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Labour Market Outcomes and Skills Acquisition of High-School Dropouts

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LABOUR MARKET OUTCOMES AND SKILL ACQUISITION
OF HIGH-SCHOOL DROPOUTS

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Abstract

We utilize an instrumental variable approach to analyse the effect that dropping out of high school has on 17 outcomes pertaining to wages, employment and subsequent skill acquisition for youths. Our analysis is based on the older cohort of the Youth in Transition Survey (YITS) for 2003, an ideal data set because it contains a rich array of outcome measures and their observable determinants as well as variables for instrumenting the dropout indicator (based on a link to the 1999 data). Our analysis indicates that dropouts have poorer wage and employment outcomes, and they do not make up for their lack of education through additional skill acquisition and training. The analysis thereby suggests that policies to curb dropping out could have both desirable efficiency effects (high returns) as well as distributional effects (high returns to otherwise more disadvantaged groups) and potential social spillover affects.

Executive Summary

We analyse the effect that dropping out of high school has on 17 outcomes pertaining to wages, employment and subsequent skill acquisition for youths. To account for the potential endogeneity of the dropout status we utilize an instrumental variable approach. Our identification strategy relies on differential effects of local labour market conditions on the dropout decisions of young persons based on youth and adult unemployment rates at the time the individual dropped out of school. High provincial youth unemployment rates may induce youths to stay in school given the difficulties they may otherwise have in obtaining a job (i.e., discouraged worker effect). Since this is a decision that would be made when they are likely under the age of 18 or 19, this would not affect their current labour market outcome when they are between the ages of 22 and 24 in our data set. As well, a high adult provincial unemployment rate for adults age 25-44 captures more general labour market conditions and an "added worker" effect whereby a high adult unemployment rate may induce youths to drop out to maintain otherwise declining family income.

Our analysis is based on the older cohort of the Youth in Transition Survey (YITS) for 2003 (cycle 3). The YITS is ideally suited for our analysis for three main reasons. First, it contains a wide array of outcome measures (17 in our study) for analysing the employment, wages and subsequent skill acquisition of dropouts compared to non-dropouts. Second, it contains a rich array of observables to control for the effect of a range of skills related to computing, writing, reading, communication, problem solving and maths. Third, and most importantly, it enables linking the 2003 cycle 3 file (which had information on respondent's labour market outcomes and characteristics during the reference period of cycle 3 for estimating the second-stage outcome equations), with the 1999 cycle 1 file (which had information on peer, teacher, and parent characteristics and attitudes and behaviours while in school for estimating a first-stage dropout equation).

We utilize the older cohort of youth (cohort B) who were ages 18-20 in the year 2000 and hence who are ages 22-24 during the survey period February 2004 - June 2004. Since our comparisons of labour market and skill acquisition outcomes are between high-school dropouts and high-school graduates (but who did not go on to post-secondary education) we restrict our analysis to youths who are likely to have completed their education by completing high school or dropping out of high school, and who are not currently enrolled. The use of the older cohort ages 22-24 ensures that respondents are old enough to be at that stage since they typically would have completed high school around the age of 17 or 18.

We classify our outcome measures into three groups. The first refers to employment outcomes and includes: their employment status; whether they have a stable job that does not have a defined end-date; whether their first starting job was full-time; whether their ending job was full-time; and their job satisfaction. The second set refers to wage outcomes: their starting wage in their first job; their ending wage; their wage gains; and satisfaction with their pay. The third group of outcome measures refers to their skill acquisitions subsequent to their education: whether they participated in employer-sponsored training; whether they participated in more general career oriented training; and the hours they spent in such training.

Our analysis indicates that dropouts have poorer wage and employment outcomes, and they generally do not make up for their lack of education through additional skill acquisition and training. The analysis thereby suggests that policies to curb dropping out could have both desirable efficiency effects (high returns) as well as distributional effects (high returns to otherwise more disadvantaged groups) and potential social spillover affects.

This provides a rationale for reducing dropping-out through various policy initiatives: increases in the school leaving age; funding assistance; expansion of accessibility; providing alternative education opportunities; providing alternative pathways to the labour market; early targeting of "at risk" youths for counselling; campaigns against dropping out; and providing information on the consequences of dropping out.

From a policy perspective, the curbing of dropping out is particularly important given the substantial existing evidence from Canada and elsewhere of the high returns to education for youths as well as the fact that potential dropouts who continue in school appear to receive above-average returns to additional education, and especially the completion of high school. This is especially important given the additional evidence that initial negative experiences in the labour market for youths (as would likely occur for dropouts) have a longer-run negative scarring effect.

This challenge for youths is particularly daunting given the prominence of skill-biased technological change and the related industrial restructuring from manufacturing to a more polarized job distribution. Such forces have led to a "hollowing out" of the middle of the job distribution. Most dropouts no longer have the opportunity to move into jobs in the middle of the job distribution or to have a progression ladder to move from low-wage service jobs into the higher-wage jobs, and they do not have the skills to make the leap to the high-end jobs. As such, even if they obtain such low-wage jobs, dropouts are likely to be trapped in them for a lifetime.

