unemployed	0.208	0.195
	(0.031)	(0.023)
	High school only	
Unemployment duration (months)	5.576	4.541
	(0.314)	(0.290)
Proportion ever unemployed	0.239	0.223
	(0.012)	(0.010)
	Low PSE	
Unemployment duration (months)	3.484	3.061
	(0.299)	(0.277)
Proportion ever unemployed	0.168	0.147
	(0.010)	(0.010)
	High PSE	
Unemployment duration (months)	3.528	2.482
	(0.315)	(0.296)
Proportion ever unemployed	0.201	0.257
	(0.014)	(0.021)

Source: Calculations based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycles 1-3.

Note: Entries were calculated using information on labour force status and highest education attained (or graduated from) from January 1999 to December 2003. Duration is measured during the first year after finishing school for respondents who went directly from school to unemployment. The proportion ever unemployed reflects the fraction of respondents that experienced any unemployment during that year. Standard errors are in parentheses.

[8] One exception is females with high school only. Their employment rate increases from 79.9% one year after leaving school to 84.4% two years after leaving school.

The entries in Table 7 also suggest that the incidence of unemployment is reduced with time since last in school. This finding can be observed for all levels of schooling. Further information on unemployment experiences following school is presented in Table 8. The entries show the average duration of unemployment spells for those who went from school to unemployment as well as the proportion of respondents that experienced unemployment during the first year following school completion. There is a clear pattern in unemployment spell duration with high school drop-outs showing the longest spells (7.8 months for females and 5.2 months for males) and graduates from high PSE programs showing the shortest spells (3.5 months for females and 2.5 months for males). Between 15% and 25% experienced unemployment during the first year after school, and unlike unemployment spell durations, there is no clear link between educational attainment and risk of being unemployed.

3.8 Wages and educational attainment

Tables 9a and 9b summarize the distribution of hourly wages by educational attainment for males and females, respectively. As regional differences are likely to exist, the summary statistics are also shown separately for each of the four regions considered in this paper: Atlantic Canada, Quebec, Ontario and Western Canada. In the tables, the wage information is summarized by presentation of the mean, the median and the lower and upper quartiles. The samples are restricted to those who held a job in December 2003. Full-time students, self-employed workers, and respondents who held a job but provided no wage information were excluded. Starting with the results for males, there are only small differences in average wage rates across different levels of education, although the average wage generally rises with education. A similar pattern is observed for the median wage rates. In all regions except for Atlantic Canada, the average wage of those with high school only is $1 per hour higher than the average wage for high school drop-outs. The difference in average wage rate between those with low PSE and high school only is $2 per hour for all regions. Finally, the average wage of those with high PSE is *lower* ($1 per hour) than the average wage of those with low PSE in Atlantic Canada, the same in Ontario and Western Canada and higher (1$ per hour) in Quebec.

Table 9a Distribution of wage per hour for males					
	Atlantic	**Quebec**	**Ontario**	**Western**	**All regions**
	High school drop-out				
Mean	11	13	14	14	13
Median	9	12	12	12	12
Lower Quartile	8	10	9	10	10
Upper Quartile	14	15	17	17	16
	High school only				
Mean	11	14	15	15	14
Median	10	12	13	13	13
Lower Quartile	8	10	10	10	10
Upper Quartile	12	17	17	18	17
	Low PSE				
Mean	13	16	17	17	16
Median	12	15	16	16	15
Lower Quartile	10	12	12	13	12
Upper Quartile	15	19	22	21	20
	High PSE				
Mean	12	17	17	17	17
Median	11	16	17	18	16
Lower Quartile	9	10	12	12	11
Upper Quartile	16	21	22	21	21

Source: Calculations based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Entries were calculated using earnings per hour information from job held in December 2003. Full-time students, self-employed workers, and respondents with no wage information were excluded.

Table 9b Distribution of wage per hour for females					
	Atlantic	**Quebec**	**Ontario**	**Western**	**All regions**
	High school drop-out				
Mean	9	10	10	10	10
Median	8	10	10	9	10
Lower Quartile	7	8	7	8	8
Upper Quartile	13	11	12	12	12
	High school only				
Mean	10	11	12	12	12
Median	9	10	11	11	11
Lower Quartile	7	8	9	9	9
Upper Quartile	10	13	14	15	14
	Low PSE				
Mean	12	15	14	14	14
Median	11	15	13	12	13
Lower Quartile	8	11	10	10	10
Upper Quartile	14	18	16	16	17
	High PSE				
Mean	16	18	16	17	16
Median	15	16	15	17	16
Lower Quartile	11	11	10	11	11
Upper Quartile	20	21	20	21	21

Source: Calculations based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Entries were calculated using earnings per hour information from job held in December 2003. Full-time students, self-employed workers, and respondents with no wage information were excluded.

The distributions of female wages are shown in Table 9b. Unlike the wages for males, there is a monotonic increase in the average wage with increases in educational attainment across all regions. This is also true for the median wages. Overall, the entries in Tables 9a and 9b suggest that education is generally associated with higher wages, and more so for women than for men. Tables 9a and 9b also show a measure of wage dispersion, the interquartile range. For both men and women, and across all regions, the dispersion is higher for higher levels of education.

