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Labour Market Outcomes and Schooling in Canada: Has the Value of a High School Degree Changed over Time?

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Labour Market Outcomes and Schooling in Canada: Has the Value of a High School Degree Changed over Time*

Daniel Parent†

Résumé / Abstract

Nous cherchons dans cette étude à examiner le processus de transition de l'école vers le marché du travail et à l'examiner dans le contexte de l'évolution dans la valeur de détenir un diplôme d'études secondaires depuis 1981. Pour ce faire nous faisons usage de deux sources de microdonnées, soit les Recensements de 1981 à 1996 ainsi que le Suivi de l'enquête sur les sortants effectué à l'automne 1995. Les principaux résultats découlant de l'analyse des données de recensement nous indiquent que bien que les diplômés du secondaire aient conservé un avantage en terme de taux d'emploi par rapport aux sortants depuis 1981, l'avantage salarial est demeuré relativement faible et a vraisemblablement diminué. Par ailleurs, l'avantage des diplômés universitaires par rapport aux diplômés du secondaire, que ce soit pour les taux d'emploi ou pour les salaires moyens, s'est quant à lui accru au cours des années. Quant aux données du Suivi, elles nous indiquent qu'il n'y a pas de différence majeure dans le processus de transition vers le marché du travail entre les sortants et les diplômés, que ce soit en terme de la distribution du temps passé entre la fin des études et le début du premier emploi à temps complet ou en terme de la distribution des salaires. Les diplômés du secondaire, tout comme dans le cas des données de recensement, ont toutefois une probabilité plus grande d'avoir occupé un emploi à temps complet. En ce qui concerne l'incidence de la formation appuyée par l'employeur, il semble que les diplômés du secondaire n'aient aucun avantage par rapport aux sortants alors que les diplômés universitaires ont un très net avantage sur l'un ou l'autre groupe, bien que les résultats soient légèrement sensibles à la spécification utilisée. Enfin, ayant établi que le rendement d'un diplôme d'études secondaires est assez faible et donne même des signes de détérioration, j'effectue un retour en arrière de façon à analyser la décision de compléter ou non les études secondaires. Il y est démontré que les jeunes ayant au mieux complété leur secondaire étaient très sensibles aux conditions du marché du travail local. Ces conditions affectaient leur décision de compléter leurs études par le biais de leur impact sur la probabilité d'occuper un emploi douze mois avant la fin de leurs études. Globalement, les résultats nous donnent à penser qu'on ne devrait peut-être pas se

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surprendre d'observer à la fois un taux élevé d'abandon au secondaire en même temps qu'un taux de fréquentation scolaire élevé à l'université.

The objective of this paper is to analyze the school-to-work transition process of young Canadians, particularly individuals with low levels of education, and to situate it in the context of the evolution in the value of a high school diploma over the 1981-1996 period, conditional on not pursuing post-secondary education. To do so I make use of Statistics Canada's School Leavers Survey and its Follow-Up (SLSF) which contains details on the earnings, job, and training histories in addition to a wealth of information on student performance in high school, family background, and the incidence of work while in school. To provide a historical perspective, I also use the 1981, 1986, 1991, and 1996 Canadian Censuses to see whether the value of holding a high school diploma (excluding the option value of pursuing post-secondary education) has markedly changed over the last 15-20 years. Evidence from the Censuses shows that 1) the premium to holding just a high school diploma in Canada is substantially lower than in the United States; and 2) labour earnings of high school graduates have stagnated and even decreased relative to those of dropouts, without major changes in the relative employment rates. Again, this is in stark contrast to the U.S. situation where the wage premium to a high school degree has in fact markedly increased over the same period of time. The evidence concerning the wage premium to a university degree is that it has been increasing since the mid 80's. Relative employment rates of university graduates have also increased. Turning to the SLSF, it is shown that high school graduates' labour market outcomes are essentially no better than those of dropouts, except perhaps in terms of employment rates. Finally, having established that the value of holding a high school diploma relative to not having one appears to be relatively small and even to have declined somewhat, we go back to the individuals' decision to leave school either as dropouts or graduates and find that they were very sensitive to the conditions of the local labour market. Those conditions affected their graduation decision through their impact on the probability of having a job or on the number of hours worked in the twelve months preceding the date they left school either as graduates or as dropouts. Overall, the results suggest that we should not, perhaps, be surprised that Canada has both a fairly high rate of dropping out from high school and high enrollment rates in universities.

Mots Clés : Éducation, marché du travail, transition école-travail

Keywords: Education, labour market, school-to-work transition

JEL: I2, J24, J31

1 Introduction

High school dropout rates have historically been substantially higher in Canada than in the United States. Although the gap between the two countries has been partially closed in recent years, likely because of the increased similarity in the educational attainment of the parents of high school students in both countries, the dropout rate in Canada is still higher than in the U.S., in general, and especially so when we exclude the Southern and Southwestern states from the comparison. To perhaps gain some insight as to why this discrepancy in high school dropout rates persists, it may then be useful to study the labour market outcomes of young Canadians in relation to their schooling level.

Thus, one of the main objectives in this paper is to examine the process of going from school to work in the context of the evolution in the value of graduating from high school relative to dropping out, *conditional on not pursuing the schooling process beyond high school.* Although the labour market performance of canadian university graduates is also examined to provide a comparison, the main focus will be to look at the transition process of young adults who have not pursued post-secondary education in terms of the main outcomes of interest, such as their earnings history, their employment history, and their on-the-job training history. The interest of focusing on that segment of the labour market made of individuals with relatively low levels of education is twofold: first, they make a sizeable proportion of the population, even among the young. Evidence from Statistics Canada's Follow-up to the School Leavers' Survey (SLSF) indicates that about 30% of all individuals aged 22-24 in 1995 had at most a high school degree. Secondly, if the marginal value of completing high school (excluding the option value of eventually obtaining a university degree) has changed over time for the worse , then we would expect individuals who, at the margin, have to decide between completing high school or not, to be particularly sensitive to labour market opportunities that present themselves while in school, which may in turn have an effect of the decision to drop out. To study the school-to-work process in the context of how the premium to a high school degree may have changed over time, I use data from the Canadian Censuses (1981, 86, 91 and 96) to get an idea of how employment rates and labor earnings in relation to educational attainment have evolved over the last 20 years in Canada.

There is much discussion about the advent of the so-called "knowledge based economy" and the general perception is that individuals with low lev-

els of schooling will have greater difficulties thriving in such an environment compared to what previous generations of low education individuals experienced, which should have the effect of inducing people to study beyond high school. Yet the evidence shows that a fairly large proportion of the population does not complete high school (the high school non completion rate was estimated at around 18% for Canada in 1991 using the School Leavers' Survey). It may be that for those individuals who do not plan to go to university after high school, the value of finishing high school hinges on whether doing so brings large enough benefits and if, as the Census data show, those benefits appear to have stagnated or even decreased over time, then we may find ourselves with a situation in which we have both a high dropout rate from high school *and* a large fraction of young people enrolling and completing university education. In other words, for high school dropouts, the margin at which schooling decisions are made is different from that of people who hesitate between stopping after high school graduation and going to university. If the university to high school premium increases while the high school completion to high school non-completion premium decreases, then the result may be that those who are hesitating between high school and university will be more likely to enroll in university while the others will be more likely to dropout, given that they heavily discount any potential benefit from a university education.

While data from the 1981, 1986, 1991, and 1996 Canadian Censuses will provide the historical perspective on the benefit of completing high school, to study the school-to-work transition process in terms of the main outcomes of interest I make use of the details about jobs contained in the SLSF. In addition to the time of transition between the end of full-time schooling and the beginning of the first so-called reference (or full time) job, information is available about wages and the receipt of training, supported by the employer or not, for up to two full-time jobs.

The main conclusion drawn from both the SLSF and Census data is that the wage premium to holding just a high school degree, starting from about the same level as that in the United States in 1981, has stagnated and even decreased since then whereas just the opposite is true in the U.S. In fact, for young people now graduating from high school, the wage premium is close to zero. Also, there is no evidence that high school graduates have any advantage compared to dropouts in terms of on-the-job training incidence. Concerning university graduates, the results with the Censuses show an improvement since the mid-80's in terms of both employment rates and

wages, relative to high school graduates, while the results with the SLSF point toward a substantial advantage in terms of employer-supported training opportunities. In turn, these training opportunities are shown to lead to higher wages and greater job attachment, even after controlling for unobserved individual characteristics.

Given that holding just a high school degree seems to provide little advantage in terms of wages, although there is still some evidence of an advantage in relative employment rates, I then take a step back to study the decision to complete high school for the subsample of individuals who do not pursue post-secondary education. We would expect those individuals to be particularly sensitive to labour market opportunities that present themselves while they are in school. Exploiting the fact that the SLSF data set includes hours worked in the twelve month period prior to leaving school either as a graduate or as a dropout, I estimate the impact that working while in school might have on the probability of graduation using local labour market conditions as an exogenous determinant of work activity. The results show that both men and women, but more particularly men, are very sensitive to job opportunities and that those job opportunities in turn lead to a sizeable reduction in the probability of graduating from high school. This contrasts with the simple raw correlation between work incidence or hours worked and graduation incidence, both of which are *positive*.

The paper is structured as follows. First, data from the Canadian Census are used to examine the evolution over time of the wage premium and the employment rate advantage of high school graduates compared to dropouts. For comparison purposes, evidence on the University/High School premium will also be presented. Then I use the SLSF to study in detail the relative performance of graduates relative to dropouts in terms of the time elapsed between the end of full time schooling and the beginning of the first reference job, the distribution of weekly wages in all reference jobs, their training history and the impact of employer-supported training on wages and job mobility. The next section then examines how sensitive to labour market conditions are young students who have to decide between graduating from high school or not. Concluding remarks follow.

2 The Value of a High School Degree, 1981-1996.

In this section, I document the evolution of the value of holding a high school diploma using the 1981, 86, 91, and 96 Canadian Censuses. Although the School Leavers Survey Follow-Up (SLSF) is the only source of detailed information on the work experiences of high school students, thus limiting the extent to which I can examine changes over time in the behavior of young individuals, perhaps we can gain a few insights by examining the evolution of the return to holding a high school diploma.

To document the earning and employment history of Canadians with low levels of education, I first computed the employment rates by Census year and by gender, both for high school graduates and high school dropouts, and for two groups of workers, 15-24 year-olds and 25-44 year-olds.[1] The idea of focusing on 15-24 year-olds is motivated by the fact that this group of individuals is likely to act as a reference for young individuals making their school/work decisions at the high school level.

The results of those computations are shown in Figures 1-4. More particularly, the graphs show the ratio of the employment rates of high school dropouts to that of high school graduates for each canadian region.[2] Although the figures point to a certain deterioration of the relative employment rate of dropouts, the decline seems to be most obvious for men, irrespective of the age group; when we look at the labor market performance of females, there are differences between the graphs looking at 25-44 vs 15-24 year-olds; in fact, there are instances where the relative rates have actually increased. Also, although we show the 1996 employment rates to get an up-to-date picture, the School Leavers Survey Follow-Up data looks at individuals who were 18-20 in 1991. Thus, for most of them, the schooling decisions pertaining to high school were either in the process of being made, or were already made. Therefore, for comparison purposes, the change in the relative employment rates between 1981 and 1991 is probably the more relevant one in the context

[1] I only used individuals not enrolled in school. The idea is to get an accurate picture of the labor market performance in terms of employment rates for people who have stopped their schooling process. It is true that for younger individuals, in our case 15-24 year-olds, the fact that they may have been out of school for 8 or 9 months (the time frame referred to in the Census) does not preclude their subsequent return to school.

[2] All the graphs are done with non-students. Since it is not possible to determine whether one was attending school or not in the 1986 Census, we have excluded it.

of rationalizing the decision to complete high school or not. And, as shown in Figures 3 and 4, there is little change between 1981 and 1991 in relative employment rates; in fact, the relative employment rate of dropouts increased for women more than it decreased for men. Overall, of course, high school graduates still enjoy an advantage in terms of employment probabilities.

For comparison purposes, I also calculated the employment rates of university graduates relative to high school graduates for men and women. As shown in figures 5-8, it seems pretty clear that male university graduates have maintained their relative advantage. Concerning the relative rates of women aged 25-44, we should be cautious about drawing too firm a conclusion based on the apparent improvement in the relative employment rates of high school graduates. Women's labour force participation rate was increasing at the start of the eighties and the pace at which it was increasing varied with educational attainment. However, when we look at the data for 15-24 year-olds, we can see that young women just out of high school have seen their "employability" decreased in relation to university graduates.

The next step was to run a series a regressions by census year and by gender of the log wage on a series of dummy variables (5) that control for age and on educational attainment expressed in categories (less than a high school degree, high school graduate, some college with no degree, and at least a Bachelor's Degree-the dropout category being the one left out). All regressions were done using a sample of people with positive wages and salaries who worked positive numbers of hours and weeks.[3] The regression coefficients from those regressions are reported in Figures 9 and 10. Focusing first on the overall 15-65 years of age population, it appears that the wage advantage of high school graduates over dropouts has remained more or less the same over time, especially for men. However, when we look at how relative wages have changed over the years for 15-24 age group, the evidence actually points towards a deterioration since 1981. Perhaps more importantly, the magnitude of the wage premium for younger people is much smaller than when we include the older cohorts. Thus it seems that since 1981, young males and females in Canada entering the labour market with only a high

[3]Although the 1971 Census could have been used as well, the questions on educational attainment made no attempt at trying to determine if the respondents whose highest level was grades 11-13 had actually graduated. It was thus impossible to directly measure the return to having completed high school relative to not completing. See Freeman and Needels (1993) and Bar-Or, Burbidge, Magee, and Robb (1995) for similar analyses with (in part) earlier data.

school diploma have earned wages that are increasingly similar to those paid to high school dropouts.

The story is quite different when we look at the wage advantage of university graduates. After reaching a low in 1986, the premium for a university degree has increased since then for both men and women. Also, contrary to what we find for the high school degree premium when we focus on younger cohorts, here the increase is actually larger for 25-34 year-old individuals.[4]

A look at Figures 11-12 which show kernel density estimates of the distribution of wages (net of age effects) basically confirms the point about the stagnation and even deterioration of wages for high school graduates; it appears to be the case that the *whole* distribution shifted leftward; in other words, the average deterioration of high school graduates' wages is not the result of a few outliers.[5]

The wage data suggest that although it may have been the case 15-20 years ago that high school graduates were in different (better paid) occupations or industries relative to dropouts, it now appears that the two groups may simply be competing for the same jobs. However, although he distribution of workers across occupations by schooling attainment shows signs of having converged between 1981 and 1996, the classifications are not directly comparable between the two Census years and thus it is difficult to make a clear statement. Nonetheless, as shown in Table 1, it seems that holding a high school degree provided a clear advantage in clerical occupations (one of the categories which are more or less the same across the two classification systems) in 1981 but not in 1996.

Overall, then, there is little in the Census data that suggests that the value of holding a high school diploma has increased over time. Again, it is worth reiterating that this statement applies to people who do not envision pursuing university education; in fact the "real" value of holding a high school diploma would include the expected added return from higher (university) education.

[4]The choice of these different age groups is based on trying to get an idea of what young individuals can expect to earn a few years after leaving school, based on the experience of the most recent cohorts.