The problem for high-school dropouts is particularly severe since the alternatives to acquiring additional education are not attractive. Apprenticeship programs have low enrolment rates for youths and low and declining completion rates, and they are not common in the emerging trades associated with the information economy. Minimum wage jobs are subject to a substantial adverse employment effect from minimum wages. And training as a substitute for a lack of high-school education is also not an attractive option given the poor record of such programs for disadvantaged youths.   Basic education, literacy and numeracy appear to be a pre-condition upon which to build subsequent life-long learning and training. Clearly the phenomenon of dropping out of high school merits more attention given its negative consequences and the lack of viable alternatives for such dropouts.

Introduction

Understanding the behaviour of high-school drop-outs is important for a number of policy related reasons. Their drop out behaviour may reflect an "irrational" act on the part of such students in that they would have earned substantial monetary returns if they had continued in school. As reviewed in Oreopoulos (2006a,b), estimates of such potential returns for dropouts are generally based on studies of the effect of compulsory school laws. Such studies invariably find that those who are compelled to stay in school longer because of such laws receive substantial economic returns – returns that are above the average returns to education (Angrist and Krueger 1991; Acemoglu and Angrist 2001; Oreopoulos 2006a, 2006b). In his comprehensive reviews, Card (1999, 2001) argues that higher returns to education are generally found when features of the education system are used to identify exogenous differences in education in that there are heterogeneous returns to education and higher returns are associated with education increases from more marginalized groups such as persons who postpone dropping out because of compulsory schooling laws or who would get more education if they lived closer to a university. Such individuals may have greater than average returns to education because they were constrained from increasing their education due to an inability to finance it or because of unusual family circumstances or peer pressure, or they excessively discounted the future returns compared to the present (Oreopolous 2005). Dropouts also miss the substantial "sheepskin" or credential effects associated with *completing* key phases of education.[1] Substantial social or third-party returns have also been documented for staying in school including reduced crime (Lochner and Moretti 2004), improved health (Lleras-Muney 2005) and

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[1] Evidence of such sheepskin or credential effects for Canada is given in Ferrer and Riddell (2002) and for the U.S. in Belman and Heywood (1991), Jager and Page (1996) and Kane and Rouse (1995).

enhanced civic activity and participation (Dee 2004; Moretti, Milligan and Oreopoulos 2003). If these conclusions are correct, then policies to reduce dropping out would have desirable efficiency effects (high returns) as well as distributional effects (high returns to more disadvantaged groups) and third-party spillover effects from the range of social benefits. This provides a rationale for reducing dropping-out through various possible policy initiatives including[2]: increases in the school leaving age; funding assistance; expansion of accessibility (for example by facilitating transfers from colleges to universities); providing alternative education opportunities; providing alternative pathways to the labour market (for example, through co-ops, internships and apprenticeships); early targeting of "at risk" youths for counselling; campaigns against dropping out; informing youths and their families of the consequences of dropping out[3]; and discouraging youths from working while in school to the extent that working long hours fosters dropping out[4].

An alternative perspective, however, suggests that individuals may drop out for perfectly rationale reasons. They may lack the ability or motivation to complete high school, or the psychic costs and disutility of schooling may be very high for them (Eckstein and Wolpin 1999). It may be perfectly sensible for them to concentrate on acquiring labour market experience or additional skills through on-the-job training. In such circumstances, policies to encourage or compel high-school completion may simply add a constraint to individual decision making, restricting their choices (see various studies cited in Oreopoulos 2005).

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[2] Taylor (2007) discusses many of the school initiatives designed to deter dropping out.
[3] Johnson, Montmarquette and Eckel (2003) provide experimental evidence indicating that providing information on the benefits of education can foster youths acquiring more education.
[4] Based on Canadian data, Parent (2006) finds that working while in school is associated with a greater likelihood of dropping out, and Bowlby and McMullen (2002) find that to be the case for those who work long hours while in school. Parent (2006) reviews the mixed U.S. evidence in this area.

The purpose of this paper is to shed light on this important policy issue by analysing the labour market consequences of dropping out as opposed to completing high school and to probe deeper into the subsequent skill acquisition decisions of dropouts. If dropouts have desirable subsequent labour market outcomes in terms of employment and wages compared to those who complete high school, then dropouts may well be behaving rationally. If they tend to acquire additional skills through training subsequent to dropping out then such training may be a substitute for formal education – a substitute that fits their particular needs.

Empirical Framework

Conceptual Framework

Our empirical work focuses on comparing a number of labour market outcomes for high-school dropouts as opposed to those who complete high-school but do not continue on to post-secondary education (at least as youths). As outlined subsequently, our analysis of the labour market *consequences* of dropping out also involves an analysis of another strand in the literature -- the *determinants* of dropping out.