The longitudinal nature of the data also allows an analysis of early wage growth. In Table 10, median wage rates are shown as a function of time since they were last enrolled in school. The table illustrates the difference in entry wages across different levels of education as well as differences in wage growth during the first two years after leaving school. The entry wage (the wage observed during the first month after leaving school) is positively correlated with education and women with a high PSE diploma have a median wage that is 70% higher than that of female high school drop-outs. The figure is somewhat lower for men, 60%.

Table 10 Median wages and time since last in school		
Time since last in school (months)	**Females**	**Males**
	High school drop-out	
1	7.0	8.0
3	7.0	8.0
6	7.0	8.5
12	8.0	9.0
24	9.0	10.0
% difference m12-m1	14.3	12.5
% difference m24-m1	28.6	25.0
	High School only	
1	8.0	9.0
3	8.0	9.0
6	8.0	9.5
12	8.5	10.5
24	9.0	11.0
% difference m12-m1	6.3	16.7
% difference m24-m1	12.5	22.2
	Low PSE	
1	10.0	11.0
3	10.0	11.5
6	10.0	12.0
12	11.0	12.5
24	12.0	13.5
% difference m12-m1	10.0	13.6
% difference m24-m1	20.0	22.7
	High PSE	
1	12.0	13.0
3	12.0	13.5
6	14.0	15.0
12	15.0	16.0
24	n.a.	n.a.
% difference m12-m1	25.0	23.1

Source: Calculations based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycles 1-3.

Note: Entries were calculated using information on wages and highest education attained (or graduated from) from January 1999 to December 2003.

The table entries also show that (median) wages grow much faster for workers with a high PSE diploma. The percentage increase in median wages during the first year for this group is 25% for females and 23% for males. For those with lower levels of education the wage increase is lower, between 6% and 16%. For these groups, the table also displays the wage growth over two years. For females, this wage growth is 28% for high school drop-outs, 12% for those with high school only and 20% for those with a low PSE diploma. For males, the two-year wage increase is between 22% and 25%.

A possible reason for the finding that higher education improves wage growth is that individuals with higher education may attract more and better job offers than otherwise similarly endowed workers. In fact, the entries in Table 8 show that the duration of unemployment spells during the first year out of school is significantly shorter for more educated workers, a finding that is consistent with the hypothesis that better educated workers receive more and better job offers than less educated workers.

4. Regression results

4.1 The effect of education on wages

The wage differences across educational levels discussed above do not control for any other differences that may exist between individuals with different levels of education. To illustrate the importance of controlling for such differences in order to better measure the wage effect of education, a set of linear regression models differing by the set of control variables were estimated. The linear regression models were estimated separately for each region and the results for males are presented in Tables 11a-11d. Female results are shown in Tables 12a-12d. In addition to these regression results, Tables 11e and 12e show results when data from all regions have been pooled. In each table, the entries in the first column show the log-wage difference across different levels of education (all relative to high school drop-outs) obtained from a regression which includes no other observable characteristics of the individuals. These figures naturally show the same pattern as in Tables 9a and 9b. In column two, a control for time since last in school was added. In order to control for differences in labour market ability, the regression specification in column three also includes information on average high school grades and self-reported scholastic abilities, all assumed to be highly correlated with labour market ability. The final specification also includes information on family background in addition to the regressors included in specification III.

Table 11a
Wage regressions for males in Atlantic Canada

	Specification			
	I	**II**	**III**	**IV**
High School only	0.062	0.082	0.075	0.034
	(1.07)	(1.36)	(1.25)	(0.54)
Low PSE	0.246**	0.290**	0.278**	0.229**
	(4.14)	(4.07)	(3.89)	(3.12)
High PSE	0.187**	0.239**	0.176*	0.125
	(2.61)	(2.67)	(1.90)	(1.30)
Specification includes controls for:				
Time since last in school and age	No	Yes	Yes	Yes
High School grade averages and Scholastic abilities	No	No	Yes	Yes
Family background	No	No	No	Yes
Sample size:	526			

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

Table 11b Wage regressions for males in Quebec				
	Specification			
	I	II	III	IV
High School only	0.005	0.009	0.012	0.007
	(0.12)	(0.21)	(0.25)	(0.15)
Low PSE	0.177**	0.148**	0.135**	0.120**
	(4.21)	(2.85)	(2.56)	(2.23)
High PSE	0.161**	0.119	0.069	0.065
	(2.34)	(1.43)	(0.79)	(0.74)
Specification includes controls for:				
Time since last in school and age	No	Yes	Yes	Yes
High School grade averages and Scholastic abilities	No	No	Yes	Yes
Family background	No	No	No	Yes
Sample size:	601			