[5]In fact, when I use a least absolute deviation estimator in place of OLS, the average estimated wage advantage of high school completion is essentially zero (for 15-24 year-olds) in 1996. In related work using the Survey of Consumer Finance, Gottschalk and Joyce (1998) show that, controlling for age, the wage advantage to holding just a high school for male heads aged 25-54 declined in Canada between 1987 and 1991, from about 15% to less than 13%.

In other words, for individuals who plan to go beyond high school, there is evidence that the premium associated to holding a university degree has increased relative to holding only a high school degree, but for those who, at best, plan to complete high school before entering the labour market, the data suggest that the advantage of holding a high school degree may in fact have declined over time.[6] However, it is still the case that high school graduates in 1996 have a larger employment rate compared to high school dropouts, even though there is very little advantage in terms of wages, conditional on having found a job.[7]

It is interesting to note that the high school dropout rate in the United States has always been lower than in Canada. While the discrepancy may have been largely due to the fact that the level of schooling of one generation is positively correlated to that of the previous generation, the fact that the dropout rate gap has not completely closed despite the fact that parents of high school students on both sides of the border are more similar nowadays in terms of schooling may suggest that other factors may be at play, such as the valued added of completing high school. As pointed out by Krueger (1997) and Gottschalk and Joyce (1998), the U.S. evidence shows that contrary to what I find here, the wage advantage of holding a high school diploma has substantially increased in recent years.[8] In addition, not only has the wage premium associated with a high school diploma increased over the years, its

[6]Taken together, these two conclusions would therefore suggest that it would not be an aberration to observe both a high dropout rate in high school *and* an increase in university enrollments and graduation rates.

[7]I will come back to this point later when I analyze the decision to drop out. Interestingly, when I make the same comparisons with the additional requirement that people work at least 1000 hours during the year, the decline in the relative employment rates of dropouts is accentuated while, again, relative wages behave similarly whether I put restrictions on hours worked or not. Thus, the basic conclusion remains the same: conditional on employment, the value of holding a high school diploma has decreased over the years in Canada.

[8]We should note, however, that the U.S.-Canada gap in the high school non-completion rates for individuals aged 20-21 has decreased in the 90's. According to my own calculations done with the Canadian Labour Force Survey and the U.S. Current Population Survey, the non-completion rate was 16.5% in Canada for March 1998 and 14.9% in the United States for the same month. In 1992, the canadian rate was at 20% and the U.S. rate 15.7% (also for the month of March). We should also note that there are substantial geographical differences in the U.S. non-competion rates. For example, the northern states (from coast to coast) have rates in the neighbourhood of 10%, which is still significantly different than those in Canada. For more details, see US Department of Education (1997).

level is much higher than in Canada.[9]

It should also be noted that while the parents' educational attainment plays a role, other evidence suggests that it cannot really be the whole story behind the differences in dropout rates in Canada and the United States. In a recent paper, Card and Lemieux (1997) show that the fraction of men and women aged 20-24 who are enrolled in school is actually higher in Canada than in the United States, and especially so for women. They also show the *reverse* is true for individuals aged 16-17.

3 The School Leavers' Follow-Up Survey (SLSF)

In 1991, Statistics Canada collected information on the school and post-school labour market experiences of 9,460 young people aged 18 to 20. One of the main purposes of that survey was to estimate the high school completion rate. The original sample was drawn from the Family Allowances File, as they were the most complete listings of individuals under the age of 15 in Canada. Five years of Family Allowances Files were used to generate a sampling frame of 18-20 year-olds and of the 18,000 individuals that were selected to be in the sample 10,782 were successfully traced and 9,460 responded. The interviews took place between April and June of 1991.

In 1994, Human Resources Development Canada commissioned Statistics Canada to re-interview the same individuals in 1995. For that interview, the response rate was 66.8% as 6,284 individuals provided information on their school and labour market experiences. These individuals were thus aged 22 to 24 at the time of the re-interview and, as a consequence, the data are best suited for studying the school-to-work transition process of the less educated among them.

Given the retrospective nature of the Follow-up, the identification of the most important job experiences of respondents relied on the notion of a "reference job". Such a job had to last at least six months and individuals had to work at least 20 hours per week in it. Two such jobs (at most) are documented in the data set, the first one that the individuals had since they

[9]Of course, this large discrepancy in the returns to a high school degree in Canada and in the United States begs the question of why? One possible avenue for future research would be to examine the role played by the differences in the institutional environment between the two countries, such as the higher canadian minimum wages, in closing the gap "from below" in wages paid to dropouts vs those paid to graduates.

were last in school (in high school, junior high, or elementary), and the most recent one. In addition, respondents were probed about the job they held the week before the interview. That job may be the first reference job, or the most recent one, or another job if, for example, the individual has worked full time in it for less than six months. Data on all those jobs are collected on usual hours worked, occupation, industry, tenure, training incidence, and usual wages. In addition, the duration to the first reference job is calculated from the self-reported ending date of school and the starting date of the job.

The sample considered in the analysis includes 4,615 individuals out of the original 6,284, with 1,408 records eliminated because the respondents were still enrolled in school at the time of the follow up interview, the other deletions being due to missing data on key variables. Also excluded from the sample are individuals who do not reside in one of the ten provinces. [10]

3.1 Summary Statistics

In the same spirit as in the previous section, Table 2 and Figures 13 and 14 show some simple descriptive statistics documenting the differences in the labour market experiences by schooling attainment. In terms of family background variables, it seems clear that high school graduates come from family with better educated parents than is the case for dropouts (with no post-secondary education) and, also, they performed substantially better when they attended school, as reflected by the much higher proportion of individuals with a B grade point averages or better. They also were significantly less likely to have failed a grade in elementary school. This last piece of information suggest that, at least to a degree, poor performances in school precede the process by which students start to contemplate dropping out of high school, instead of the idea of dropping out subsequently affecting school performance. Also, there is no striking difference in the distribution of the time to the first reference job between graduates and dropouts, except perhaps for the spike in the neighbourhood of zero months. Given that a larger fraction of graduates had a job while they were in school, this suggests that some of them actually moved full time into the labour market by working in the same job they had in the last twelve months preceding the end of their full time schooling.

[10] Although 40% of the individuals present in the SLF have at most a high school diploma, using the sample weights brings the estimated population proportion to about 30%.

The data indicate that although graduates seem to have fared better in terms of employment rates[11], the same cannot be said for labor earnings (or wages): both groups earn approximately the same on average and the distributions of log weekly wages shown in Figure 14 provide no evidence that high school graduates are doing any better compared to dropouts. Again, this suggests that they may be competing for the same jobs. Note that graduates seem to be doing better in terms of training incidence in the most recent reference job, but not in the first.[12] This may indicate that graduates gain an edge over dropouts as they progress in their career. However, as is always the case when discussing sample means, observed and unobserved (to the analyst) characteristics are likely to play a role, hence the need for a multivariate analysis.

It is interesting to note that the characteristics of dropouts who did pursue post-secondary education are different from the characteristics of the "real" dropouts on one important dimension: they are more likely to come from more educated families although they performed just as poorly in class. In fact, their parents are more educated than those of high school graduates. In terms of employment rates, dropouts with some additional post-secondary schooling are doing just as well as high school graduates. Therefore, it seems appropriate to separate them out from the other dropouts if one wants to evaluate the differences in labour market performance between graduates and dropouts.

Not surprisingly, university graduates are earnings a much better wage, conditional on employment, than either one of the other groups. What might be surprising is the fact that a lower percentage of university graduates declares ever having had a reference job. However, this just serves to illustrate the limits of the SLSF data in terms of analyzing the school-to-work transition of more educated poeple. First of all, they have been out of school for a shorter time, thus some of them may still be searching. Second, they may be in full-time jobs that begun less than six months before the date of the interview, which disqualifies those jobs as being reference jobs. But

[11]Basically ALL of the difference in employment rates between graduates and dropouts is driven by women. There is very little difference for men.

[12]It is not possible to determine with certainty whether employers were providing and financing this training, although individuals in the SLF do respond to a question asking whether their employer provided any support for the training they took, be it in terms of providing transportation, giving time off, or by paying for the training. There is no separate question on the financing aspect only.

most importantly, the question about ever having a reference job is simply ill-suited for studying the labour market outcomes of university graduates as it specifically makes reference to jobs that began after the individual left high school. Therefore, for many university students, the wages from those jobs are likely to be simply a source of funds to finance university studies.[13]

Finally, if we look at the incidence of work while in high school and its relation to completion rates, we can see that in fact high school graduates were more likely to have worked than was the case for dropouts. Turning to hours worked while in school, Table 2 shows no evidence that, on average, more hours are associated with a lower incidence of completing high school. In fact, although not shown here, this is true over a substantial range in hours worked. This just serves to highlight the likely important effect of selectivity in the joint determination of hours worked while in school and high school completion.

3.2 High School Graduation and Employment.

Both the Census and the SLSF data show (at least for women in the latter case) that having a high school degree is associated with a larger employment rate. Whether one causes the other is another matter. If it turns out that taking into account the joint endogeneity of employment and schooling outcomes breaks this positive correlation between the two, then from the individual's perspective, seeking the "treatment" of completing high school might not make much difference if that individual does not plan to pursue post-secondary education. If it stands, then there is added benefit to staying in high school until completion.

To take into account the fact that both outcomes are endogenous, I estimate a bivariate probit model in which 1) high school graduation impacts upon ever holding a reference job, and 2) for identification purposes, the parents' education and local labour market conditions at the time they were in school are assumed to influence the probability of completing high school but not of holding a reference job.

Results are shown in Table 3 for both men and women. For comparison purposes, I also show the results from a simple probit for high school com-

[13]Although not shown here, the distribution of time between the beginning of the first reference job and the date last in University (instead of high school) reveals that the majority of observations have negative durations, which again is suggestive of those jobs being used to finance schooling.

pletion. As can be seen from the simple probit, there is very little evidence in the SLSF that, for men, a high school diploma is associated with a higher probability of ever having occupied a reference job, while the opposite is true for women. Results from the bivariate probits are not very conclusive as the estimates are rather imprecisely measured. Note, though, that the coefficient associated with high school completion changes sign from the independent probit to the bivariate probit, suggesting perhaps that, even for women, the causal effect of holding a high school degree on the probability of having a reference job may not be so strong.[14] Overall, despite their inconclusiveness, the results shed some doubt on whether there is a substantial advantage for women to complete high school in terms of a higher employment probability. For men, there is certainly no evidence that this is the case. Thus, balancing the evidence on employment rates and schooling from the Census and from the SLSF, it must be recognized that, on the one hand, the Census samples are much larger and therefore less susceptible to sampling error, but 2) the joint endogeneity of employment and schooling outcomes very likely biases upward the effect of high school graduation.

3.3 Labor Earnings and High School Graduation.

To check whether the lack of statistical relationship between wages and completing high school results perhaps from the way observables and unobservable interact with schooling attainment, I next estimate a multivariate model of weekly wage determination. Results of the estimation are shown in Table 4. As before, results showing the impact of having graduated from university should be interpreted with some caution, given that many of the jobs held by university graduates are very likely not to be strongly related to the transition process from school to work. Even then, results suggest that university graduates did better than other less educated individuals, although the premium is much lower than that estimated with Census data. Also, it

[14]Using a Two-Stage Least Squares approach, which avoids making distributional assumptions, produces qualitatively the same results if only with slightly more precision.

Also, given that I am instrumenting with a group variable, the standard errors are likely to be downward biased (Moulton (1986) and Shore-Sheppard (1996)). However, although the number of individuals belonging to a given group (a Census Metropolitan Area) shows substantial variation, I do have approximately 600 different groups, which approaches the size of the respective samples of men and women. Therefore, I do not expect the problem to be nearly as severe as if I had a small number of groups.

is interesting to note that the premium to a university degree for women is quite sensitive to the inclusion of family and personal background variables, contrary to men.

As for the return to a high school diploma, we can see that it is not significantly different from zero and that, here again, it is substantially more sensitive to the inclusion of the background variables for women than it is for men. However, due to small sample sizes, the parameters are not very precisely estimated. But even though they are not precisely estimated, they are very similar to the parameters estimated using Census data for people aged 15-24. The idea of comparing two specifications with and without detailed controls for school performance and parents education is to get a feel on how the estimated wage premia from the Census data might be biased upward due to omitted variables. Based on the results using the SLSF, it could be argued that as low as the estimated returns to a high school degree are using the Censuses, it seems likely that the true returns are even lower.

3.4 The Impact of a High School Diploma on the Receipt of Training.

Although the descriptive statistics do suggest that graduates seem to benefit from greater training opportunity, the more relevant question to ask is whether the fact they have a High School diploma does indeed *cause* an increase in the training receipt probability. In other words, would the same individuals have received training even in the absence of graduating. If so, this would then suggest that from the individual's point of view, graduating from high school does not give any special advantage in terms of the receipt of training over not completing high school.

Table 5 shows the results from estimating a random-effect probit model to study the effect of having a high school degree on the incidence of training. Note that we will make use of two 0-1 training variables, one for which the respondents simply answered whether they took any training during the time they were in a reference job, the other will be the previous one interacted with an indicator for the support of that training by the employer.

Let

$$y_{it}^{*} = \beta x_{it} + \alpha_i + u_{it} \tag{1}$$

$$y = 1 \text{ iff } y_{it}^{*} \geq 0$$

where α_i is a random variable distributed according to a univariate function H indexed by a finite number of parameters δ, for example a normal distribution function. Assuming independence between the incidental parameters α_i and the x_{it}'s, β can be consistently estimated by maximizing the following likelihood function:

$$LogL = \sum_{i=1}^{N} log \int \prod_{t=1}^{T} (F(\beta x_{it} + \alpha)^{y_{it}} [1 - F(\beta x_{it} + \alpha)]^{1-y_{it}} dH(\alpha|\delta) \qquad (2)$$

However, it is well known that a random-effect specification gives biased estimates when there exists a correlation between the regressors and the error term. In the case of the receipt of training and of its support by the employer, we are likely to have such a correlation: more "able" individuals, or simply less intrinsically mobile individuals, two characteristics that we cannot observe in the data, should be more likely to receive training (e.g. see Lynch (1992) for U.S. evidence on the characteristics of individuals who receive company-provided training). Thus, although the random-effect model takes unobserved heterogeneity into account, it does so in a limited way and the resulting $\widehat{\beta}$ will likely suffer from omitted-variable bias.

As shown in Tables 5, however, there is little evidence that high school completion increases the probability of training, whether it be supported by the employer or not.[15] On the other hand, there is evidence that having more than a high school diploma (even being a dropout with some post-secondary education) does increase the probability of training. Also, whether including many controls for past school performance and family and personal background has a sizeable impact or not on the estimated parameters depends on the training variable used. If employers provide and/or support training based on their observation of each worker's characteristics, such as grades in school, and if these characteristics are correlated with schooling attainment, than one would expect the effect of high school graduation to be more sensitive to the inclusion of those variables. [16] Essentially, this what I find: the effect of schooling on the probability of receiving employer-supported training is substantially more sensitive to the inclusion of the background variables

[15]Results by gender being similar, only the pooled estimates are shown.