With respect to the consequences of dropping out, subsequent labour market outcomes pertaining to wages and employment and their stability are common outcome measures used in the literature on evaluating training programs and other labour market interventions. Measures of job and pay satisfaction are also commonly employed. With respect to dropouts, subsequent training and skill acquisition decisions could also be important substitutes for formal education, and hence could also be important outcomes to examine as well.

Conceptually, the effect of dropping out on these subsequent labour market outcomes is theoretically indeterminate. Dropping out could positively affect such outcomes if youths who

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are not academically oriented drop out and acquire labour market experience as opposed to more formal education, or they make up for their lack of formal education through subsequent on-the-job training. It could also positively affect such outcomes for those who leave to engage in entrepreneurial endeavours (e.g., Bill Gates dropping out of Harvard) although this would rarely apply to high schools as opposed to universities. In these various circumstances, staying in school may be a waste of their time relative to working in the labour market and acquiring experience and on-the-job training or quickly engaging in entrepreneurial tasks.

Working in the other directions, dropping out could negatively affect such outcomes if it were more of an "irrational" act reflecting such factors as peer pressure, family circumstances and lack of family support, present gratification dominating future considerations, and simply lack of information of the negative and potentially irreversible consequences. Dropping out can also send an important negative signal to employers, and it can have negative longer run consequences by not providing a base upon which to build subsequent training and life-long learning. Dropping out could also have no effect on subsequent labour market performance if these positive and negative effects offset each other.

With respect to the determinants of dropping out, the conceptual and empirical literature[5] generally emphasises the importance of factors such as anti-social behaviour, poor school attendance, little engagement in school activities, poor school performance, lack of engagement with teachers and having peers with similar characteristics.

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[5] Reviews of the conceptual and empirical literature are given in Audas and Willms (2001), Bowlby and McMullan (2002), Rumberger 1987, and Vitaro, Larocque, Janosz and Tremeblay (2001).

Outcome Measures

The outcome measures used in our analysis are ones that are available in our data set (discussed subsequently) that capture the wage and employment outcomes and subsequent training outcomes discussed previously. They are divided into three groups. The first group refers to employment outcomes and includes: their employment status; whether they have a stable job that does not have a defined end-date; whether their first starting job was full-time[6]; whether their ending job was full-time; and their job satisfaction. The second set refers to wage outcomes: their starting wage in their first job; their ending wage; their wage gains; and satisfaction with their pay. The third group of outcome measures refers to their skill acquisitions subsequent to their education: whether they participated in employer-sponsored training; whether they participated in more general career oriented training; and the hours they spent in such training.

Empirical Model

We estimate the effects of dropping out of high school on our outcome measures of interest using the following framework:

$$LabourMarketOutcome = x'\beta + \gamma Dropout + v, \qquad (1)$$

where the subscripts on these variables are dropped for notational simplicity, x is a vector of control variables, *Dropout* is a dummy variable indicating whether the person dropped out of high school (i.e., they did not complete high school) and v is a residual. The vector x includes

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[6] The YITS asked information about the respondents' job(s), up to seven jobs; but most of the youths only had one job in the reference period.

age, gender, marital status, presence of children, immigrant status, visible minority status, self-reported skills in various areas, and their province at the time the outcome measures were reported. We focus primarily on the effects of the dropout variable on the labour market outcomes.

Unfortunately, estimates of equation (1) are likely to be problematic because of the endogeneity of the dropout status with respect to the labour market outcomes we are examining. To deal with this problem we employ a two-stage least squares estimator. Our identification strategy relies on differential effects of local labour market conditions on the dropout decisions of young persons.[7] We also differentiate between youth and adult unemployment rates at the time the individual dropped out of school. There are two factors driving this distinction. First, high provincial youth unemployment rates may induce youths to stay in school given the difficulties they may otherwise have in obtaining a job (i.e., discouraged worker effect). Since this is a decision that would be made when they are likely under the age of 18 or 19, this would not affect their current labour market outcome when they are between the ages of 22 and 24 in our data set. Second, a high adult provincial unemployment rate for adults age 25-44 captures more general labour market conditions and an "added worker" effect whereby a high adult unemployment rate may induce youths to drop out to maintain otherwise declining family income. Variations in local labour market conditions have been used as an identification strategy in a number of papers on education and training choices, including, among others, Beaudry, Lemieux and Parent (2000), Cameron and Taber (2004), Parent (1999, 2006) and Riddell and Riddell (2007).

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[7] Another alternative would be to rely on differences in minimum wages. However, Campolieti, Fang and Gunderson (2005b) found that minimum wages did not have an effect on schooling outcomes in Canada. More specifically, they found no evidence of youths leaving school to queue for jobs after changes in the minimum wages.