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

Table 11c Wage regressions for males in Ontario				
	Specification			
	I	II	III	IV
High School only	0.090*	0.091*	0.095*	0.087
	(1.68)	(1.65)	(1.71)	(1.55)
Low PSE	0.272**	0.260**	0.248**	0.233**
	(4.74)	(3.95)	(3.71)	(3.42)
High PSE	0.241**	0.209**	0.181**	0.157*
	(3.74)	(2.65)	(2.17)	(1.86)
Specification includes controls for:				
Time since last in school and age	No	Yes	Yes	Yes
High School grade averages and Scholastic abilities	No	No	Yes	Yes
Family background	No	No	No	Yes
Sample size:	853			

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

Table 11d Wage regressions for males in Western Canada				
	Specification			
	I	II	III	IV
High School only	0.053	0.101**	0.122**	0.100**
	(1.48)	(2.73)	(3.21)	(2.64)
Low PSE	0.161**	0.278**	0.309**	0.292**
	(3.99)	(5.78)	(6.31)	(5.98)
High PSE	0.204**	0.359**	0.378**	0.352**
	(4.13)	(5.87)	(5.83)	(5.43)
Specification includes controls for:				
Time since last in school and age	No	Yes	Yes	Yes
High School grade averages and Scholastic abilities	No	No	Yes	Yes
Family background	No	No	No	Yes
Sample size:	853			

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

Table 11e Wage regressions for males in Canada (all regions)				
	Specification			
	I	II	III	IV
High School only	0.050**	0.070**	0.076**	0.062**
	(2.18)	(2.95)	(3.15)	(2.60)
Low PSE	0.190**	0.216**	0.217**	0.199**
	(7.69)	(7.37)	(7.32)	(6.67)
High PSE	0.188**	0.218**	0.193**	0.166**
	(6.06)	(5.65)	(4.74)	(4.06)
Specification includes controls for:				
Time since last in school and age	No	Yes	Yes	Yes
High School grade averages and Scholastic abilities	No	No	Yes	Yes
Family background	No	No	No	Yes
Sample size:	2,906			

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

For males in Atlantic Canada, there are no significant wage difference between high school drop-outs and those with high school only. Graduating from a low PSE is associated with a significant wage gain, around 25%, and this wage gain is relatively stable across regression specifications. Similar to the finding in Table 9a, those with high PSE have lower average wages than those with low PSE but the difference is not statistically significant. In fact, in the most general regression specification, there is no significant wage difference between high school drop-outs and those with high PSE. As already discussed, this is likely due the nature of the sample which consists of respondents that are between 22 and 24 years old in December 2003. Moreover, a substantial fraction of the sample is still enrolled in some form of PSE at this date. In Quebec and Ontario, a pattern similar to that in Atlantic Canada is observed although the wage difference between high school drop-outs and those with low PSE is smaller in magnitude in Quebec than in the other two regions. Finally, for Western Canada, the estimates from the most general specification suggest significant wage difference between high school drop-outs and those with high school or more. Further, for this region, the effect of education on wages is the largest among all regions.

Table 12a
Wage regressions for females in Atlantic Canada

	Specification			
	I	**II**	**III**	**IV**
High School only	-0.055	-0.065	-0.104	-0.062
	(0.63)	(0.74)	(1.22)	(0.70)
Low PSE	0.112	0.086	0.007	0.047
	(1.28)	(0.97)	(0.08)	(0.53)
High PSE	0.435**	0.368**	0.223**	0.222**
	(4.88)	(3.81)	(2.31)	(2.22)
Specification includes controls for:				
Time since last in school and age	No	Yes	Yes	Yes
High School grade averages and Scholastic abilities	No	No	Yes	Yes
Family background	No	No	No	Yes
Sample size:	518			

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

Table 12b Wage regressions for females in Quebec				
	Specification			
	I	II	III	IV
High School only	0.088	0.082	0.103*	0.102*
	(1.51)	(1.35)	(1.69)	(1.69)
Low PSE	0.355**	0.342**	0.310**	0.313**
	(6.28)	(5.50)	(4.92)	(4.97)
High PSE	0.459**	0.416**	0.321**	0.329**
	(7.26)	(5.51)	(4.14)	(4.16)
Specification includes controls for:				
Time since last in school and age	No	Yes	Yes	Yes
High School grade averages and Scholastic abilities	No	No	Yes	Yes
Family background	No	No	No	Yes
Sample size:	611			

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

Table 12c Wage regressions for females in Ontario				
	Specification			
	I	II	III	IV
High School only	0.155**	0.178**	0.172**	0.193**
	(2.28)	(2.58)	(2.50)	(2.76)
Low PSE	0.285**	0.317**	0.288**	0.312**
	(4.23)	(4.34)	(3.95)	(4.22)
High PSE	0.399**	0.423**	0.364**	0.381**
	(5.70)	(5.07)	(4.27)	(4.41)
Specification includes controls for:				
Time since last in school and age	No	Yes	Yes	Yes
High School grade averages and Scholastic abilities	No	No	Yes	Yes
Family background	No	No	No	Yes
Sample size:	833			