[16]Note that I include the receipt of unemployment insurance and of welfare benefits simply as controls which serve to proxy unobservable characteristics. I give no interpretation to the estimated coefficients attached to these controls.

than the somewhat loosely defined question of whether respondents took any training during the time they were in their reference job.[17]

3.5 Training and Wages

Although it does not appear to be the case that high school graduates are more likely than dropouts to get training, it would still be of interest to establish whether individuals having some post-secondary education see their wage increase following training. To do so, I will exploit again the panel structure of the data set to estimate OLS and fixed-effect regressions of the log of weekly and hourly wages on an indicator variable for the presence of employer-supported training.

As we can see from Table 6, whether the analysis is carried out in levels or in first-differences, it seems clear that training is an important source of wage growth. Although it does not make any qualitative difference whether wages are measured per hour or per week, the latter measure is more sensitive to training which suggests that training also has a positive effect on hours worked. However, the data pertaining to training and to wages paid in each reference jobs are lacking in at least two important aspects: 1) there is no information on when training took place during the course of the employment relationship; and 2) the so-called "usual" weekly wages earned in each reference job are not linked to any particular period during the relationship except for those still working in a reference job at the time of the interview, for whom the wages paid likely reflect what they earn at interview time. For past employment relationships, wages could mean average wages over the course of the employment relationship, or end-of-tenure wages. Consequently, it is possible that the wages of some of the respondents could be lower if they are undergoing training at the time of the interview and their employers make them pay for their training through reduced wages, as predicted by standard human capital theory Becker (1975). This would tend to partially mask the overall positive relationship between completed training and wages.

[17]From Table 5, we can see that training incidence and employer tenure are positively related and competing structural interpretations can be given for that relationship. It could result from the fact that high tenure workers are intrinsically less mobile and thus represent, all else equal, better candidates for employers to train. Or, it could result from the fact that the receipt of training develops firm-specific skills which make these workers more valuable to employers. I return to this question below.

On the other hand, the positive effect estimated with fixed-effects is identified from cross-job variation for the same individual. Although this controls for individual fixed-effects, it does not control for the unobserved quality of job matches. Given that I do not have within-job variation in training outcomes with the SLSF data (contrary, for example, to the National Longitudinal Survey of Youth), there likely subsists upward biases in the estimated effects.

3.6 The Receipt of Employer-Supported Training and Job Mobility

To investigate the possibility that employer-supported training leads to more job stability, I then estimate a Cox proportional hazard model. To fully exploit the panel structure of the SLSF data in order to eliminate individual-specific incidental parameters, I borrow from Chamberlain (1985)'s insight and stratifies the analysis within individuals. This causes all constant individual-specific terms to cancel out from the likelihood function, including each individual's baseline hazard. To be more specific, suppose that that for worker i we have n_i spells (ordered by their increasing length) and that the duration for each spell is denoted t_{ij}, where j stands for the spell number. Assuming all spells for the same person are independently distributed given the heterogeneity parameter, I can write the the hazard function as

$$\lambda_{ij}(t) = exp(\beta' X_{ij}(t) + \alpha_i)\lambda_{i0}(t), \tag{3}$$

$$j = 1, ..., n_i;$$

$$i = 1, ..., N;$$

Then , it can be shown that the partial log-likelihood function is equal to

$$L = \sum_{i=1}^{N} \sum_{j=1}^{n_i} ln \left[\frac{exp(\beta' X_{i(k)}(t_{i(j)}))}{\sum_{k=j}^{n_i} exp(\beta' X_{i(k)}(t_{i(j)}))} \right] \tag{4}$$

where the denominator corresponds to the risk set of worker i. Note that both α_i and λ_{i0} do not appear in equation (4). One potential disadvantage of using this methodology is that individuals who have worked in at least two reference jobs and from whom the parameters are identified may not be a random

sample of the population. To check whether that might be a real concern, Table 7 shows summary statistics for workers with at least two reference jobs and for those with just one reference job. The evidence presented in Table 7 does not suggest that the two sub-samples are much different in terms of the underlying characteristics of their members. Thus, one can be more confident that using a stratified Cox analysis does not eliminate incidental parameters at the cost of introducing systematic sample-selection biases.

Looking at Table 8[18], we can see that whether one analyzes job spells with or without conditioning out time invariant individual characteristics does not change the basic message that the receipt of training does seem to favor prolonged employment relationships.[19]

To summarize the results from this sub-section, it appears that having a high school degree does not favor the receipt of employer-supported training, but that having post-secondary education, particularly a university degree, does although there is evidence that unobserved individual characteristics play a substantial role in the latter case: when personal and family background variables are taken into account the measured impact of having graduated from university is reduced by over 30%. Given that such additional variables are likely to be imperfect controls, it is plausible that there still subsists an upward bias in the estimates. Also, training favors wage growth even when unobserved individual (but not job-match) heterogeneity is controlled for. Finally, there is strong evidence that employer-supported training does favor more lengthy employment relationships, as would be expected if either the skills acquired contain firm-specific components or the skills acquired are general but mobility costs are enough to prevent workers from quitting.[20]

To conclude on this section using data from the Follow-up to the School Leavers' Survey, it thus seems that having just a high school degree does not bring additional benefits except perhaps in terms of getting employment in

[18]Results for men and women are very similar.

[19]One must note, however, that the possible confounding effects of job-match quality are not controlled for using this methodology. In other words, it could still be the case that good matches which are destined to last longer irrespective of whether one receives training or not also happen to involve more training. In those cases, one cannot give a causal interpretation to the negative correlation between the hazard rate and the receipt of training.

[20]Although if that were the case, one would have to explain why mobility costs are more important for trainees than for non-trainees. The results from the hazard model show that unobserved individual characteristics, such as innate stability favoring the receipt of on-the-job training are not what drives the results.

the case of women; hourly earnings are basically the same as those of high school dropouts and training opportunities do not appear to be enhanced by completing high school. For university graduates, though, their initial wage advantage over other educational groups is amplified by their having greater access to employer-supported training, which increases both their earnings and help them keep their jobs longer.

Interestingly, high school dropouts who, somehow, pursue post-secondary education[21] do a lot better than both "real" dropouts and high school graduates with no post-secondary education. However, as we saw in the descriptive statistics, their characteristics are somewhat different than those of the other two groups and approach in some respects the characteristics of high school graduates with some post-secondary schooling. Thus, it may be no surprise that in terms of the probability of getting training, they are doing basically as well as them.

Combining the evidence from the Censuses with that of the SLSF, one gets the overall impression that although high school graduates seem to maintain an edge in terms of employment rates (the SLSF evidence on this is not so clear), some of the wage advantage graduates used to enjoy over dropouts, which was already at a relatively low level, has apparently decreased. Consequently, we may suspect young high school students who do not plan to go to college to be especially sensitive to job opportunities that present themselves while they are in school and these job opportunities might actually cause some of them to drop out, as the only major disadvantage they may have compared to graduates disappears once they have a job. This is the issue to which I turn next.

4 Local Labour Market Conditions and the Decision to Complete High School.

In this section, I analyze the decision to complete high school and the influence that local labour market conditions have through the decision to work while in school. In other words, I take into account the fact that finishing high school and having a job in the twelve months preceding the end of full-time schooling are both endogenous variables and I use the local unemployment rate as an exogenous determinant of work while in school to determine im-

[21] One of these individuals even reports having obtained a university degree.

pact of such work on the decision to graduate. The unemployment rate I use in the estimations reported here is the rate in the Census Metropolitan Area if the individual studied in a CMA; otherwise I use the province average excluding the CMA's.[22] The analysis is carried out for both men and women.[23]

To help organize one's thoughts, consider Figure 15 which shows optimal schooling choices for two types or individuals. The figure has been drawn so that individual 1 is indifferent between dropping out and graduating from high school while individual 2 is indifferent between stopping after completing high school of getting a university degree. If the return to completing high school stays the same while the premium to completing a university degree increases just slightly, individual 1 will still be indifferent between dropping out and graduating but individual 2 will now strictly prefer to enroll in university. In fact, an increase in the slope of the linear segment between point B and Point C, even if it is accompanied by a slight reduction in the premium to completing university, will have the effect of causing an increase in university enrollments (with a possible decrease in university completion rates). As for type 1 people, even the slightest reduction in the return to finishing high school will cause an increase in dropout rates. As it turns out, the evidence from the Censuses points toward an increase in the return to a (completed) university education while the return to just a high school degree has, at best, stagnated. It is in that sense that it may not really surprising that, in Canada, we have surpassed the United States in terms of university enrollment rates (Card and Lemieux (1997)) while at the same time still lagging behind in terms of high school completion rates.

To model both the decision to complete high school and the decision to work in the twelve months preceding the end of going full-time to school, I first use a bivariate probit model which allows for the error terms of both choice equations to be correlated, as would be expected if some unobserved

[22]For those that do not complete high school, we use the unemployment rate that prevailed at the time (month) they quit school. For those that graduate, we use the annual average computed over the last four years by CMA's or province. Whether the average is computed over a shorter period of time instead of four years does not make any qualitative difference. The effect of local labour market conditions on the probability of graduation was also studied using the full 1991 School Leavers Survey sample by Dagenais, Montmarquette, Parent, Durocher, and Raymond (1998).

[23]See also Beaudry, Lemieux, and Parent (1999) for an analysis using aggregate data of the effect of local labour market conditions on Canadian school enrolment rates for the period 1976-1998.

factors which influence the decision to drop out also influence the decision to work. Note that the raw data (see Table 2) indicate a *positive* correlation between working while in school and high school completion. Also, the same positive correlation exists between hours worked while in school and graduation. A priori, if we thought that work while in school is bad for schooling attainment we would expect a negative correlation. However, this just serves to highlight the importance of modeling both decisions jointly as unobserved characteristics are likely to be behind such a positive correlation. For example, more motivated individuals might be more likely to work as well as to graduate. To model jointly the decision to complete high school and the decision to work we also use a joint probit-tobit specification.

Results are reported in Tables 9 and 10 for the bivariate probit model. As we can see, whether the students work or not in the twelve months leading to the end of going to high school full time is strongly related to the state of the labour market. In turn, working while in school is found to have a strong effect on the probability of graduation, for both men and women, although men's decision to work appear to be slightly more responsive to changes in the unemployment rate. Also, results in Table 10 suggest that women's response to local labour market conditions is sensitive to the unemployment rate measure used: in both cases where we use either the provincial unemployment rate of women aged 25-44 or the overall provincial unemployment rate as instruments, working while in school does not appear to decrease the probability of graduation.[24] As we can see from the correlation coefficients shown in Table 9 and, for men , in Table 10 as well, the positive correlation between unobservables that affect both decisions is quite strong, as the summary statistics in Table 2 seemed to suggest: those that graduate and work are not a random sample of the population of young students. Excluding local labour market conditions from the graduation equation and allowing correlation between unobservables reverse what simple descriptive statistics would lead us, in fact, to conclude: working does seem to have the causal effect of making young students drop out of high school. Interestingly, although Cameron and Heckman (1994) show that young people in the United States (using the NLSY) show some sensitivity to an alternative measure of local labour market conditions, recent attempts by Ruhm (1997) and Oettinger

[24]Although not shown here, estimating the equation for high school graduation independently produces a positive relationship betweem working and graduating, which essentially reproduces the patterns present in the raw data.

(1999) at trying to use the local rate of unemployment as an instrument for work while in school to explain either educational attainment or high school performance have failed in that the instrument appears to be of poor quality. Here again, if there is a substantial wage advantage to completing high school, as all the evidence in the U.S. indicates, then that may not come as a total surprise. In any event, it seems clear that the canadian experience is strikingly different.

Finally, as a check on the robustness of the results with respect to the assumption of joint normality, I estimated a linear two-stage least square model in which the local unemployment rate is used as an instrument for work activity. It is well-known that a linear probability model is flawed as an econometric model for discrete choice problems, but it does provide consistent estimates of the parameters of interest. Although the results are not shown here, I get the same qualitative conclusions.

4.1 The Impact of Hours Worked While in School

While the fact of being employed does seem to increase the probability of dropping out of high school, it would also be of interest to know how that probability varies with hours worked. While in principle one could simply use local labour market conditions as an instrument for hours worked and then use the predicted values of hours worked in the high school completion probit, the estimation is complicated somewhat by the fact that not every students worked within twelve months of getting out of high school. Therefore, I have to take into account the censoring at zero hours. To do this, I estimate a bivariate model in which one outcome is high school graduation, as before, and the other is hours worked, modeled as a censored regression.[25]

More specifically, let the latent propensity to complete high school and the number of hours worked be represented as:

$$C_i^* = X_i\beta + \delta H_i + \nu_i \tag{5}$$

$$H_i = Z_i\gamma + \eta_i \text{ iff RHS} > 0 \tag{6}$$

$$H_i = 0 \text{ otherwise}$$

[25]The modelused here represents a simpler version of the one used in Dagenais, Montmarquette, Parent, Durocher, and Raymond (1998).

where H represent the number of hours worked, X and Z are vectors of exogenous variables and the error terms ν and η are assumed to follow a bivariate normal $N(0,0,1,\sigma_\eta^2,\rho)$ where ρ is the correlation coefficient between ν and η. In estimating equations (5) and (6), we make the assumption that local labour market conditions affect the decision to complete high school only through their effect on the number of hours worked (just as in the case of the bivariate probit).[26]

Results are reported in Table 11. As we can see, we obtain the same qualitative conclusion as the one obtained from the bivariate probit model: working more hours causes an increase in the probability of not graduating from high school and the effects are very similar for both sexes.

5 Conclusion

The point of departure for this paper was to note that although we keep hearing about how important it is to pursue post-secondary education given the new requirements of today's jobs, there is still a sizeable proportion of the population which does not complete high school. The natural question that arises then is why? The possibility explored in this paper is that it may just be the case that for those people whose margin of decision is between high school graduation and dropping out, people who do not really plan to go to university, the advantage of completing high school may have stagnated or declined over the years. Data from the Census suggest that this has been the case while the opposite is true for a university education. Also, using data from the Follow-Up to the School Leavers Survey, it seems that graduates have no particular advantage over dropouts except in terms of employment rates. On the other hand, university graduates and, to a lesser degree, anyone with some post-secondary education, have more favourable labour market outcomes measured in terms of employment rates and training supported by their employers. In turn, those training opportunities help them achieve higher earnings and greater job attachment. Therefore, it seems that university graduates, starting from an already more favorable position, see their relative fortunes improve even further as they progress early on in their careers.

Then, taking a step back to look at the decision process by which high school students choose to complete high school or not, we find that they are

[26]See the Appendix for a full derivation of the likelihood function.

very sensitive to the state of the local labour market and that the jobs they take up while they are still in school cause a significant decrease in their graduation probability. In other words, given that there does not seem to be a major advantage to completing high school over not completing it except in terms of employment rates, once they get a job during school, many of them drop out before graduation.

The main message from this paper is not, of course, that dropping out of high school is such an enviable alternative. Rather, it suggests that stopping after high school graduation is simply not enough anymore for those that want rewarding, stable, and well-paid jobs. High school graduates nowadays appear, to a certain degree, to be simply competing with dropouts for the same jobs, which was not the case 20 years ago.