In addition, the YITS also provides an opportunity to include the effect of many variables that are documented in the literature as influencing a young person's decision to drop out. This permits us the specification of the following equation for the drop out decision:

$$Dropout = \alpha + \delta_1 UR_{youths} + \delta_2 UR_{adults} + z'\eta + e. \qquad (2)$$

The vector z contains a number of important variables that include the student's peer, teacher, and parent characteristics; positive attitudes towards school; and negative behaviours while in school (see Appendix 1 for details). These are all exclusively used in the first-stage dropout equation (none appear in the second-stage outcome equations) because they are all reported at the time the individual dropped out, while the labour market outcomes are measured at a later date.

We expect that the probability of dropping out of high school is expected to be lower for students who have high-school peers who are planning to continue their education, teachers who are compatible, and parents who have finished high-school. The probability of dropping out is also expected to be lower for students who exhibited positive attitudes while in school as indicated by various self-reported measures: doing their school work often; expressing an interest in learning; being treated with respect by fellow students; participating in school activities; and regarding school positively. Conversely, the probability of dropping out is expected to be higher for students who exhibit negative behaviours as exhibited by such factors as frequently skipping class, drinking or using drugs.

Data

Our statistical analysis is based on the Youth in Transition Survey (YITS) for 2003 (cycle 3) the most recent year available (released June 2006), which was collected by Statistics Canada. The survey design is based on the Labour Force Survey. Within each household, one person in the target population was pre-selected for YITS. The "older youth" survey used here is based on youths 18-20 years old and was conducted between mid-February to mid-June 2004 using computer-assisted telephone interview (CATI) procedures. The response rate for this 18-20 year cohort was 78.9 percent.

The YITS is ideally suited for our analysis for three main reasons. First, it contains a wide array of outcome measures (17 in our study) for analysing the employment, wages and subsequent skill acquisition of dropouts compared to non-dropouts. Second, it contains a rich array of observables to control for the effect of a range of skills related to computing, writing, reading, communication, problem solving and maths. Third, and most importantly, it enables linking across cycles to access a rich array of variables for estimating a first-stage dropout equation to be utilized in the subsequent second-stage outcome equations[8].

We utilize the older cohort of youth (cohort B) who were ages 18-20 in the year 2000 and hence who are ages 22-24 during the survey period February 2004 - June 2004. Since our comparisons of labour market and skill acquisition outcomes are between high-school dropouts and high-school graduates (but who did not go on to post-secondary education) we restrict our analysis to youths who are likely to have completed their education by completing high school or

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[8] Information on grades, peer, teacher, and parent characteristics and attitudes and behaviours while in school was contained in the YITS cycle 1 (1999) file which had to be merged with the cycle 3 (2003) file which contained information on the respondents' labour market outcomes and characteristics during the reference period of cycle 3.

dropping out of high school, and who are not currently enrolled.   The use of the older cohort

ages 22-24 ensures that respondents are old enough to be at that stage since they typically would

have completed high school around the age of 17 or 18 (see Appendix 2). The employment data

was retrospective for the period January 02 – December 03 and the subsequent skill acquisition

was retrospective for the calendar year prior to the survey, January 03 – December 03[9]. The

target population for the older youth cohort includes persons born in the years 1979 to 1981,

excluding those in the northern territories, Indian reserves, Canadian Forces bases and some

remote areas.

Appendix 1 provides the variable definitions and descriptive statistics for the outcome

measures (Appendix 1A) and the explanatory variables used in the second-stage outcome

regressions as well as the instrumental variables used in the first-stage dropout regressions

(Appendix 1B). The first column gives the variable names as used in the subsequent empirical

analysis. The second column gives the code name from the codebooks. The third column

provides a more detailed definition of the variables, and the fourth and fifth columns give the

means and standard deviations respectively.

Empirical Results

First-Stage Dropout Equation

Although the main purpose of estimating the first-stage dropout equation is to calculate

an instrumented dropout variable to be included as the key regressor in the second-stage outcome

equations, the results for the dropout equation have some interest in their own right and hence

are discussed briefly.

As indicated in Table 1, the variables predicting dropout behaviour generally behaved in the expected manner as discussed previously. A high youth unemployment rate at the time of the dropout decision is associated with fewer dropouts, reflecting a "discouraged worker effect" from the difficulty that potential dropouts have in finding jobs during periods of high unemployment. Conversely, a high adult unemployment rate is associated with a higher probability of dropping out on the part of youths, likely reflecting an "added worker effect" as youths leave school to get a job to sustain family income or because families find it more difficult to support youths if one of the parents is unemployed. The fact that the effect from the adult unemployment rate in inducing youths to leave school is greater than that of the youth unemployment rate in inducing them to remain in school suggests that a tight labour market that would reduce the unemployment rate of both youths and adults by the same amount would tend to reduce dropping out.

There is no difference in dropout probabilities between males and females after controlling for other determinants of dropping out. Having a child at the time of the dropout decision has a strong positive effect on the probability of dropping out. Having high school peers who want to continue their education, compatible teachers and parents who are high-school graduates are all associated with lower probabilities of dropping out.