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

Table 12d Wage regressions for females in Western Canada				
	Specification			
	I	II	III	IV
High School only	0.124**	0.113**	0.119**	0.118**
	(2.30)	(2.06)	(2.15)	(2.11)
Low PSE	0.233**	0.215**	0.213**	0.216**
	(4.23)	(3.56)	(3.47)	(3.47)
High PSE	0.439**	0.405**	0.395**	0.396**
	(7.53)	(5.84)	(5.57)	(5.53)
Specification includes controls for:				
Time since last in school and age	No	Yes	Yes	Yes
High School grade averages and Scholastic abilities	No	No	Yes	Yes
Family background	No	No	No	Yes
Sample size:	948			

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

Table 12e Wage regressions for females in Canada (all regions)				
	Specification			
	I	II	III	IV
High School only	0.110**	0.109**	0.116**	0.114**
	(3.49)	(3.41)	(3.67)	(3.58)
Low PSE	0.271**	0.267**	0.253**	0.253**
	(8.64)	(7.82)	(7.47)	(7.43)
High PSE	0.418**	0.392**	0.347**	0.343**
	(12.53)	(9.90)	(8.67)	(8.52)
Specification includes controls for:				
Time since last in school and age	No	Yes	Yes	Yes
High School grade averages and Scholastic abilities	No	No	Yes	Yes
Family background	No	No	No	Yes
Sample size:	2,805			

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

The entries in Tables 12a-12d show the effect of education on wages for females across the four regions (Table 12e shows results when data is aggregated across regions). Generally, the wage effect is larger than for males. In all regions, except Atlantic Canada, there are significant wage increases associated with increases in educational attainment. The wage difference between low PSE and high PSE is small in Quebec but sizeable in Ontario and Western Canada. Overall, consistent with the findings in Tables 9a and 9b, the effect of education on wages is substantially higher for women than for men. This finding is also consistent with findings in other studies, see for example Hansen (2006), Burbidge et al (2003), Ferrer and Riddell (2002). The fact that a substantial fraction of the sample is still enrolled in school in December 2003 may introduce a statistical problem to the analysis of the effect of education on wages. For instance, as mentioned above, this will be the case if those who are still enrolled in school are also endowed with higher unobserved labour market skills than those who are working. In an attempt to deal with this potential selection problem, estimates from selection corrected wage regressions are presented in Tables 13a and 13b. The estimates were obtained by specifying a likelihood function that models the probability of not being enrolled in school (and instead working) jointly with wages for those who are working. If, as hypothesized, unobserved labour market skills are correlated with the probability of being enrolled in school, we would expect a negative correlation between the idiosyncratic error terms in the schooling equation and in the wage equation. If the assumptions made in the selection corrected model specification are correct, the resulting estimates will consistently describe the effect of education on wages among those who are working.[9]

[9] The estimates may be sensitive towards the normality assumption invoked in the selection corrected model. Another issue surrounding these types of models is identification, and in this paper identification is obtained through functional form assumptions. Alternatively, one could obtain identification by searching for variables that explain school enrollment decisions but not wages.

Table 13a Selection corrected wage regressions for males					
	Atlantic	**Quebec**	**Ontario**	**Western Canada**	**All regions**
High School only	-0.031	0.036	0.094	-0.032	0.007
	(0.48)	(0.71)**	(1.52)	(0.76)	(0.25)
Low PSE	0.126	0.162 **	0.195**	0.124**	0.122**
	(1.61)	(2.82)	(2.39)	(2.12)	(3.53)
High PSE	-0.016	0.212 **	0.150	0.104	0.086*
	(0.87)	(2.17)	(1.52)	(1.33)	(1.81)
Correlation	-0.092	-0.073	-0.176**	-0.239**	-0.155**
	(1.17)	(1.06)	(2.03)	(3.01)	(3.62)
Specification includes controls for:					
Time since last in school and age	Yes	Yes	Yes	Yes	Yes
High School grade averages and scholastic abilities	Yes	Yes	Yes	Yes	Yes
Family background	Yes	Yes	Yes	Yes	Yes

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

The estimates for males shown in Table 13a suggest smaller effects of education on wages than those found in Tables 11a-11e. Focusing on the results for all regions, the estimates suggest a wage difference between high school drop-outs and graduates from a low PSE program of around 12%, down from 20% in the uncorrected regression results. Further, the wage effect of a high PSE program is less than 10%, down from 17% in the uncorrected case, and only marginally significant. As previously discussed, these results would be expected if the effect of education is positively correlated with ability and those with higher ability are also more likely to be enrolled in school in December 2003. This means that the uncorrected estimates in Tables 11a-11e are exaggerating the effect of education on wages among those who work. Finally, for all regions the correlation between the idiosyncratic error terms in the schooling equation and in the wage equation is negative and precisely estimated for all regions except Atlantic Canada and Quebec.