One puzzle left unexplained in this paper is why has the monetary value of a high school degree diverged so much from that in the Unites States since the early 80's. While the relationship between education and log-earnings in the United States is approximately linear (Card (1999)), that appears not to be the case in Canada. In fact, the results in this paper suggest that the relationship is rather convex. Although not shown here, using mid-points of all the educational categories included in the Census data to estimate the relationship between log earnings and years of schooling (as opposed to the education categories used in this paper) suggests indeed that the relationship is convex and that the convexity is produced by the flattening of log earnings-schooling relationship at lower levels of education. One avenue for future research would be to try to determine whether a different institutional environment, such as the higher minimum wages in Canada, have in a sense had the effect of censoring the lower part of what may otherwise be a linear relationship, as in the U.S.

References

Bar-Or, Y., J. Burbidge, L. Magee, and A. L. Robb (1995, October). The wage premium to a university education in canada. *Journal of Labor Economics 13*(4), 762–794.

Beaudry, P., T. Lemieux, and D. Parent (1999). What is happening in the youth labour market in canada? mimeo, University of British Columbia, Forthcoming in *Canadian Public Policy*.

Becker, G. S. (1975). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education* (2 ed.). New York: Columbia University Press.

Cameron, S. and J. Heckman (1994). Determinants of young males' schooling and training choices. In L. M. Lynch (Ed.), *Training and the Private Sector*, pp. 201–231. Chicago, IL: The University of Chicago Press.

Card, D. (1999). The causal effect of education on earnings. In O. Ashenfelter and D. Card (Eds.), *Handbook of Labor Economics*, Volume 3. North Holland.

Card, D. and T. Lemieux (1997). Adapting to circumstances: The evolution of work, school, and living arrangements among north american youth. Working Paper no. 386, Princeton University, Industrial Relations Section.

Chamberlain, G. (1985). Heterogeneity, omitted variable bias, and duration dependence. In J. Heckman and B. Singer (Eds.), *Longitudinal Analysis of Labor Market Data*. Cambridge, UK: Cambridge University Press.

Dagenais, M., C. Montmarquette, D. Parent, B. Durocher, and F. Raymond (1998). Travail pendant les études et abandon scolaire : Causes, conséquences et politiques d'intervention. cahier de recherche 98s-32, Centre interuniversitaire de recherche en analyse des organisations, Montreal, Quebec.

Freeman, R. B. and K. Needels (1993). Skill differentials in canada in an era of rising labor market inequality. In D. Card and R. B. Freeman (Eds.), *Small Differences that Matter: Labor Markets and Income Maintenance in Canada and the United States*. Chicago, IL: University of Chicago Press.

Gottschalk, P. and M. Joyce (1998). Cross-national differences in the rise in earnings inequality: Market and institutional factors. *Review of Economics and Statistics* (4), 489–502.

Krueger, A. B. (1997). Reassessing the view that american schools are broken. Technical report, Working Paper No. 395, Industrial Relations Section, Princeton University.

Lynch, L. M. (1992). Private-sector training and the earnings of young workers. *American Economic Review 82*, 299–312.

Moulton, B. R. (1986). Random group effects and the precision of regression estimates. *Journal of Econometrics 32*(3), 385–397.

Oettinger, G. S. (1999, October). Does high school employment affect high school academic performance? *Industrial and Labor Relations Review 53*(1), 136–151.

Ruhm, C. J. (1997, October). Is high school employment consumption or investment? *Journal of Labor Economics 15*(4), 735–776.

Shore-Sheppard, L. (1996, December). The precision of instrumental variables estimates with grouped data. Working Paper No. 374, Industrial Relations Section, Princeton University.

US Department of Education, . (1997, July). Dropout rates in the united states: 1995. National Center for Education Statistics, Statistical Analysis Report 97-473.

Appendix

Let the bivariate normal density function be expressed as:

$$f(\nu_i, \eta_i) = \frac{1}{2\pi\sqrt{1-\rho^2}\sigma} \exp\left[-\frac{1}{2\left(1-\rho^2\right)}\left(v_i^2 - 2\rho v_i \frac{\eta_i}{\sigma} + \frac{\eta_i^2}{\sigma^2}\right)\right] \tag{7}$$

Each individual's contribution to the likelihood function can be expressed by examining all possible cases, where C_i denotes high school completion and H_i: represents the hours worked by individual i:

$$P\left(C_i = 1, H_i > 0\right) = \int_{-x_i\beta-\delta H_i}^{\infty} f\left(v_i, \eta_i\right) dv_i \tag{8}$$

Standardizing the bivariate normal density function:

$$P\left(C_i = 1, H_i > 0\right) = \int_{-x_i\beta-\delta H_i}^{\infty} \frac{1}{\sigma}\phi_2\left(v_i, \eta_i^*\right) dv_i, \tag{9}$$

where ϕ_2 corresponds to the standardized density and $\eta_i^* = \frac{H_i - z_i\gamma}{\sigma}$.
In similar fashion:

$$P\left(C_i = 0,\, H_i > 0\right) = \int_{-\infty}^{-x_i\beta-\delta H_i} \frac{1}{\sigma}\phi_2\left(v_i, \eta_i^*\right) dv_i. \tag{10}$$

The last two cases are:

$$P\left(C_i = 1,\, H_i = 0\right) = \int_{-x_i\beta}^{\infty} \int_{-\infty}^{\frac{-z_{ii}\gamma}{\sigma}} \phi_2\left(v_i, \eta_i^*\right) dv_i d\eta_i^*, \tag{11}$$

and

$$P\left(C_i = 0,\, H_i = 0\right) = \int_{-\infty}^{-x_i\beta} \int_{-\infty}^{\frac{-z_i\gamma}{\sigma}} \phi_2\left(v_i, \eta_i^*\right) dv_i d\eta_i^* = \Phi_2\left(-x_i\beta, \frac{z_i\gamma}{\sigma}\right), \tag{12}$$

where Φ_2 corresponds to the standardized cumulative bivariate distribution.

Letting n_j $(j = 1, 4)$ represent the number of observations in each subsample corresponding to the cases just described, we obtain the following log-likelihood function which is maximized with respect to the parameters $\beta, \delta, \gamma, \sigma$ and ρ :

$$\log L = \sum_i^{n_1} \log \int_{-x_i\beta-\delta H_i}^{\infty} \frac{1}{\sigma}\phi_2\left(v_i, \eta_i^*\right) dv_i + \sum_i^{n_2} \log \int_{-\infty}^{-x_i\beta-\delta H_i} \frac{1}{\sigma}\phi_2\left(v_i, \eta_i^*\right) dv_i \tag{13}$$

$$+ \sum_i^{n_3} \log \int_{-x_i\beta}^{\infty} \int_{-\infty}^{\frac{-z_{ii}\gamma}{\sigma}} \phi_2\left(v_i, \eta_i^*\right) dv_i d\eta_i^* + \sum_i^{n_4} \log \Phi_2\left(-x_i\beta, \frac{z_i\gamma}{\sigma}\right)$$

Table 1A. Occupations by Schooling Attainment
Census 1981; 15-24 year-olds

Occupation	schooling Dropouts	Graduates	Total
MANAG / ADM	265	257	522
	1.82	2.82	2.21
SCI / ENG / MATH	91	102	193
	0.63	1.12	0.82
SO-SCIENCES	45	36	81
	0.31	0.40	0.34
TEACHING	40	27	67
	0.28	0.30	0.28
MED / HEALTH	157	154	311
	1.08	1.69	1.32
ART / LIT / REC	126	87	213
	0.87	0.96	0.90
CLERICAL	2483	3441	5924
	17.08	37.80	25.06
SALES	1317	975	2292
	9.06	10.71	9.69
SERVICES	2752	1148	3900
	18.93	12.61	16.50
FARM / HORT / HUSB	831	279	1110
	5.72	3.06	4.70
O-PRIMARY	613	173	786
	4.22	1.90	3.32
PROCESSING	1341	569	1910
	9.22	6.25	8.08
MACH / FAB / REPAIR	2377	1018	3395
	16.35	11.18	14.36
CONSTRUC-TRADES	1339	537	1876
	9.21	5.90	7.94
TRANSP-EQUIP-OPERATIN	762	300	1062
	5.24	3.30	4.49
Total-Counts	14539	9103	23642
Total-Column Freqs.	100.00	100.00	100.00

Pearson's Chi Square Statistic (14 df): 1634.29
P-Value: (0.000)

Table 1B. Occupations by Schooling Attainment
Census 1996; 15-24 year-olds

Occupation	schooling Dropouts	Graduates	Total
SEN-MANAG.	6 0.07	3 0.04	9 0.06
OTHER-MAN.	170 1.99	220 3.08	390 2.49
PROF. BUSIN/FIN.	4 0.05	6 0.08	10 0.06
FIN. / SECRET. / ADMINS.	63 0.74	111 1.55	174 1.11
CLERIC. OCC'S & CLER.	616 7.21	743 10.41	1359 8.67
NAT. & APPL. SCIEN.	51 0.60	44 0.62	95 0.61
PROF. HEALTH	0 0.00	3 0.04	3 0.02
TECH. HEALTH	48 0.56	64 0.90	112 0.71
SOC. SCI., GOV. SERV.	20 0.23	26 0.36	46 0.29
TEACHERS, PROFS	4 0.05	15 0.21	19 0.12
ART / CULT / RECR / SPORT	137 1.60	95 1.33	232 1.48
WSALE / TECH / INSU / REAL	62 0.73	73 1.02	135 0.86
RETAIL SUPERV / SALESP	898 10.51	1017 14.24	1915 12.21
FOOD & BEV.	785 9.19	676 9.47	1461 9.32
PROTECT SERV.	102 1.19	122 1.71	224 1.43
CHILDCARE	307 3.59	193 2.70	500 3.19

Table 1B. Occupations by Schooling Attainment (cont'd)
Census 1996; 15-24 year-olds

Occupation	schooling Dropouts	Graduates	Total
TRAVEL & ACCOMOD	1733	1286	3019
	20.29	18.01	19.25
CONTRACTORS, TRADE / TR	18	20	38
	0.21	0.28	0.24
CONSTRUCTION	255	165	420
	2.99	2.31	2.68
OTHER TRADES	356	266	622
	4.17	3.73	3.97
TRANS. EQUIP. OP.	378	306	684
	4.43	4.29	4.36
LABOURERS, HELPERS	548	359	907
	6.42	5.03	5.78
OCC'S IN PRIM. IND'S	879	465	1344
	10.29	6.51	8.57
SUPERV., MANUF	711	546	1257
	8.32	7.65	8.02
LABOURERS, MAN / UTILS /	391	316	707
	4.58	4.43	4.51
Total-Counts	8542	7140	15682
Total-Column Freqs.	100.00	100.00	100.00

Pearson's Chi Square Statistic (24 df): 237.25
P-Value: (0.000)

Table 2. Mean Sample Statistics

Variable	H.S. dropouts with no post-sec. education	H.S. dropouts with some post-sec education	High school graduates	H.S. graduates with some post-sec education	B.A. degree or more
Father went to college / university	5.25%	13.93%	6.31%	10.96%	33.51%
Mother went to college / university	3.49%	11.03%	8.54%	8.82%	24.62%
% Males	55.19%	49.83%	48.70%	44.97%	40.49%
GPA of A in high school	3.43%	2.51%	9.82%	18.38%	53.28%
GPA of B in high school	26.30%	31.19%	43.80%	48.14%	43.61%
GPA of C in high school	56.11%	52.29%	42.33%	31.27%	3.11%
GPA of D in high school	14.16%	14.01%	4.06%	2.20%	0.00%
Failed in primary school	38.37%	25.98%	21.28%	12.35%	0.87%
Collected UI in last 12 months	21.99%	18.85%	19.05%	22.03%	15.05%
Collected welfare in last 12 months	21.47%	17.37%	12.21%	6.29%	1.65%
With a child	41.00%	29.66%	24.08%	16.26%	4.14%
Hours worked while in school	13.43	15.71	13.60	12.43	873.00%
Had a job while in high school	56.29%	64.28%	66.36%	67.43%	58.40%
Had at least one reference job	80.33%	87.66%	87.12%	86.16%	71.93%
N (in the sample)	1188	285	1002	1572	568
N (in the population)*	98149	29006	168248	326097	138555

*Obtained from the sample weighst.

FIRST REFERENCE JOB

Variable	H.S. dropouts with no post-sec education	H.S. dropouts with some post-sec education	High school graduates	H.S. graduates with some post-sec education	B.A. degree or more
Usual weekly hours	40.87	39.06	38.91	36.04	34.30
Weekly wages	356.98	340.36	354.44	349.04	395.37
Took training	0.30	0.29	0.28	0.36	0.52
Employer supported OJT	0.18	0.14	0.16	0.24	0.36
Tenure (in months)	31.48	29.00	33.48	30.20	23.64

MOST RECENT REFERENCE JOB

Variable	H.S. dropouts with no post-sec education	H.S. dropouts with some post-sec education	High school graduates	H.S. graduates with some post-sec education	B.A. degree or more
Usual weekly hours	42.95	42.69	40.39	38.30	37.12
Weekly wages	405.94	456.47	418.07	449.39	471.14
Took training	0.21	0.39	0.27	0.44	0.55
Employer supported OJT	0.15	0.33	0.18	0.33	0.42
Tenure (in months)	24.03	23.20	25.63	22.86	19.09

Table 3. Schooling Attainment and Employment
Standard Errors in parentheses
Source: SLF

Panel A: Men

	Standard Probit	Bivariate Probit	
	Outcome	Outcome	Outcome
Variable	Has Had at Least One Reference Job	Has Had at Least One Reference Job	Has Graduated from High School
H.S. Diploma	-0.1318 (0.1970)	-1.1183 (0.9412)	–
Local Unemployment Rate	0.0246 (0.0494)	–	0.0757 (0.0475)
Father Went to College	0.1120 (0.4208)	–	0.2631 (0.5636)
Mother Went to College	-0.4959 (0.3971)	–	0.8821 (0.3668)
Married	0.4439 (0.1759)	0.4634 (0.1656)	0.2066 (0.2224)
Difficulties in Maths.	0.0312 (0.1726)	0.0624 (0.1667)	0.0426 (0.1671)
Difficulties in Languages	0.2584 (0.1819)	0.2536 (0.1813)	0.0298 (0.1773)
Went to Private School	-0.5842 (0.3695)	-0.5885 (0.4127)	-0.2548 (0.3432)
GPA of A	-0.3397 (0.3749)	0.3943 (1.0445)	2.1783 (0.4310)
GPA of B	-0.0968 (0.3085)	0.3595 (0.5509)	1.1624 (0.2631)
GPA of C	-0.1308 (0.2858)	0.0741 (0.3124)	0.5667 (0.2420)
Failed in Primary School	-0.1286 (0.1795)	-0.2318 (0.2070)	-0.3298 (0.1586)
Has a child	-0.2039 (0.2087)	0.4030 (0.2800)	-0.5606 (0.2275)
Had a Job while in H. School	0.1953 (0.1767)	0.2011 (0.1655)	0.0951 (0.1616)
Regional Dummies	Yes	Yes	Yes
Correlation Coefficient	–		0.6684 (0.7815)
N	1071		1071

Table 3. Schooling Attainment and Employment (cont'd)
Standard Errors in parentheses
Source: SLF