Having positive attitudes such as doing schoolwork often, being treated with respect and participating in school activities are associated with lower probabilities of dropping out but the effect is statistically significant only for participating in school activities (albeit close for the other measures).

Exhibiting behaviours that are generally regarded as negative are usually associated with higher probabilities of dropping out. This is the case with frequently skipping classes, and for

frequently using drugs. Drinking moderately (once or twice per month) in high school is actually

associated with a lower probability of dropping out, although drinking extensively (one or more

days per week is associated with a higher probability of dropping out, albeit the effect is

statistically insignificant. Perhaps drinking moderately is a socializing phenomenon and *de*

rigour for preparing for college.

The first-stage F-statistic of 16.17 is well above the generally acceptable benchmark of

10, suggesting that the variables used exclusively to identify the first-stage dropout decision

explain sufficient variation in the dropout decision to be considered as valid instruments (Staiger

and Stock, 1997).

Effect of Dropping Out on Various Outcomes

Table 2 summarizes the effect that dropping out of high-school has on various outcomes

pertaining to youth employment and wages and subsequent skill acquisition through training.

Column 2 gives the coefficient on the instrumented dropout variable, for each of the seventeen

second-stage outcome equations (full regressions available on request).

Dropping out generally has a negative effect on employment and wage outcomes after

controlling for other factors that might affect those outcomes. These controls include observable

skills related to computers, writing, reading, communicating, problem solving and maths. They

also include factors that might make dropouts different from graduates in conventionally

unobserved ways, as identified in our first-stage dropout equation.

Specifically, with respect to employment outcomes, dropouts have a 0.18 lower

probability of being employed and a 0.19 lower probability of having a stable job (one with no

specific end date) compared to graduates. These are statistically significant and large effects,

relative to the average probability of being employed of 0.85 or of having a stable job of 0.84.

Dropouts are also less likely to work full-time in their last job and to be satisfied with their job,

although those effects are statistically insignificant (t-values respectively of 1.33 and 1.62).

Dropouts are no less likely to have a full-time job when they first start working, but this likely

reflects the fact that many may dropout because they have a full-time job lined up. The fact that

they are less likely to have subsequent stable employment and to work full-time in their last job

suggests that such a full-time job that may induce them to dropout is not likely to be lasting.

With respect to wage outcomes, similar negative effects of dropping out are generally

found. Specifically, in their final job, dropouts have wages that are 20 percent lower than do

graduates. Their wage gain between their ending wage and starting wage in their first job, and

their pay satisfaction are also significantly lower for dropouts than for graduates. Dropouts have

a lower starting wage in their first job than do graduates but the difference is not statistically

significant. In essence, while their starting wage is not significantly different than that of

otherwise comparable high-school graduates, this is not sustainable, as evidenced by their lower

final wage in that first job and lower wage gain in that job, as well as their lower satisfaction

with their pay in comparison with otherwise similar high-school graduates.

With respect to subsequent skill acquisitions through training, the differences between

dropouts and graduates are generally statistically insignificant, except for their being 0.08 more

likely to take career training (t =1.71). As discussed previously, dropouts may take more training

as a substitute for their lack of formal education, or they may take less training because

education is often a pre-requisite or complement to subsequent training. Our analysis is unable

to disentangle whether neither of these effects exists or they are simply offsetting. It does

suggest, however, that dropouts are not able to substantially compensate or substitute for their lack of formal education by acquiring skills through subsequent training.

Columns 4 and 5 in Table 2 respectively report the OLS coefficients and their t-values for the dropout variable. A comparison of these with the instrumented dropout coefficients and t-values of columns 2 and 3 indicate that the signs are generally the same but the magnitudes are often substantially different. It clearly is important to control for the possible endogeneity of the drop out status so as to obtain causal estimates of the impact that dropping out has on subsequent labour market and skill acquisition outcome.

Summary and Policy Implications

Our analysis strongly suggests that high-school dropouts have poorer wage and employment outcomes than do graduates, and that they do not substantially make up for their lack of education through additional skill acquisition and training. Our data set also enables controlling for a wide range of skill related variables as well for the fact that dropouts may be different than graduates in a number of conventional unobservable traits that could otherwise affect their labour market outcomes.

The analysis suggests that policies to curb dropping out could have both desirable efficiency effects (high returns) as well as distributional effects (high returns to a disadvantaged group) and potential social or third-party effects. This provides a rationale for reducing dropping-out through various policy initiatives. As indicated previously these include: increases in the school leaving age; funding assistance; expansion of accessibility; providing alternative education opportunities; providing alternative pathways to the labour market; early targeting of "at risk" youths for counselling; campaigns against dropping out; and informing youths and their

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families of the consequences of dropping out.   As well, initiatives to curb working while in school may merit attention given the Canadian evidence that such working while in school slows school completion and may have a negative effect on subsequent earnings[10].