Table 13b Selection corrected wage regressions for females					
	Atlantic	**Quebec**	**Ontario**	**Western Canada**	**All regions**
High School only	-0.004	0.085	0.159**	0.097	0.084**
	(0.04)	(1.29)	(2.03)	(1.58)	(2.31)
Low PSE	0.094	0.251**	0.220**	0.121	0.153**
	(0.92)	(3.64)	(2.38)	(1.60)	(3.67)
High PSE	0.278**	0.307**	0.242**	0.208**	0.224**
	(2.48)	(3.44)	(2.19)	(2.36)	(4.48)
Correlation	-0.089	-0.217**	-0.128	-0.168*	-0.158**
	(0.98)	(3.24)	(1.47)	(1.83)	(3.49)
Specification includes controls for:					
Time since last in school and age	Yes	Yes	Yes	Yes	Yes
High School grade averages and scholastic abilities	Yes	Yes	Yes	Yes	Yes
Family background	Yes	Yes	Yes	Yes	Yes

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

The selection corrected estimates for females are presented in Table 13b. As for males, a comparison between the estimates in this table with the corresponding estimates in Tables 12a-12e suggests that the uncorrected estimates exaggerate the effect of education on wages. However, the wage differences across educational levels are still larger for females than for males. Further, as for males, the correlation between the idiosyncratic error terms in the schooling equation and in the wage equation is negative.

To summarize, the results suggest that there are significant wage gains from graduating PSE in Canada for females. Female graduates from universities at levels of at least a Bachelor's degree have average wages that are around 22% higher than those of high-school drop-outs. The results also indicate that wages among PSE graduates are higher than wages among those with high school only. For males, the wage gain associated with PSE is smaller. It should be noted that the relatively low wage gains associated with PSE may in part be due to the fact that the sample consists of young individuals even though the regression specifications control for time since last in school.

4.2 Wage differences across major field of study

Previous work, e.g. Hansen (2006), Drewes (2006), Boothby and Rowe (2002) have documented substantial wage or earnings differences across different fields of study. In order to assess the importance of field of study on wages among PSE graduates, wage regressions were estimated separately for males and females, but aggregated across regions. The results

are presented in Table 14, which shows estimates associated with eight different fields of study with business serving as the excluded category.[10] Thus, the entries show average wages given a specific major field of study relative to students whose major field of study was business. Most of the estimates in Table 14 are not statistically significant suggesting that early wages (the samples were restricted to those who had graduated from a valid post-secondary program between January 2000 and November 2003) are relatively homogenous. However, wages for those who graduated from studies focusing on arts or communications technologies are significantly lower than wages among business students. For males, graduates from humanities/social sciences/education also have significantly lower wages than business students.

Table 14
The effect of major field of study on wages

	Males		Females	
Major field of study	**Estimate**	**T-stat**	**Estimate**	**T-stat**
Arts/Communications Technologies	-0.134**	(2.14)	-0.164**	(3.42)
Humanities/Social sciences/Education	-0.197**	(3.98)	-0.030	(1.01)
Physical and Life sciences/Technologies	-0.039	(0.48)	-0.070	(1.29)
Math Sciences/Engineering/Agriculture	-0.027	(0.61)	-0.119**	(2.91)
Health	-0.039	(0.50)	-0.009	(0.24)
Personal and transportation services	0.031	(0.52)	-0.064	(1.43)
Other	0.065	(0.79)	-0.011	(0.14)
Sample size:	926		1454	

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Major field of study refers to respondents' first main field of study or specialization. Sample is limited to respondents who had graduated from a valid post-secondary program by December 2003. Respondents who completed/attended PSE before Jan 2000 were removed as the field of study was not determinable. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level. Regression model includes controls for time since last in school, age, high school grade average, self-reported scholastic abilities (reading and math), family background, regional dummy variables and occupation. Finally, the excluded major field of study category is business.

4.3 Wage differences across occupations

The wage differences across different occupations for PSE graduates are shown in Table 15. As for the estimates described above, the specifications control for a wide range of observable characteristics. While the entries suggest small and mostly insignificant wage differences across major field of study, the entries in Table 15 indicate existence of significant wage differences across different occupations. Because of sample size constraints, occupational categories had to be aggregated into five groups: Natural sciences and health; Social sciences/education/government/art; Sales/services; Trades/

[10] The regression specifications include controls for similar observable characteristics as the specifications in Tables 13a and 13b but also include controls for region and occupation.

primary production/processing and business/management. The estimates in Table 15 show the average wage in a certain occupation relative to that in business/management. The entries suggest that average wages are highest in Natural sciences and health, and this is true for both men and women. Lowest average wages are found in Sales/service occupations. Perhaps somewhat surprisingly, average wages in Social sciences/ education/ government/art are higher than those in business/management. Again, this finding may be in part due to the young nature of the sample. A similar finding was reported by Hansen (2006), who used data from the National Graduates Survey (NGS). As both data sources focus on new entrants in the labour market, it is likely that the lower average wages in business relative to Social sciences is due to differences in entry wages across these occupations.

Table 15
The effect of occupation on wages

	Males		Females	
	Estimate	**T-stat**	**Estimate**	**T-stat**
Natural sciences/Health	0.275**	(5.93)	0.295**	(7.96)
Social sciences/Education/Government/Art	0.198**	(3.75)	0.167**	(5.35)
Sales/Service	-0.064	(1.47)	-0.169**	(6.02)
Trades/Primary production/Processing	0.135**	(2.88)	0.103*	(1.70)
Sample size:	926		1454	

Source: Ordinary Least Squares (OLS) regressions based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Major field of study refers to respondents' first main field of study or specialization. Sample is limited to respondents who had graduated from a valid post-secondary program by December 2003. Respondents who completed/attended PSE before Jan 2000 were removed as the field of study was not determinable. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level. Regression model includes controls for time since last in school, age, high school grade average, self-reported scholastic abilities (reading and math), family background, regional dummy variables and major field of study. Finally, the excluded occupation category is business.