Panel B: Women

	Standard Probit	Bivariate Probit	
	Outcome	Outcome	Outcome
Variable	Has Had at Least One Reference Job	Has Had at Least One Reference Job	Has Graduated from High School
H.S. Diploma	0.4499 (0.2221)	-0.5920 (0.7398)	–
Local Unemployment Rate	-0.0443 (0.0443)	–	0.0628 (0.0477)
Father Went to College	-0.7873 (0.3063)	–	0.6077 (0.4166)
Mother Went to College	-0.2454 (0.2005)	–	1.1620 (0.4945)
Married	-0.0947 (0.1860)	-0.1620 (0.1903)	-0.2907 (0.1895)
Difficulties in Maths.	0.1894 (0.1835)	0.2284 (0.1789)	0.2036 (0.1900)
Difficulties in Languages	0.0599 (0.2118)	0.0558 (0.1776)	0.0283 (0.2120)
Went to Private School	0.2480 (0.4285)	0.2989 (0.3657)	0.3134 (0.3352)
GPA of A	-0.2381 (0.5781)	0.1159 (0.6200)	1.1625 (0.4035)
GPA of B	-0.1229 (0.5499)	0.1585 (0.4991)	0.7395 (0.3828)
GPA of C	0.1910 (0.5313)	0.3935 (0.4490)	0.6736 (0.3676)
Failed in Primary School	0.1341 (0.2303)	0.0178 (0.2420)	-0.2977 (0.2067)
Has a child	-0.7334 (0.2005)	-0.9069 (0.2190)	-0.8417 (0.1926)
Had a Job while in H. School	0.4052 (0.1797)	0.4369 (0.1788)	0.2919 (0.1926)
Regional Dummies	Yes	Yes	Yes
Correlation Coefficient	–		0.5869 (0.4060)
N	980		980

Table 4. Schooling Attainment and Earnings
Standard Errors in parentheses
Dependent Varaible: Log of Hourly Earnings

Variable	Men 1	2	Women 3	4
Dropout w. Post-sec.	0.0832 (0.0530)	0.0982 (0.0507)	-0.1051 (0.0610)	-0.1347 (0.0576)
H.S. Graduate	0.0374 (0.0384)	0.0285 (0.0375)	0.0702 (0.0411)	0.0249 (0.0438)
H.S. Grad. w. Post-sec.	0.1177 (0.0382)	0.1006 (0.0397)	0,1769 (0.0433)	0,1103 (0.0473)
B.A Degree+	0.1748 (0.0600)	0.1310 (0.0663)	0.3382 (0.0526)	0.2061 (0.0582)
Tenure(months)	0.0038 (0.0006)	0.0038 (0.0006)	0.0021 (0.0007)	0.0019 (0.0007)
Father Went to College	–	0.0576 (0.0448)	–	0,0130 (0.0470)
Mother Went to College	–	0.0133 (0.0455)	–	0,0589 (0.0514)
Married	0.0136 (0.0286)	0.0150 (0.0281)	0.0071 (0.0317)	-0.0033 (0.0327)
Difficulties in Maths.	–	-0.0412 (0.0250)	–	-0.0754 (0.0269)
Difficulties in Languages	–	-0.0237 (0.0262)	–	-0,0382 (0.0384)
Went to Private School	–	-0.0565 (0.0483)	–	-0,0204 (0.0484)
GPA of A	–	0.0799 (0.628)	–	-0.0053 (0.0697)
GPA of B	–	0.0564 (0.0500)	–	-0.1142 (0.0625)
GPA of C	–	0.0948 (0.0487)	–	-0.1155 (0.0568)
Failed in Primary School	–	-0.0089 (0.0333)	–	-0,0017 (0.0728)
Received Unemp. Benefits in last 12 months	–	0.1051 (0.0255)	–	-0,0324 (0.0346)
Received Welfare Benefits in last 12 months	–	-0.2345 (0.0413)	–	-0,1948 (0.0501)
Has a child	0.0172 (0.0326)	0.0156 (0.0318)	-0.0293 (0.0418)	0.0164 (0.0489)
Had a Job while in High School	-0.0502 (0.0272)	-0.0546 (0.0269)	-0.0089	-0.0031 (0.0267)
Regional Dummies	Yes	Yes	Yes	Yes
Training Dummy	Yes	Yes	Yes	Yes
R Squared	0.1430	0.1673	0.1437	0.1810
Person-Jobs	2528	2528	2414	2414
Individuals	1652	1652	1613	1613

Table 5. High School Graduation and the Reciept of Training

Random Effect Probit Specification

Standard Errors in Parentheses

	Dependent Variable: Respondent Took Training		Dependent Variable: Employer Supported Training	
Variable	1	2	3	4
Dropout w. Post-sec.	0.3324	0.3203	0.3603	0.3170
	(0.1185)	(0.1186)	(0.1325)	(0.1324)
H.S. Graduate	-0.0069	-0.0244	-0.0372	-0.1016
	(0.0757)	(0.0784)	(0.0875)	(0.0902)
H.S. Grad. w. Post-sec.	0.4154	0.3799	0.4348	0.3317
	(0.0706)	(0.0756)	(0.0811)	(0.0861)
B.A Degree+	0.8156	0.7264	0.7948	0.5447
	(0.0852)	(0.0971)	(0.0959)	(0.1079)
Tenure (in Months)	0.0125	0.0124	0.0125	0.0126
	(0.0009)	(0.0009)	(0.0009)	(0.0010)
Female	-0.0285	-0.0026	0.0505	0.0940
	(0.0417)	(0.0431)	(0.0466)	(0.0482)
Father went to Coll/Univ.	–	0.0586	–	0.1181
		(0.0663)		(0.0728)
Mother Went to Coll/Univ.	–	-0.0826	–	-0.0661
		(0.0705)		(0.0777)
Married	0.0323	0.0276	0.0410	0.0573
	(0.0461)	(0.0466)	(0.0514)	(0.0520)
Difficulty in Maths.	–	0.0785	–	-0.0138
		(0.0426)		(0.0478)
Difficulty in Lang.	–	-0.0594	–	-0.0566
		(0.0501)		(0.0568)
Went to Private School	–	0.2548	–	0.2010
		(0.0751)		(0.0828)
GPA of A in H.S.	–	0.1521	–	0.2552
		(0.1222)		(0.1374)
GPA of B in H.S.	–	0.0154	–	0.0061
		(0.1109)		(0.1255)
GPA of C in H.S.	–	-0.0350	–	-0.0774
		(0.1082)		(0.1228)
Failed in Primary School	–	0.0011	–	-0.1313
		(0.0602)		(0.0694)
Collected UI in Last 12 Months	–	-0.0939	–	-0.1745
		(0.0513)		(0.0584)
Collected Welfare in Last 12 Months	–	0.0041	–	0.1598
		(0..0901)		(0.1006)
With a Child	-0.1784	-0.1556	-0.1532	-0.1368
	(0.0593)	(0.0615)	(0.0672)	(0.0699)
Had a Job While in H.S.	0.0876	0.0853	0.0269	0.0336
	(0.0442)	(0.0442)	(0.0405)	(0.0496)
Regional Dummies	Yes	Yes	Yes	Yes
Log Likelihood	-3391.9987	-3383.2581	-2919.1603	-2896.9887
Number of Person-Jobs	5352	5352	5352	5352
Number of Individuals	3445	3445	3445	3445
Wald Test for Absence of Random Effects	17.24	15.96	26.95	24.94
(P-Value)	(0.0000)	(0.0001)	(0.0000)	(0.0000)
Proportion of Var. Due to Individual Random Effect	0.1613	0.1559	0.2291	0.2213
	(0.0384)	(0.0385)	(0.0430)	(0.0433)

Table 6. Impact of Employer–Supported Training on Wages
Standard Errors in Parentheses

A. Dependent Variable: Log of Hourly Earnings

	Men		Women	
	Levels	Fixed-Effects	Levels	Fixed-Effects
Variable				
Employer-Supported Training	0.1817 (0.0335)	0.1893 (0.0353)	0.1375 (0.0292)	0.1725 (0.0333)
Person-Jobs	2528	2528	2414	2414
Individuals	1652	1652	1613	1613

B. Dependent Variable: Log of Weekly Earnings

	Men		Women	
	Levels	Fixed-Effects	Levels	Fixed-Effects
Variable				
Employer-Supported Training	0.2645 (0.0399)	0.2349 (0.0419)	0.2513 (0.0365)	0.2625 (0.0410)
Person-Jobs	2528	2528	2414	2414
Individuals	1652	1652	1613	1613

Note. Other covariates are the same as those in Table 4.

Table 7. Single–Spell vs. Multiple–Spell Individuals
Mean Sample Statistics

Variable	Single Spell	Multiple Spells
High School Degree	0.88	0.87
Father went to Coll/Uinv.	0.13	0.11
Mother Went to Coll/Univ.	0.10	0.10
% Males	0.51	0.51
GPA of A in H.S.	0.22	0.17
GPA of B in H.S.	0.42	0.43
GPA of C in H.S.	0.32	0.35
GPA of D in H.S.	0.05	0.05
Failed in Primary School	0.18	0.16
Collected UI in Last 12 Months	0.19	0.22
Collected Welfare in Last 12 Months	0.06	0.07
With a Child	0.20	0.20
Had a Job While in H.S.	0.62	0.71
N	1568	2183

Table 8. Impact of Employer–Supported Training on Job Mobility
Cox Proportional Hazard Specification
Standard Errors in Parentheses

Variable	Pooled Estimation	Within-Individual Estimation
Employer-Supported Training	-0.6967 (0.0822)	-1.2057 (0.1480)
Dropout w. Post-sec.	0.1225 (0.1677)	-
H.S. Graduate	-0.1533 (0.1227)	-
H.S. Grad. w. Post-sec.	0.1028 (0.1198)	-
B.A Degree+	0.1657 (0.1557)	-
Female	-0.0319 (0.0668)	-
Log-Likelihood	-19664.3	-2635.11
Person-Jobs	5352	5352
Individuals	3445	3445

Note. Other covariates are the same as those in table 5.

Table 9. Impact of Having a Job while in School on Graduation
Bivariate Probit Model Specification
Standard Errors in Parentheses

A. Men

Variable	H.S. Graduation Equation	Job While In H.S. Equation
Had A Job	-1.2642 (0.2413)	–
Local Unemployment Rate	–	-0.1081 (0.0319)
Father Went to Coll/Univ.	0.2968 (0.3540)	-0.0277 (0.3152)
Mother Went to Coll/Univ.	0.5470 (0.3432)	0.1657 (0.3360)
Difficulty in Maths.	0.1159 (0.1272)	0.0976 (0.1393)
Difficulty in Lang.	0.1487 (0.1445)	0.1772 (0.1495)
Went to Private School	-0.2984 (0.2532)	-0.1738 (0.3036)
GPA of A in H.S.	1.7137 (0.4716)	0.0542 (0.3556)
GPA of B in H.S.	0.9218 (0.2857)	0.0545 (0.2673)
GPA of C in H.S.	0.3798 (0.2483)	-0.1128 (0.2561)
Failed in Primary School	-0.4169 (0.1355)	-0.3218 (0.1455)
With a Child	-0.2445 (0.1790)	0.2133 (0.1673)
Regional Dummies	Yes	Yes
Correlation Coefficient	0.8464 (0.1590)	
Log Likelihood	-179822.73	
N	1071	

Note. See text for the definition of the unemployment rate used.

Table 9. Impact of Having a Job while in School on Graduation (cont'd)
Bivariate Probit Model Specification
Standard Errors in Parentheses

B. Women

Variable	H.S. Graduation Equation	Job While In H.S. Equation
Had A Job	-1.1664 (0.3675)	–
Local Unemployment Rate	–	-0.0779 (0.0296)
Father Went to Coll/Univ.	0.2711 (0.3131)	0.0310 (0.3078)
Mother Went to Coll/Univ.	1.1233 (0.4310)	0.4597 (0.3740)
Difficulty in Maths.	0.2193 (0.1643)	0.1697 (0.1660)
Difficulty in Lang.	-0.1344 (0.1858)	-0.2076 (0.2010)
Went to Private School	0.2273 (0.2199)	0.1500 (0.3369)
GPA of A in H.S.	0.6668 (0.4797)	-0.1428 (0.4716)
GPA of B in H.S.	0.4651 (0.3505)	0.0873 (0.4087)
GPA of C in H.S.	0.3567 (0.3615)	-0.0189 (0.4018)
Failed in Primary School	-0.5774 (0.2129)	-0.5617 (0.2092)
With a Child	-0.8241 (0.2241)	-0.2750 (0.1552)
Regional Dummies	Yes	Yes
Correlation Coefficient	0.8849 (0.2230)	
Log Likelihood	-121750.85	
N	980	

Note. See text for the definition of the unemployment rate used.

Table 10. Impact of Having a Job while in School on Graduation
Alternative Measures Local Labour Market Conditions
Standard Errors in Parentheses

A. Men

Variable	High School. Graduation Equation	Job While In High School Equation	High School Graduation Equation	Job While In High School Equation
Had A Job	-1.2606 (0.2104)	–	-1.0012 (0.4587)	–
Provincial Unemployment Rate	–	-0.1143 (0.0320)	–	–
Provincial Unemployment Rate of 25-44 Year-Old Men	–	–	–	-0.0560 (0.0342)
Correlation Coefficient	0.8687 (0.1339)		0.6787 (0.2841)	
Log Likelihood	-181715.28		-188305.93	
N	1071		1071	

B. Women

Variable	High School. Graduation Equation	Job While In High School Equation	High School Graduation Equation	Job While In High School Equation
Had A Job	0.0554 (0.7072)	–	0.6398 (0.8681)	–
Provincial Unemployment Rate	–	-0.0409 (0.0516)	–	–
Provincial Unemployment Rate of 25-44 Year-Old Women	–	–	–	-0.0958 (0.0511)
Correlation Coefficient	0.1350 (0.4247)		-0.1621 (0.5190)	
Log Likelihood	-123427.79		-128809.60	
N	980		980	

Note. Other covariates (not shown) are the same as in Table 3.

Table 11. Impact of Hours Workes while in School on Graduation
Bivariate Probit–Tobit Model Specification
Standard Errors in Parentheses

A. Men

Variable	H.S. Graduation Equation	Hours Worked Equation
Hours Worked	-0.6079 (0.0620)	-
Local Unemployment Rate	-	-0.5111 (0.0574)
Correlation Coefficient	0.7059 (0.1000)	
Mean Log Likelihood	-1.9522	
N	1071	

B. Women

Variable	H.S. Graduation Equation	Hours Worked Equation
Hours Worked	-0.6294 (0.0624)	-
Local Unemployment Rate	-	-0.5839 (0.0616)
Correlation Coefficient	0.6562 (0.1008)	
Mean Log Likelihood	-1.9317	
N	980	

Note. Unemployment rate used is the same as the one used in Table 9.