From a policy perspective, the curbing of dropping out is particularly important given the evidence (discussed previously) of the high returns to education for youths as well as the fact that potential dropouts who continue in school appear to receive above-average returns to additional education, and especially the completion of high school. This is especially important given the additional evidence that initial negative experiences in the labour market for youths[11] (as would likely occur for dropouts) have a longer-run negative scarring effect, fostering a legacy of state dependence whereby the initial conditions self-perpetuate into persistent negative future longer run lifetime effects. This can occur as youths "tune out" and turn their backs on a labour market that has turned its back on them. They may also miss out on establishing early networks and experience that could foster subsequent career development, and employers may regard dropping out as an early negative signal.

This challenge for youths is particularly daunting given the prominence of skill-biased technological change and the related industrial restructuring from manufacturing to a more polarized job distribution involving professional, business and administrative, financial jobs at the high end, and personal services at the low end. Such forces have led to a "hollowing out" or disappearance of the middle of the job distribution such as blue-collar, unionized jobs in sectors like manufacturing. There is no longer a progression of moving up the job distribution given that the middle has largely disappeared. Dropouts no longer have the opportunity to move into such

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[10] Such evidence for Canada is found in Parent (2006) and in Bowlby and McMullan (2002) for students who work long hours while in school.

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jobs in the middle of the job distribution or to have a progression ladder to move from low-wage

service jobs into the higher-wage jobs, and they do not have the skills to make the leap to the

high-end jobs. As such, even if they obtain such low-wage jobs, dropouts are likely to be

trapped in them for a lifetime.

The problem for high-school dropouts is particularly severe since the alternatives to

acquiring additional education are not attractive. Apprenticeship programs in Canada do not

appear to be an attractive alternative given their low enrolment rates for youths (the average age

of first registering as an apprentice being 27 in Canada) and their low and declining completion

rates[12]. As well, Canadian apprenticeships tend to focus on traditional areas like construction

and the declining manufacturing sector rather than on the emerging trades associated with the

information economy.

Working in minimum wage jobs is also not an attractive alternative to completing high

school given the evidence of a substantial adverse employment effect of minimum wages for

teens in Canada. A 10% increase in the minimum wage gives rise to a 3% to 6% reduction in the

employment of teens[13].

The alternative of obtaining subsequent training as a substitute for a lack of high-school

education is also not an attractive option given the poor record of such programs for

disadvantaged youths[14]. As indicated in one review[15]: "There is not yet any example of a

program in Canada that has proven to be effective in meeting the employment needs of severely

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[11] Canadian evidence on the negative effects for youths is provided in Beaudry and Green (2000) and McDonald and Worswick (1999) as well as in some of the chapters in Picot, Saunders and Sweetman (2007).

[12] Features of the apprenticeship system in Canada are described in Schuetze (2003) and Sharpe and Gibson (2005).

[13] See, Baker, Benjamin and Stanger (1996), Campolieti, Fang and Gunderson (2005a) and Campolieti, Gunderson and Riddell (2006), Yuen (2003) and references cited therein.

[14] This lack of positive effects for the disadvantaged is discussed, for example, in reviews by Riddell (1991, 1995). Marquart (1999) and Riddell and Sweetman (2000). Those studies cite similar extensive U.S. evidence.

[15] HRSDC (1997) cited in Marquart (1999, p. 7).

employment-disadvantaged youth."   Basic education, literacy and numeracy appear to be a pre-condition upon which to build subsequent life-long learning and training[16]. Subsequent training does not appear to be an alternative to basic education.

Clearly the phenomenon of dropping out of high school merits more attention given its negative consequences and the lack of viable alternatives to improve the labour market options for such dropouts. This is especially the case given our evidence that policies to curb dropping out could have both desirable efficiency effects (high returns) as well as distributional effects (high returns to otherwise more disadvantaged groups) and potential social spillover affects.

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[16] Evidence of the importance of basic education as a foundation for subsequent training is given, for example, in Lowenstein and Spletzer (1998) for the U.S; Fortin and Parent (2006) and Parent (2003) for Canada; and Kapsalis (1997) and Coulombe and Tremblay (2006) for international evidence. These studies refer to others with the same conclusion.

Table 1 – First-Stage Linear Probability Estimates of Probability of Dropping Out of High School
(Mean of dependent variable or probability of dropping out = 0.451)
(Predicted value used as key independent variable in second-stage outcome equations)