4.4 The effect of education on labour force status

In addition to yielding higher wages, PSE may benefit students by reducing the risk of experiencing unemployment and by increasing time spent in employment. The discussion in Section 2.7 above, which was based on the entries in Table 6, showed that the proportion of respondents that were unemployed decreased with educational attainment up to low PSE but that it was similar for graduates from a high PSE program and high school drop-outs. It was hypothesized that this finding may be due to the lack of controls for differences in time since last in school. The entries in Table 16 are based on model specifications that include controls for a number of observable characteristics, including time since last in school. Specifically, Table 16 shows differences in the probability of being unemployed and of being neither employed nor unemployed (Home) across different levels of education. The estimated marginal effects suggest that the probability of being unemployed is significantly lower for PSE graduates than for high school drop-outs. The effect is larger for males than for females. Regarding the effect of education on home

time, there is only a weak negative effect of education for males while it is significant and sizeable for females. However, for females the results suggest that completing high school, regardless if further schooling is acquired or not, significantly reduce home time.

Table 16
Education and labour market status

	Males		Females	
	Unemployed	**Home**	**Unemployed**	**Home**
High School only	-0.018	0.008	-0.002	-0.148**
	(1.03)	(0.52)	(0.37)	(3.80)
Low PSE	-0.035**	-0.028*	-0.010*	-0.198**
	(2.42)	(1.70)	(1.73)	(5.49)
High PSE	-0.045**	-0.033	-0.011*	-0.120**
	(5.05)	(1.27)	(1.76)	(6.18)
Specification includes controls for:				
Time since last in school and age	Yes		Yes	
High School grade averages and scholastic abilities	Yes		Yes	
Family background	Yes		Yes	
Regional controls	Yes		Yes	
Sample size:	2,895		2,484	

Source: Estimation based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Samples restricted to those who, in December 2003, were either employed, unemployed (looking for work) or not employed or unemployed (Home). Full-time students and self-employed workers were excluded. Entries show marginal effects with absolute values of T-statistics in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

4.5 The link between major field of study and occupations

In addition to an examination of early labour market outcomes for post-secondary graduates, this paper will also investigate the correspondence between occupational structure among post-secondary school graduates and the qualifications they obtained during their training. As discussed above in Section 2.6, there is a fairly strong correspondence between major field of study and occupation among respondents in this sample. While the association between occupation and major field of study in that section is informative, it does not provide information on what characteristics are important to improve the likelihood of a correspondence between field of study and subsequent occupation. To investigate this further, Table 17 presents results from a regression of the correspondence between major field of study and current occupation on selected observable characteristics. The dependent variable equals one if one of the following combinations of major field of study and occupation was observed:

Major field of study	Occupation
Humanities/Social sciences/Education	Social sciences/Art
Business	Management/Business
Physical and life sciences/Technologies	Natural sciences/Health
Math sciences/Engineering/Agriculture	Natural sciences/Health
Health	Natural sciences/Health
Personal and transportation services	Sales
Math Sciences/Engineering/Agriculture	Trades/Primary production/Processing

For any other combinations of major field of study and occupation, the dependent variable is set to zero. While this measure of correspondence is imprecise it enables a preliminary assessment of who is more likely to succeed in obtaining a job that, at least weakly, corresponds to the major field of study. It also provides an indication of how well the system for higher education in Canada provides skills that are demanded in the labour market. Among males, around 60% were coded as working in an occupation that matched their main field of study. The figure was somewhat lower for females, about 55%.

Table 17
Effects of observable characteristics on the correspondence between major field of study and occupation

	Males		Females	
	Estimate	**T-stat**	**Estimate**	**T-stat**
High level PSE	-0.158**	(3.68)	-0.061*	(1.79)
Time since last in school	0.040**	(2.82)	-0.012	(1.03)
HS grade 90+	0.093	(1.36)	0.214**	(3.90)
HS grade 80-90	-0.015	(0.41)	0.083**	(2.79)
Atlantic Canada	0.046	(0.75)	0.083	(1.60)
Quebec	0.029	(0.67)	0.096**	(2.85)
Western Canada	0.032	(0.79)	0.023	(0.71)
Sample size:	926		1454	

Source: Estimation based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Samples restricted to those who had graduated from a valid post-secondary program by December 2003. Respondents who completed/attended post-secondary education before January 2000 were removed as the field of study could not be determined. The dependent variable equals one if there is a correspondence between the main field of study and current occupation and it equals zero otherwise. Regression specification also includes controls for scholastic abilities and family background. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level.