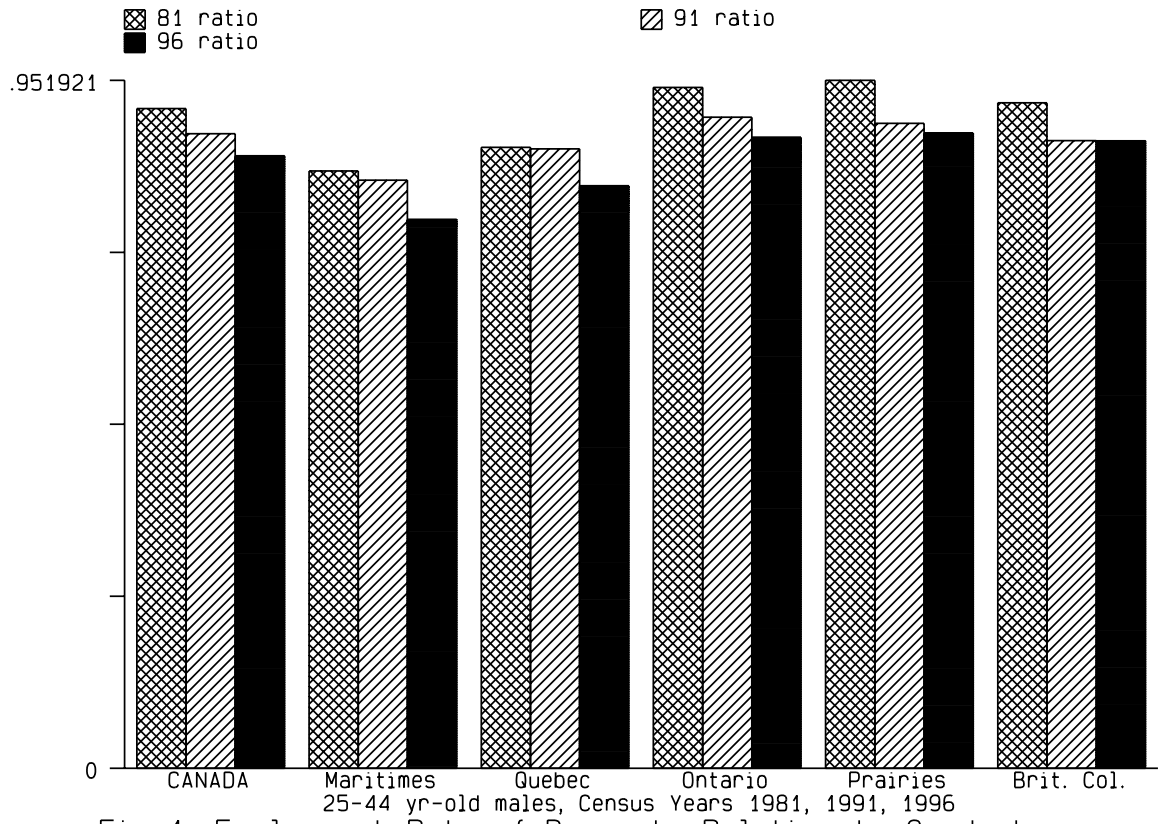


Fig 1. Employment Rate of Dropouts Relative to Graduates

STATA™

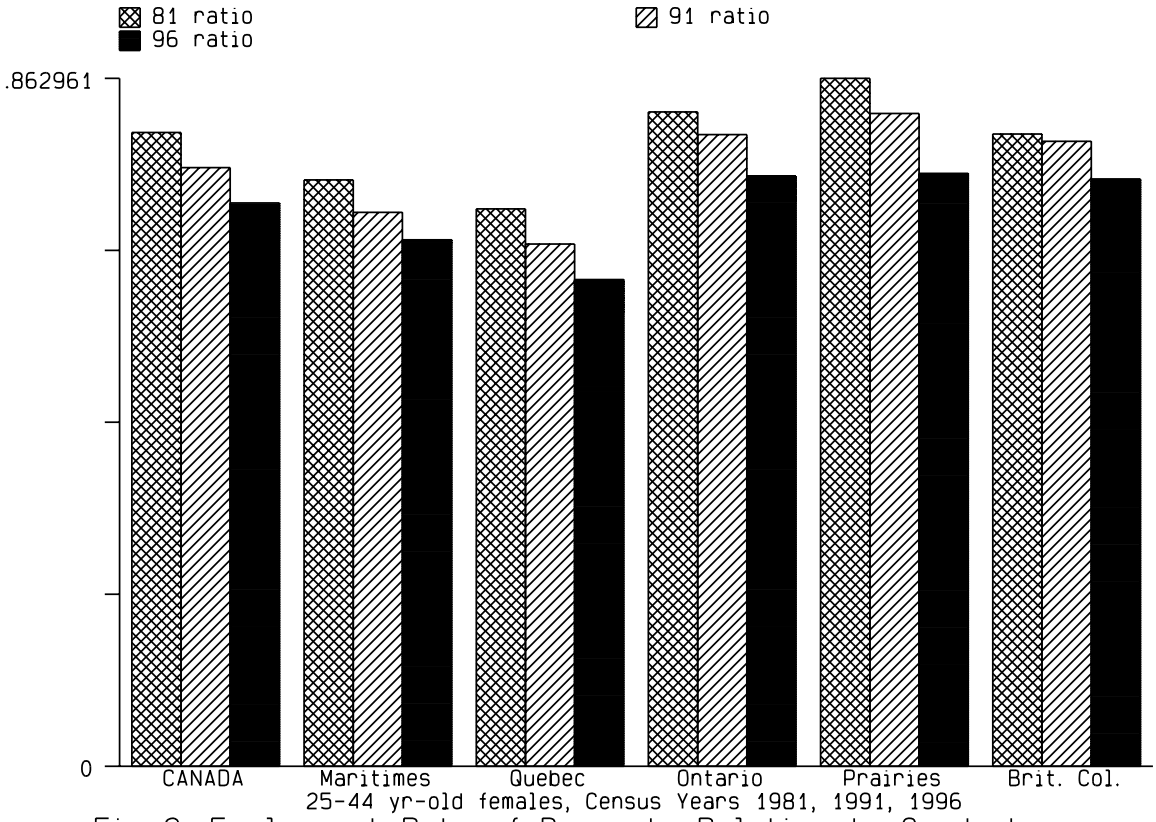


Fig 2. Employment Rate of Dropouts Relative to Graduates

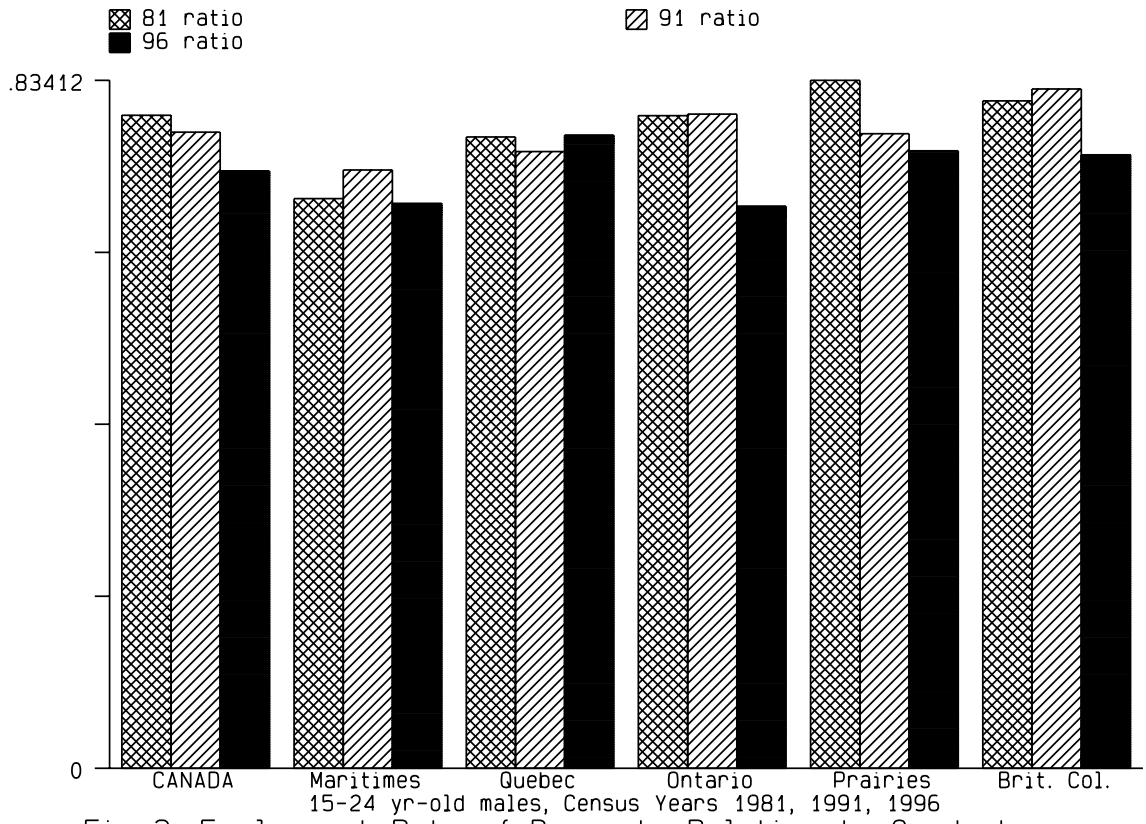


Fig 3. Employment Rate of Dropouts Relative to Graduates

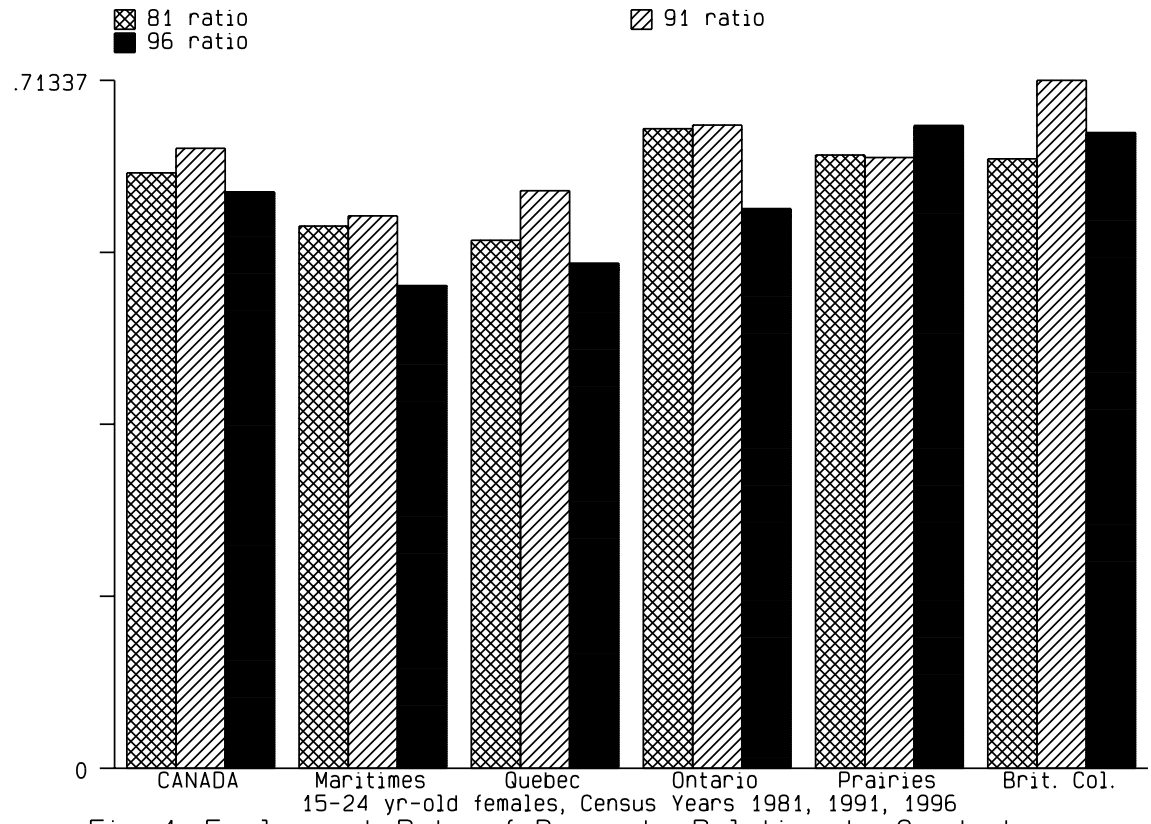


Fig 4. Employment Rate of Dropouts Relative to Graduates

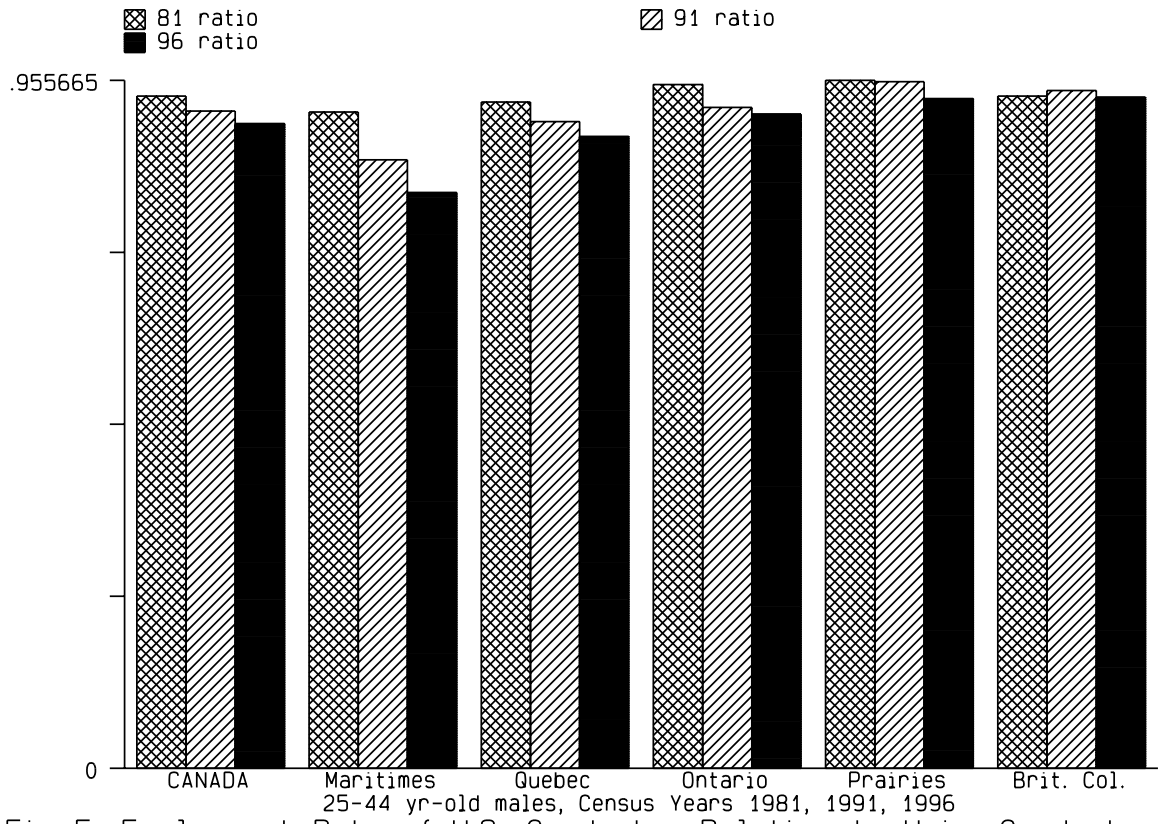


Fig 5. Employment Rate of H.S. Graduates Relative to Univ. Graduates

STATA™

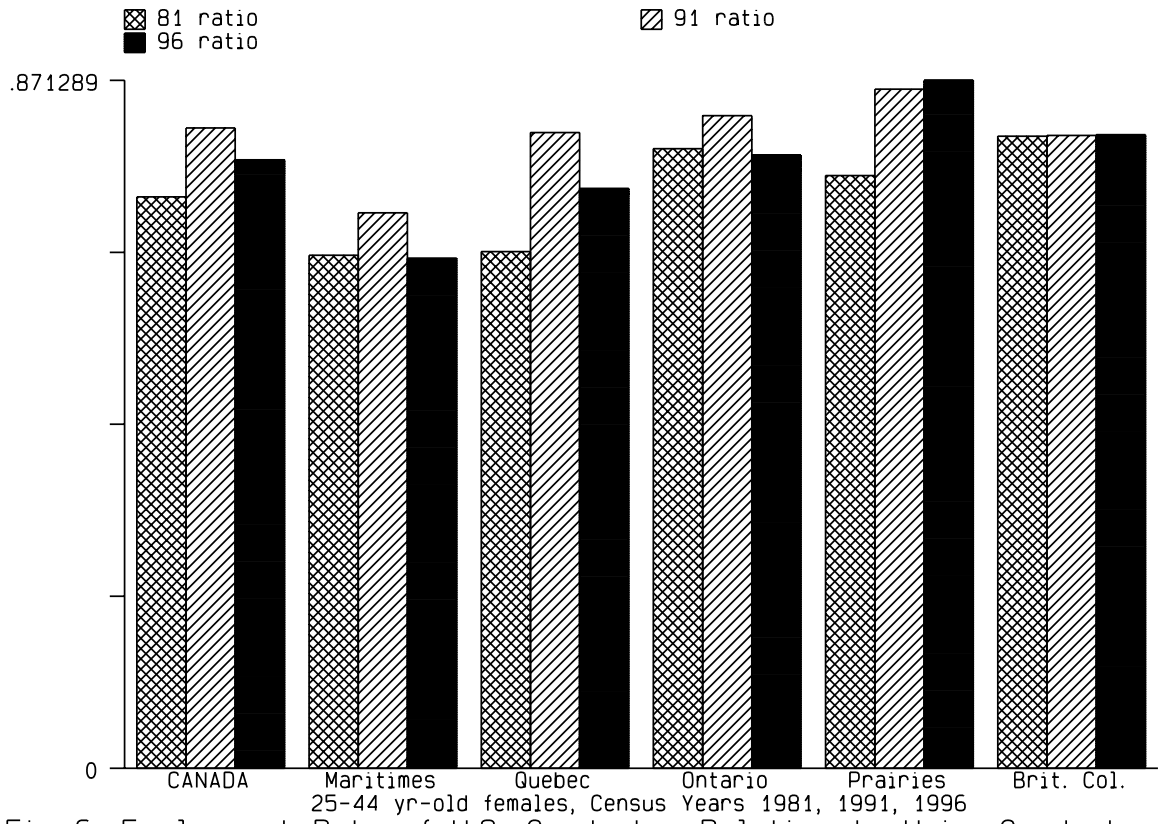