Independent Variable	Means	Coefficient	T-statistic
Youth unemployment	14.434	-.026***	-2.77
Adult unemployment	7.393	.039***	3.70
(Male)	0.637		
Female	0.363	-.020	-.59
Having a child at that time	0.023	.371***	6.25
Peers/ teachers/ parents			
Peers continuing education	3.580	-.027*	-1.69
Teachers compatible	3.934	-.089***	-5.07
Parents high-school grads	0.749	-.094***	-2.70
Positive Attitudes			
Did schoolwork often	3.426	-.021	-1.57
Treated with respect	2.954	-.034	-1.41
Participated in school activity	2.393	-.045**	-2.38
School regarded positively	2.871	-.025	-1.02
Interest in learning	3.584	.024	1.35
Negative Behaviours			
[Never skipped class]	0.232		
Less than once per month	0.100	-.029	-.61
Once or twice per month	0.251	.052	1.21
One or more day/week	0.416	.154***	3.32
[Never use drugs]	0.678		
Less than once per month	0.049	.083	1.20
Once or twice per month	0.063	.005	.08
One or more day/week	0.210	.169***	3.58
[Never drink]	0.310		
Less than once per month	0.094	-.037	-.73
Once or twice per month	0.222	-.068*	-1.76
One or more day/week	0.374	.083	1.20
Constant		1.25***	8.99
Sample size		2,215	
R-squared		.17	
First-stage F-statistic		16.17***	

**Table 2 – Summary of Effect of Dropping Out of High School on Various Outcomes
(Coefficient on Predicted Drop Out Variable from 17 Second-stage OLS IV Outcome Equations)**

17 Outcomes	Mean	Instrumented Dropout Coefficient	T-statistic	OLS Dropout Coefficient	T-statistic
	(1)	(2)	(3)	(4)	(5)
Employment Outcomes					
Employed	0.853	-.179***	-3.11	-0.085***	-4.04
Stable job	0.840	-.188**	-2.54	-0.024	-0.73
Full-time starting job	0.712	.041	.57	0.012	0.42
Full-time ending job	0.806	-.090	-1.33	-0.008	-0.33
Job satisfaction	2.906	-.205	-1.62	-0.265**	-2.14
Wage Outcomes					
Starting ln wage	2.202	-.032	-.60	0.012	0.56
Ending ln wage	2.406	-.197***	-3.34	-0.067***	-2.75
Wage gain	0.203	-.165***	-3.35	-0.073***	-4.34
Pay satisfaction	2.715	-.305**	-2.44	-0.220*	-1.79
Subsequent Training					
Employer training	0.272	.031	.44	0.010	0.35
Career training	0.084	.079*	1.71	-0.013	-0.86
Any training	0.338	.096	1.29	-0.011	-0.38
Hours employer training	9.400	16.43	.80	10.89	1.27
Hours Career training	11.819	-38.2	-.25	0.977	0.02
Hours total training	21.218	30.86	.75	3.88	0.22

Note: The column 2 estimates are the coefficients for the predicted dropout variable based on the first-stage equation estimates on the probability of dropping out, and estimated for each of the 17 outcome measures. Full regression results for each of the 17 outcome measures are available on request.

Appendix 1 – Variable Definitions and Descriptive Statistics

Variable Name	Code Name	Definition	Mean	S.D.
Appendix 1A – YITS 2003 Cohort B, Cycles 1 and 3, Survey Conducted Feb 04-June 04				
17 Outcome Measures Used as Dependent Variables in Second-Stage Regressions				
Employed	JBST24D3	Had a job in Dec. 2003	0.853	0.354
Stable job	P23Q76	No specific end date to that job	0.840	0.366
Full-time start job	HWSD3	30+ hrs/wk. when first started that job	0.712	0.453
Full-time end job	HWED3	30+ hrs/wk. when last worked at that job	0.806	0.395
Job satisfaction	P23Q61	1 very disatisfied to 4 very satisfied with job	2.906	0.783
Starting wage	EPHS13	Ln hourly start wage of first job Jan 02-Dec 03	2.202	0.369
Final wage	EPHE13	Ln hourly final wage of first job	2.406	0.426
Wage gain	Derived	Ln ending wage minus starting wage of first job	0.203	0.313
Pay satisfaction	P23Q62	1 very disatisfied to 4 very satisfied with pay	2.715	0.804
Employer training	P63QO1	Took employer organized training Jan03-Dec03	0.272	0.445
Career training	P63QO3	Took job or career related training Jan03-Dec03	0.084	0.277
Any training	Derived	Took employer or career training Jan03-Dec03	0.338	0.473
Hours employer training	TTHERD3	Hours employer related training Jan03-Dec03	9.400	37.034
Hours career training	TTHJCD3	Hours career related training Jan03-Dec03	11.819	104.288
Hours total training	TTHD3	Hour employer or career training Jan03-Dec03	21.218	110.090
Appendix 1B – YITS 1999, Cohort B, Cycle 1, Survey Conducted Jan 2000-April 2000				
Explanatory Variables Used in Second-Stage Regressions for 17 Outcomes				
(High school graduate)	HEDLD3	Highest education high school graduation	0.549	0.498
High school drop out		Highest education below high school graduation	0.451	0.498
(Age 22)	AGED3	Age 22 as of December 2003	0.381	0.486
Age 23		Age 23 as of December 2003	0.347	0.476
Age 24		Age 24 as of December 2003	0.272	0.445
(Male)	GENERD3	Male	0.637	0.481
Female		Female	0.363	0.481
(Single, never-married)	MARSTD3	Includes very small # separated, divorced	0.702	0.457
Married, common law		Married or common law	0.298	0.457
(No children)	DEPCHD3	Have no children	0.789	0.408
Have children		Have some children	0.211	0.408
(Non-immigrant)	LANIMMD3	Non-immigrant	0.946	0.227
Immigrant		Immigrant	0.054	0.227
(Non visible minority)	VISMIND2	Non visible minority	0.906	0.291
Visible minority		Visible minority	0.094	0.291
Computer skills	R3Q1	Self-reported 1 poor to 5 excellent	2.910	1.215
Writing skills	R3Q2	Self-reported 1 poor to 5 excellent	3.212	1.053
Reading skills	R2Q3	Self-reported 1 poor to 5 excellent	3.564	0.998
Communication skills	R3Q4	Self-reported 1 poor to 5 excellent	3.396	1.028
Problem solving skills	R3Q5	Self-reported 1 poor to 5 excellent	3.551	0.866
Math skills	R3Q6	Self-reported 1 poor to 5 excellent	2.974	1.132