The entries in Table 17 suggest that graduates from high PSE are less likely to work in an occupation that matches the main field of study. This effect is larger for males than for females. A possible reason for this finding may be that many shorter post-secondary programs provide more specific skills than longer programs at universities that may focus more on general skills. The gender difference in this effect may be due to less patience in job search among male graduates. The regression results also indicate that the match between field of study and occupation improves with time since last in school. Thus, recent graduates

from a PSE program may find themselves in a transition period between school and work during which they take jobs that do not necessarily match the qualifications obtained in school. However, this effect is only significant for males. The probability of a match also improves with high school grade average, but this effect is significant for females only. While there are no significant regional variations in the match for males, the probability of a match for females between field of study and occupation is higher in Quebec than in other regions.

The above analysis described how certain characteristics are correlated with the match of skills acquired in school and those used in the labour market. The entries in Table 18 show the effect of such a match on wages and the effect is positive and significant for both men and women. Indeed, the estimates are virtually the same across gender and indicate that graduates that are working in occupations that correspond to their field of study earn on average about 18% more than otherwise similar graduates. The fact that a match between field of study and occupation yields higher wages (and productivity), combined with observations that many respondents have not yet obtained a job in occupation that matches their main field of study, indicates that many PSE graduates may be overqualified for their jobs. Interestingly, these numbers are similar to those reported by Li et al (2006), who found that 48% of young university graduates (under the age of 30) worked in a position for which they were overqualified.[11] However, as the regression results on the determinants of a "match" indicate, the probability of a match increase with time. This suggests that the nature of over qualification may be a transitory phenomenon.

Table 18
Effects of the correspondence between major field of study and occupation on wages

	Males		Females	
	Estimate	**T-stat**	**Estimate**	**T-stat**
Correspondence between major field of study and current occupation	0.175**	(6.53)	0.177**	(8.26)
Sample size:	926		1454	

Source: Estimation based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples are restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. Major field of study refers to respondents' first main field of study or specialization. Sample is limited to respondents who had graduated from a valid post-secondary program by December 2003. Respondents who completed/attended PSE before Jan 2000 were removed as the field of study was not determinable. Absolute values of T-statistics are shown in parentheses. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level. Regression model includes controls for type of post-secondary education, time since last in school, age, high school grade average, self-reported scholastic abilities (reading and math), family background, and regional dummy variables. See text for details on how the correspondence between major field of study and current occupation was defined.

[11] Li et al (2006) used data from the Survey of Labour and Income Dynamics and defined respondents to be overqualified if they worked in an occupation that required at most a high school education. Similar to the findings in this paper, they also report that overqualification falls with time.

4.6 School-to-work transitions, school interruptions and wages

The last set of regression results, presented in Table 19, show the effects of having experienced unemployment during the first year after leaving school on subsequent wages. For both females and males, the effect of such an experience is negative and significant. The negative effect is larger for females than for males, and the magnitude of the coefficient for women suggests that the average wage for those who were unemployed for at least one month during the first year after leaving school is about 26% lower that the average wage of similarly endowed women who did not experience any unemployment during that transition period. For males, the effect is -15%. However, it is possible that the negative effect of being unemployed diminish with time since last in school. To test this, the unemployment indicator was interacted with a measure of time since last in school (measured in months). The interaction effect is positive and significant for females (0.004) and positive but insignificant (0.001) for males. Thus, for women, the negative effect of being unemployed is reduced by approximately 5% per year so that the negative effect has disappeared after 5 years. However, for males, the negative effect of early unemployment is persistent and does not diminish with time.

Table 19 also presents the effects of the duration of school interruption between secondary school and post-secondary school on subsequent wages. This variable is set to zero for all workers who did not attend any PSE. The effect is negative and significant for females and negative and insignificant for males, suggesting that moving straight from secondary school to PSE carries a significant, but small, wage premium. The measure for school interruption was also interacted with the type of PSE completed (low or high) and the interaction estimates suggest that the wage penalty associated with a school interruption is only significant for females who, as of December 2003, had not completed any PSE. Thus, it is possible that the negative estimate for school interruption on subsequent wages is not reflecting a causal effect of such interruption on wages but instead that interruption is correlated with unobserved characteristics that influence wages.

Table 19
Effects of unemployment and school interruptions on wages

	Females		Males	
	Estimate	**Std err**	**Estimate**	**Std err**
Unemployed	-0.263**	0.057	-0.147**	0.059
Interacted with time since last in school	0.004**	0.002	0.001	0.002
Duration (in months) of school interruption	-0.005**	0.002	-0.003	0.002
Interacted with Low PSE	0.002	0.002	-0.003	0.002
Interacted with High PSE	0.009**	0.004	0.004	0.006

Source: Estimation based on survey data from the oldest cohort in Youth in Transition Survey (YITS), cycle 3.

Note: Dependent variable is the log of wage per hour. Samples are restricted to those with positive earnings per hour information from job held in December 2003. Full-time students and self-employed workers were excluded. * indicates statistical significance at the 10%-level while ** indicates statistical significance at the 5%-level. Regression model includes controls for type of post-secondary education, time since last in school, age, high school grade average, self-reported scholastic abilities (reading and math), family background, and regional dummy variables.