Fig 6. Employment Rate of H.S. Graduates Relative to Univ. Graduates

STATA™

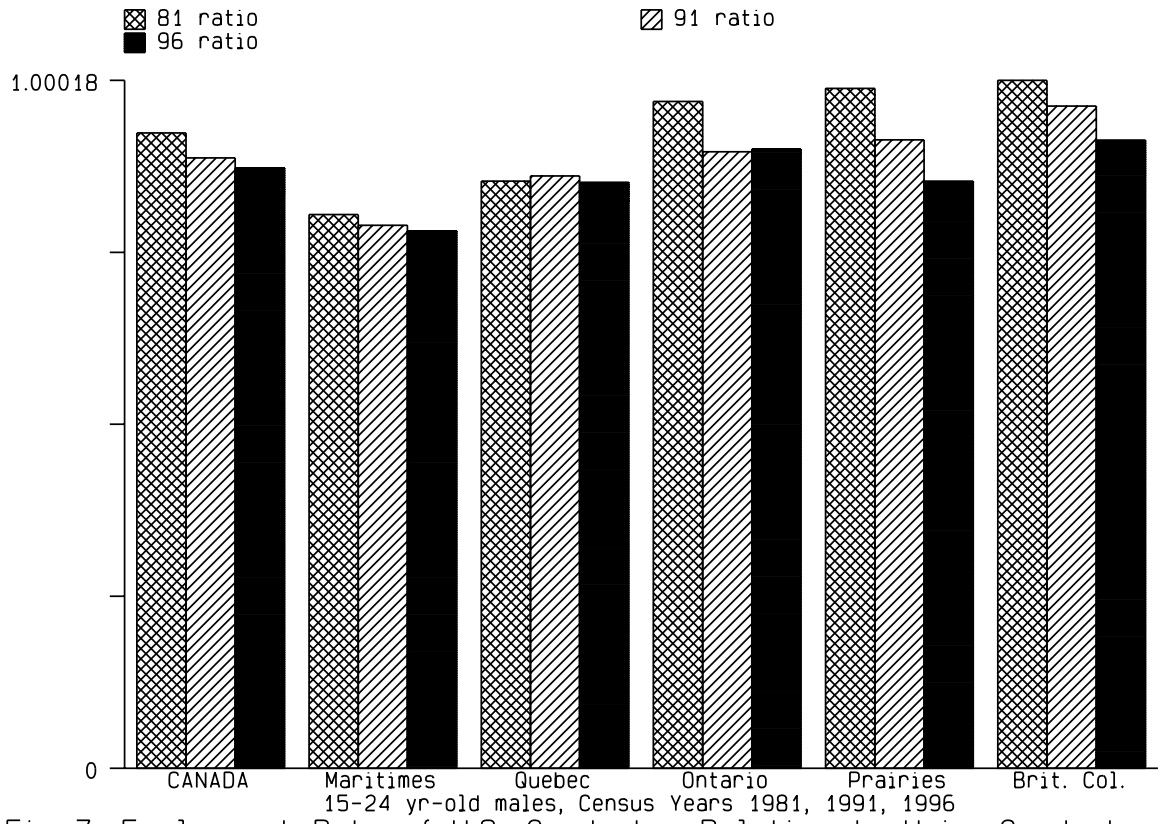


Fig 7. Employment Rate of H.S. Graduates Relative to Univ. Graduates

STATA™

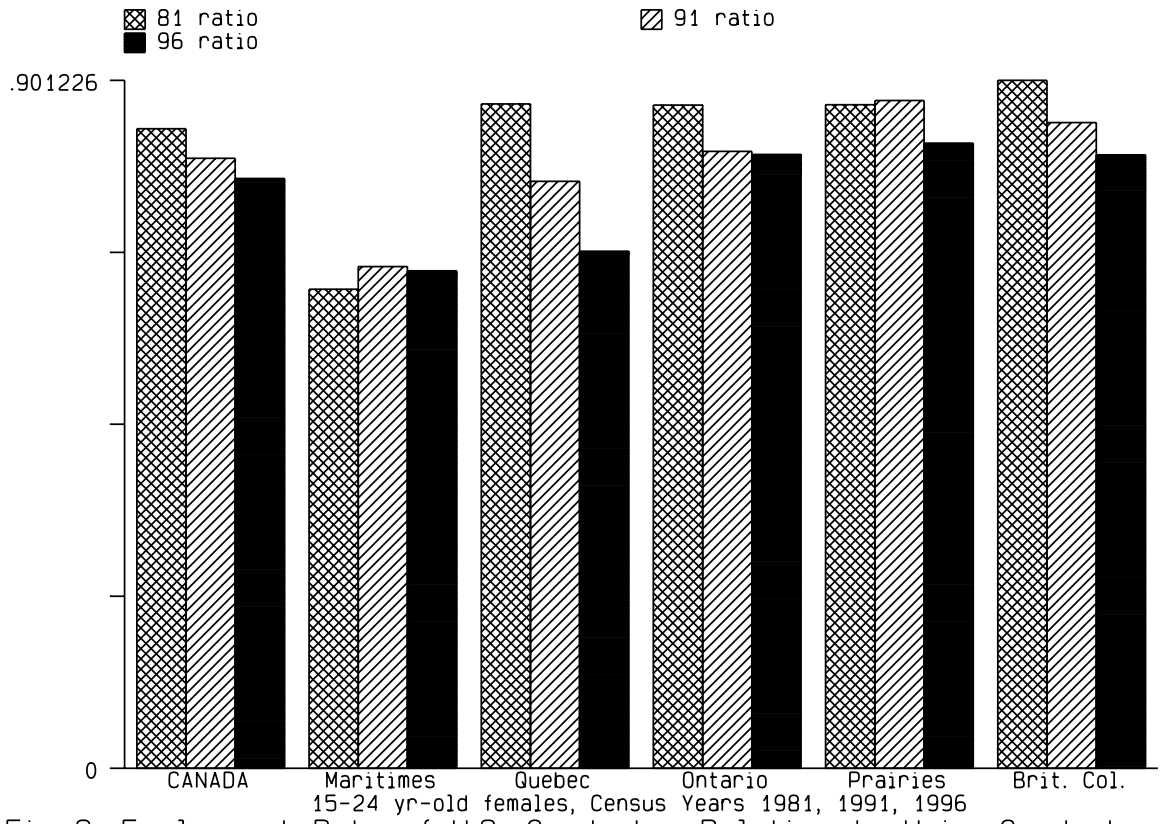
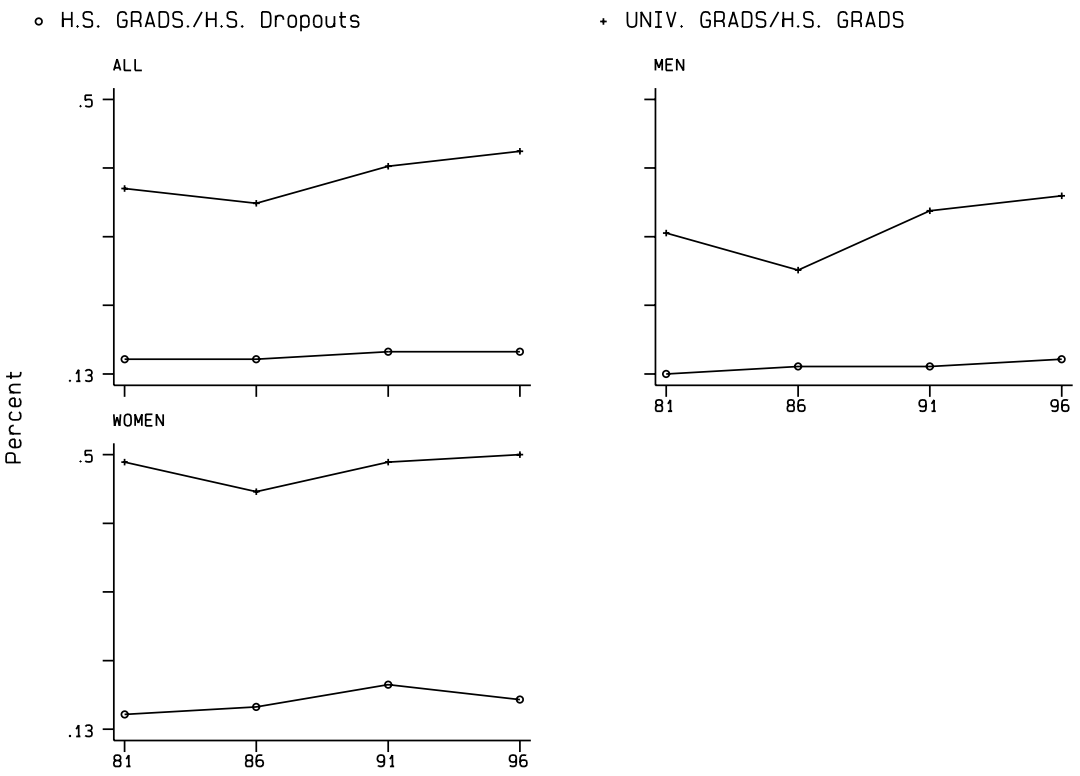


Fig 8. Employment Rate of H.S. Graduates Relative to Univ. Graduates

STATA™



Hourly Earnings, 15-65yrs, CENSUS 1981, 1986, 1991, 1996

Fig 9. Wage Premium Associated with Schooling

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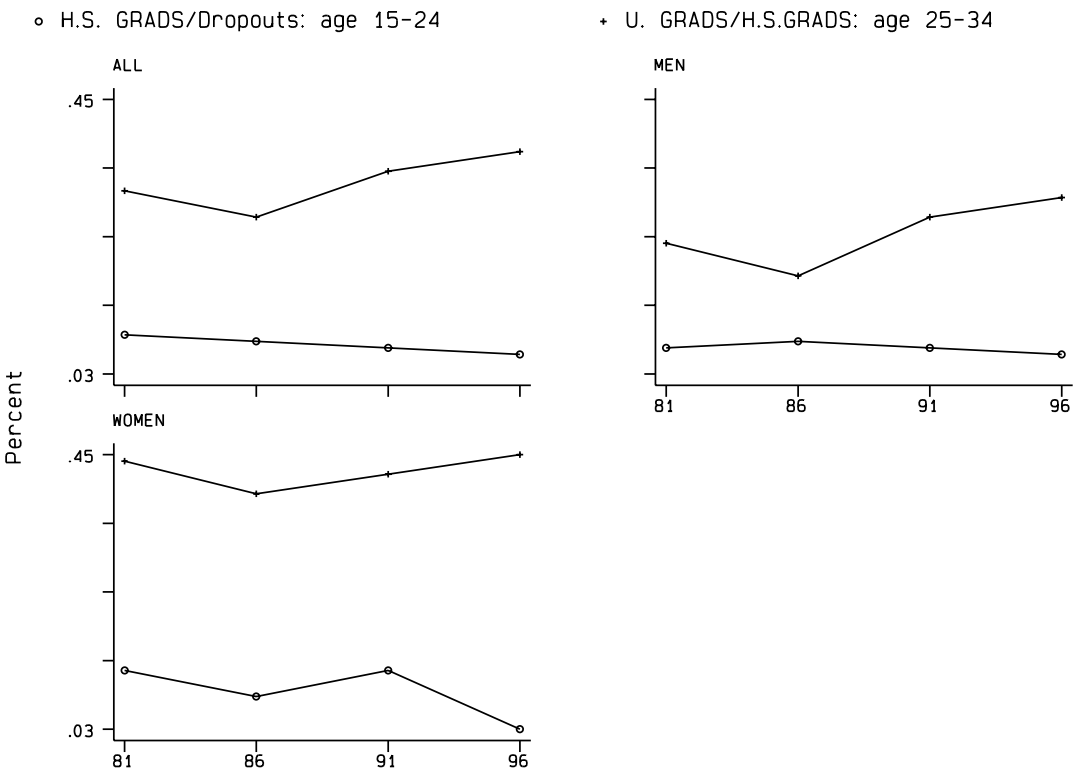