(Ontario)	PROVD3	Province of residence at time of survey	0.316	0.465
Newfoundland		Provincial indicator	0.013	0.112
Prince Edward Island		Provincial indicator	0.006	0.080
Nova Scotia		Provincial indicator	0.027	0.162
New Brunswick		Provincial indicator	0.026	0.159
Quebec		Provincial indicator	0.232	0.422
Manitoba		Provincial indicator	0.045	0.208
Saskatchewan		Provincial indicator	0.041	0.198
Alberta		Provincial indicator	0.155	0.362
British Columbia		Provincial indicator	0.139	0.346
Instruments Used in First-Stage Regression on Probability of Dropping Out*				
Youth unemployment	Derived	Provincial unemployment rate youths age 15-24	14.434	3.234
Adult unemployment	Derived	Provincial unemployment rate adults age 25-54	7.393	2.880
(Male)	GENERD3	Male	0.637	0.481
Female		Female	0.363	0.481
Having a child at that time	Derived	Derived from birth year of first chid	0.023	0.150
Peers/ teachers/ parents				
Peers continue education	PEERS	Peers planning to continue edu. None 1 to All 5	3.580	0.973
Teachers compatible	FC11_F11	Get along with teachers, Never 1 to all the time 5	3.934	0.886
Parents high-school grads	PED1	Parents high school diploma or more	0.749	0.434
Positive Attitudes				
Did schoolwork often	FC11_F16	Did schoolwork, never 5 to all of the time 1	3.426	1.297
Treated with respect	FC21_F22	Respect by students, disagree1 to agree 4	2.954	0.654
Participate in school activity	FC21_F25	Participate in school activities, disagree1 to agree 4	2.393	0.743
Regarded school positively	FC21_F28	School not a waste of time, agree 1 to disagree 4	2.871	0.644
Interest in learning	FC11_F18	Interested in learning, never 1 to all of the time 5	3.584	0.920
Negative Behaviours				
[Never skipped class]	SKIP	Never skipped class	0.232	0.422
Less than once per month		Skipped less than once a month	0.100	0.300
Once or twice per month		Skipped once or twice a month	0.251	0.434
One or more day/week		Skipped once or more per week	0.416	0.493
[Never use drugs]	DRUG	Never use marijuana or hash	0.678	0.467
Less than once per month		Drugs less than once a month	0.049	0.216
Once or twice per month		Drugs once or twice a month	0.063	0.243
One or more day/week		Drugs once or more per week	0.210	0.407
[Never drink]	DRINK	Never drink alcohol	0.310	0.462
Less than once per month		Drink less than once a month	0.094	0.291
Once or twice per month		Drink once or twice a month	0.222	0.416
One or more day/week		Drink once or more per week	0.374	0.484

* Note: In addition to the instruments used in the first-stage equation that were not used in the second-stage outcome equations, the first-stage regression also included a female dummy variable as was used in the second-stage outcome equations.

Appendix 2 – Age and Likely Grade for Older B Cohort Age 18-20 in Year 2000

Age	Likely Grade	Year for Older B Cohort
1	--	
2	--	
3	--	
4	--	
5	Kindergarten	
6	1	
7	2	
8	3	
9	4	
10	5	
11	6	
12	7	
13	8	
14	**9 High School**	**1996 cohort B in HS**
15	**10 High School**	**1997 cohort B in HS**
16	**11 High School**	**1998 cohort B in HS**
17	**12 High School**	**1999 cohort B in HS**
18	**13 or Univ. 1**	**2000 cohort B age 18-20**
19	U1 or Univ. 2	2000 cohort B age 18-20
20	U2 or Univ. 3	2000 cohort B age 18-20
21	U3 or Univ. 4	
22	U4 or Post-sec	2004 cohort B interviewed
23	Post-sec	2004 cohort B interviewed
24	Post-sec	2004 cohort B interviewed

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