4.7 Regional mobility among PSE graduates

The analysis so far has studied different aspects of labour market outcomes in four regions: Atlantic Canada, Quebec, Ontario, and Western Canada. Each respondent region refers to the region of residence at the time of the Cycle 3 interview. However, some of the PSE graduates reside in a region that is different from the region in which they acquired their degree. For instance, among those PSE graduates that were residing in Quebec in 2003, 4% had obtained their credentials in another Canadian province. A somewhat higher figure, 8%, is recorded for respondents residing in Ontario. For respondents in other provinces, the figures are similar to those for Ontario. Thus, inter-provincial migration is relatively rare, even in this highly mobile sub-population.

In order to assess the wage effects of such migration, an indicator was created that took on the value one if the respondent acquired his/her PSE in the same province as he/she resided in at the time of the Cycle 3 interview, and it equaled zero otherwise. When inserted into wage regression equations, the coefficients associated with this indicator were positive but never statistically significant. This result was found for both men and women as well as when data was aggregated across regions and gender.

5. Summary and policy implications

This paper has used data from three cycles of the Youth in Transition Survey (YITS) to investigate how early labour market outcomes differ across different levels of education. The YITS data provide detailed information on the transition from school to work for a cohort of young respondents.

The results support previous findings of a significant relationship between educational attainment and wages. Wages were found to be higher for graduates from high school relative to those of high school drop-outs. Similarly, graduates from short post-secondary programs generally have higher wages than those with high school only. Finally, graduates from long post-secondary programs earn higher wages than graduates from short programs, although this effect was limited to females. Overall, the effect of education on wages is larger for women than for men. This finding is consistent with previous work, e.g. Hansen (2006), Burbidge et al (2003), Ferrer and Riddell (2002) who have also found that the return to education in Canada is higher for women than for men.

Another finding in this paper is that education increases the probability of being employed. For males, graduates from a post-secondary program are significantly less likely to be unemployed and the effect is larger for longer programs. A similar result was found for women although the magnitude of the effect was smaller. It was also found that education reduces inactivity (neither employed nor searching for a job) in the labour market and more so for women than for men. Thus, similar to findings in previous work and not surprisingly, the results suggest the existence of beneficial labour market outcomes among post-secondary graduates relative to those with no schooling beyond high school. These benefits appear already within a few years after graduation and, as some research indicate, will grow with time in labour market.

The results also reveal that around 20% will experience unemployment during the first year after finishing school. This figure is similar for both men and women and independent of the highest grade completed. However, the duration of the unemployment spell during this first year is significantly shorter for those who have graduated from a post-secondary program. Thus, although higher education does not appear to reduce the incidence of unemployment immediately following school, it does reduce the time spent unemployed. Higher education therefore seems to generate more and/or better job offers. Another indication of this was the finding that the wage growth during the first year following school is significantly higher for graduates from a high post-secondary program than for other workers. Further, labour force data for the first two years out of school reveal that while the employment rate increase substantially during the first year, it remains constant during the second year. This pattern was observed regardless of educational attainment and gender. Indeed, employment rates for men and women were similar for all levels of education except for high school drop-outs, where the employment rate is higher for males than for females. This may be due to higher fertility rates for women with low levels of education.

This paper has also documented that the correspondence between main field of study and occupation among post-secondary graduates is lower for graduates from long programs but it increases with time since graduation. This suggests that the transition period between school and work is characterized by unemployment or employment in jobs that may not completely match the qualifications. However, with time, search either on-the-job or off-the-job generally leads to an improved match between skills obtained in school and those used in the workplace. When log-wages were regressed on an indicator for a match between field of study and occupation, the estimates indicate significant wage gains for graduates working in occupations that matched their main field of study in school. The fact that the probability of match between main field of study and occupation increase with time also suggests that the wage difference between those with and without a post-secondary education degree will increase with time.

Overall, the findings in this paper suggest that PSE graduates generally have better labour market outcomes than those with no schooling beyond high school. These differences can be observed within a few years of graduation and are likely to increase over the life-cycle (see for instance Belzil (2004) for evidence on higher wage growth among higher educated workers). For the female sample, the results show that average wages among graduates from long PSE programs are higher than average wages for graduates from short PSE program. However, such a pattern is not observed for males. The higher return to education for females relative to males may also explain the observation that more women than men pursue PSE. If expectation about future wage outcomes associated with different levels of education is a deciding factor, then groups with higher wage differences are predicted to acquire more education than groups with lower economic returns. Indeed, Belzil and Hansen (2006) found that students in Canada appear to be forward-looking and respond to expectations about future earnings gain. Further, the higher return to PSE for women may also imply that they are less sensitive than men towards tuition fee increases. In fact, the estimated returns in this paper implies that the tuitions fees must be substantially higher than they are today in order to make the present value of net benefits from a post-secondary education lower than the present value of net benefits from a high school diploma. Given that the earnings differences presented in this paper will likely increase over the life-cycle, the current fee levels for post-secondary education makes investments in higher education very beneficial.

Regarding the occupational destinations of PSE graduates, the YITS data indicate a relatively close match between field of study and subsequent occupation. However, a substantial fraction of PSE graduates appear to be working in occupations that do not correspond well with the major field of study in their post-secondary studies.

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