Fig 10. Wage Premium Associated with Schooling

STATA™

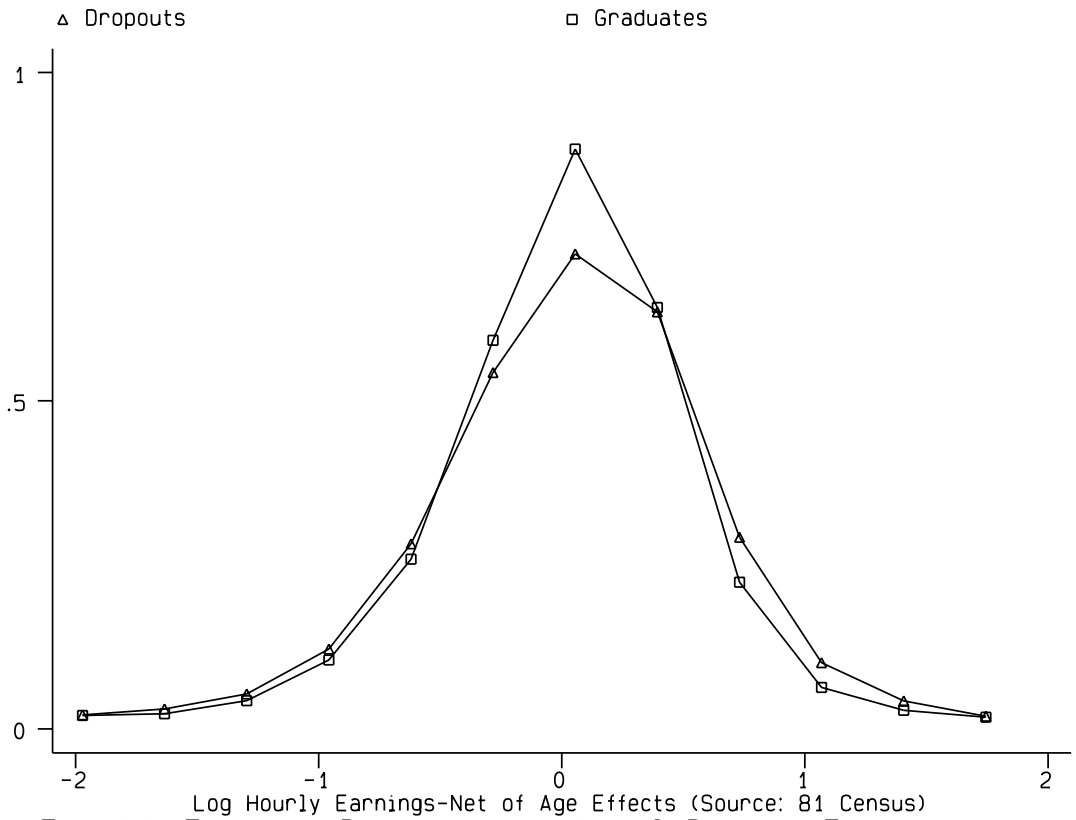

Fig. 11. Earnings Distribution: Kernel Density Estimates

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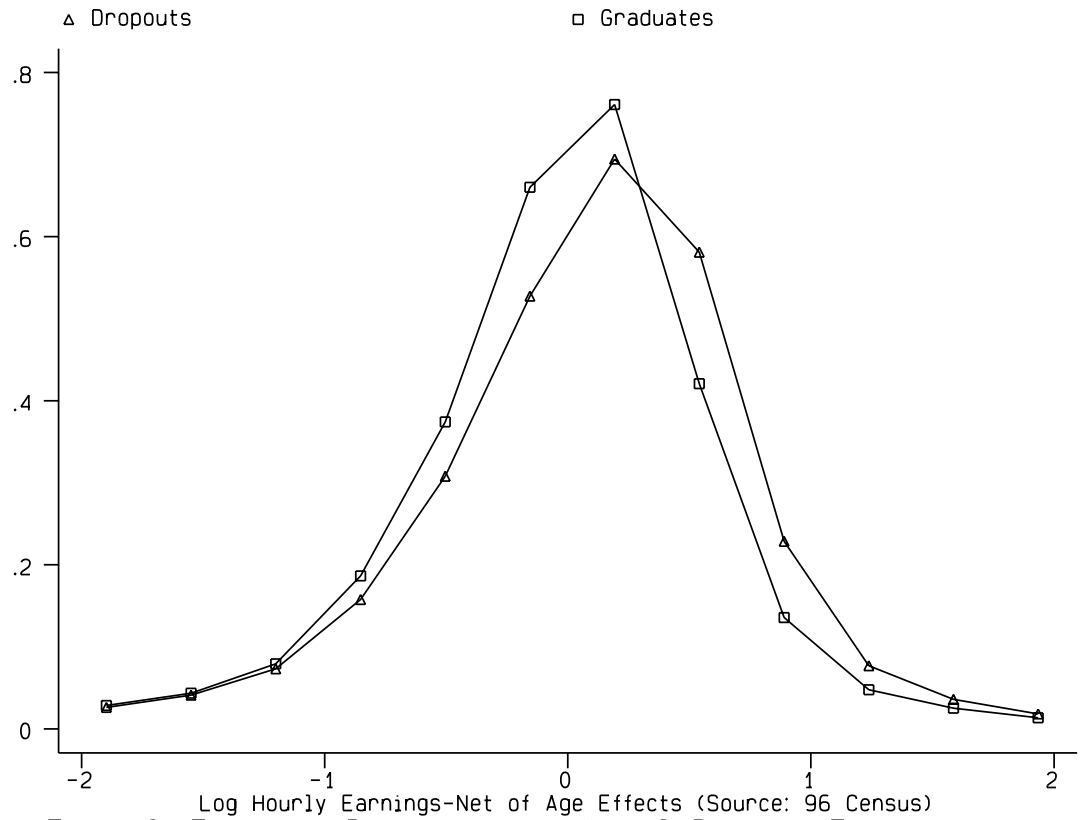

Fig. 12. Earnings Distribution: Kernel Density Estimates

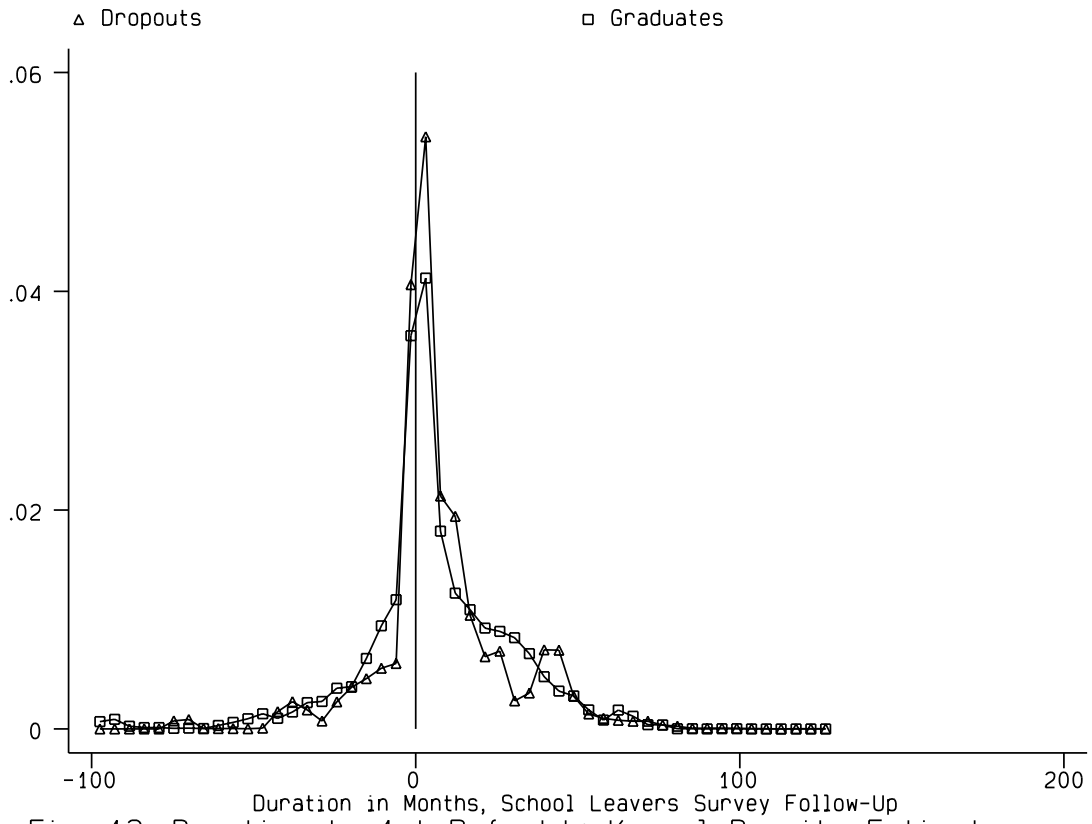

Fig. 13. Duration to 1st Ref. Job: Kernel Density Estimates

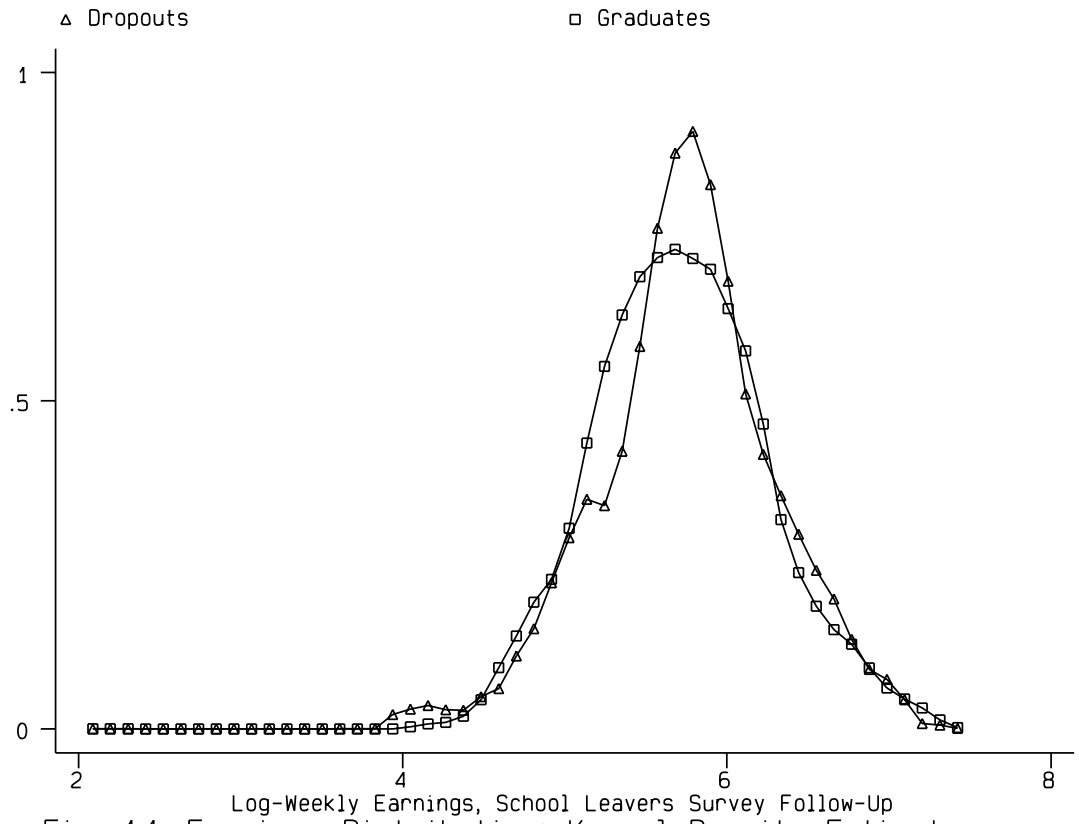

Fig. 14. Earnings Distribution: Kernel Density Estimates

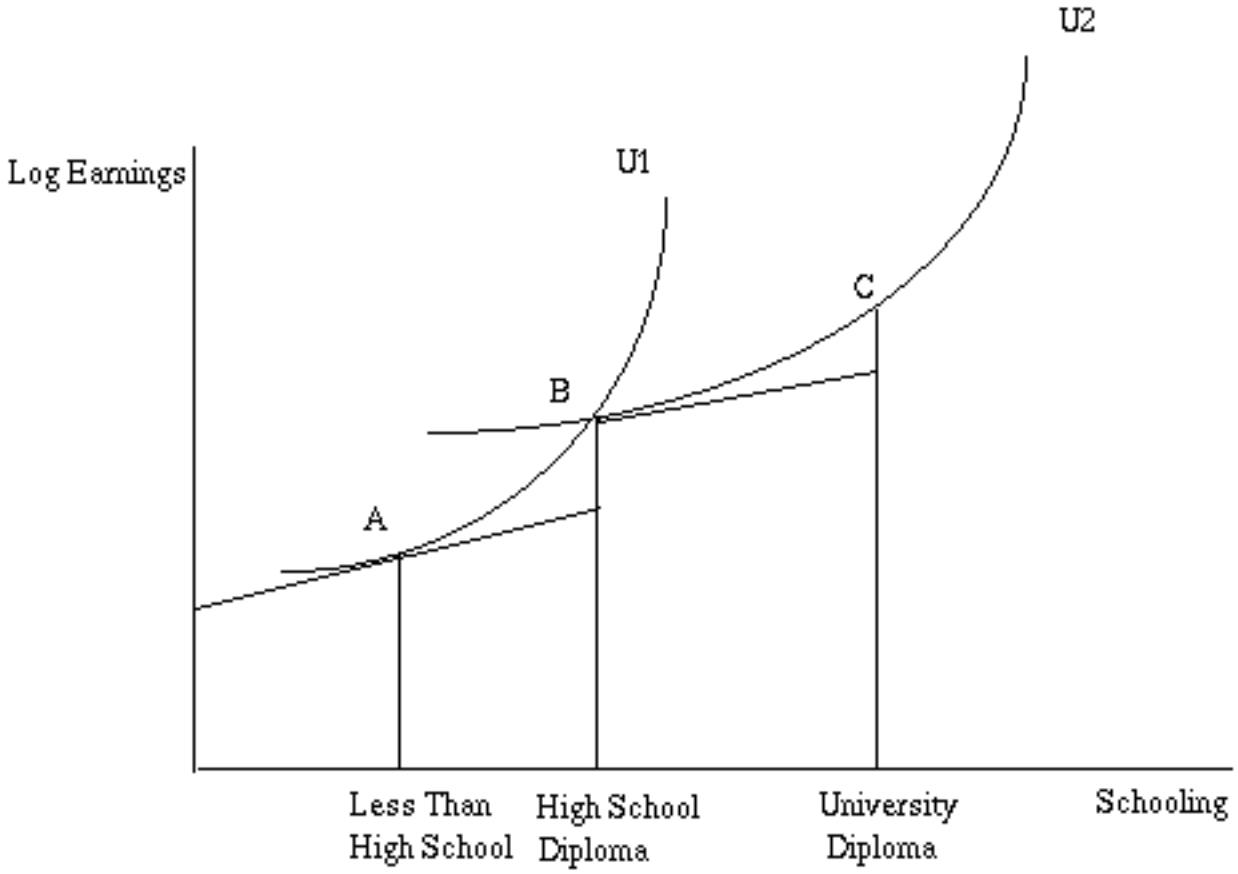

Figure 15. Optimal Schooling Choices and the Returns to Education

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