Pergamon

Economics of Education Review, Vol. 16, No. 2, pp. 103–109, 1997

0272-7757/97 $17.00+0.00

S0272-7757(96)00037-4

Labor Market Conditions and the High School Dropout Rate: Evidence from New York State

DANIEL I. REES* and H. NACI MOCAN*†

*Department of Economics and the Center for Research on Economic and Social Policy, University of Colorado at Denver, Campus Box 181, P.O. Box 173364, Denver, CO 80217-3364, U.S.A.
†National Bureau of Economic Research, 50 East 42nd Street, 17th Floor, New York, NY 10017-5405, U.S.A.

Abstract—A number of cross-sectional studies have examined the impact of labor market conditions on the decision to drop out of school. However, results from these studies have been mixed. In this paper the authors use panel data estimation methods in order to avoid potential omitted variable problems. The results suggest a negative relationship between the unemployment rate and the proportion of a district's high school students who drop out in a given year. Educational inputs such as teacher experience and education do not seem to be reliable predictors of district dropout rates. The results underline the importance of controlling for unobservable district characteristics. [*JEL* I21] ©1997 Elsevier Science Ltd. All rights reserved

1. INTRODUCTION

THE HIGH school dropout rate is an important and often used indicator of the quality of a school system. However, changes in the dropout rate do not necessarily correspond to changes in school quality. For instance, from 1988–1989 to 1990–1991 New York City saw its high school dropout rate decline by 10%. Although education officials largely claimed credit for this development, they "acknowledged that a sluggish economy, with diminished job prospects, might be partly responsible for the improvement" (Berger, 1992, p. A1).

A number of recent studies have, with mixed results, investigated the relationship between labor market conditions (usually measured by the unemployment rate) and the decision to drop out. These studies, however, lacked adequate controls for district and community characteristics that are themselves likely to be correlated with the unemployment rate and the probability that a student leaves school. Thus, there exists the strong possibility that previous estimates of the effect of labor market conditions on dropping out are biased.

In this paper we use panel data estimation techniques in order to avoid the omitted variable problem. Our data are drawn primarily from the New York Department of Education and cover the academic years 1978–1979 through 1986–1987. In addition to investigating the effect of labor market conditions on district dropout rates, attention is paid to the impact of educational inputs such as teacher education and experience.

2. BACKGROUND

Duncan (1965) showed that the national unemployment rate was negatively related to the proportion of students in a particular cohort who dropped out of school. She attributed this simple correlation to the fact that individuals "defer leaving school when jobs are scarce" (Duncan, 1965, p. 133), but if the unemployment rate is thought of as a general indicator of labor market conditions, then the argument can be framed both in terms of starting wages for dropouts as well as the probability of finding employment upon quitting school.[1] In either case, students presumably compare their expected future income stream if they stay in school for an additional year with their expected income stream if they immediately enter the labor force.

It is also possible that the schooling decision is made by the entire family, taking into account additional considerations. For instance, if the family's primary earner loses his or her job, this could force others in the family to enter the labor market. According to this scenario, high levels of unemployment might be associated with a worsening of the dropout problem. In short, theoretically, it is not clear how an increase in unemployment would impact the dropout rate.

Using data from the *High School and Beyond* survey, Ehrenberg and Brewer (1994), in fact, found a positive relationship between the county unemployment rate and the probability that White students from low income families drop out. The authors, however, discovered no evidence of a positive unemployment

[Manuscript received 27 April 1994; revision accepted for publication 24 June 1996]

effect for Whites from other backgrounds, or for Blacks and Hispanics in general. In contrast, Rumberger's (Rumberger, 1983) results suggest a strong negative relationship between the unemployment rate and the probability that Black and Hispanic males leave school. Finally, Zwerling and Thomason (1992) found no evidence that local labor market conditions affect the probability of dropping out.[2]

All three of these studies estimated a cross-sectional model of the form,

$$y_i^* = \beta' \mathbf{X}_i + \epsilon_i, \quad (1)$$

where y_i^* is a latent variable, but student i can be observed to discontinue schooling if $y_i^*>0$. The vector of explanatory variables, $\mathbf{X}_i$, includes the county unemployment rate and one or two broad measures of family background, but only spotty measures of community or area characteristics. If such characteristics are correlated with y_i^* and the unemployment rate, then the estimated coefficient of the unemployment variable will be biased.[3] For example, consider a high school serving a particularly depressed area with persistently high unemployment and a host of other ills such as above average illegal drug consumption. If the students at this high school are more likely to be exposed to drugs, and are therefore more likely to discontinue schooling, then this will generate a bias in the estimated unemployment coefficient. The unobservable (omitted) variable, however, does not have to be as sinister as illicit drug consumption. Factors such as the quality of the local library or the community's "taste" for education may well be correlated with the unemployment rate and the probability that a student drops out of school.

One way around this problem is to turn to district-level (grouped) data. The dependent variable then becomes the district mean of the dummy variable y_i, defined as

$$y_i = 1 \text{ if } y_i^* > 0$$

$$y_i = 0 \text{ otherwise,}$$

which can be observed over a number of years. If the omitted variable is assumed to be constant with respect to time, then it can be controlled for using panel data estimation methods.

3. THE DATA

The New York Department of Education's *Personnel Master Files* (*PMF*) and *Institutional Master Files* (*IMF*) are the primary sources of data for this project. The *PMF* provides information on salaries, educational achievement, and personal characteristics for all public school teachers in New York State. School-level data, such as enrollment, the number of dropouts, and the racial mix of students, come from the *IMF*. Data from both sources were collected for a period of nine years (1978–1979 through 1986–1987) and aggregated to the district level. Unemployment rates were obtained from the New York State Department of Labor (1990).

A total of 680 public school districts were used in the analysis.[4] Complete information for most districts was available for each of the nine years under study. However, because of missing data, some districts were represented in the panel less than nine times. The dependent variable used in the analysis is the proportion of a district's 9th through 12th graders who dropped out in a given year. Schools were asked to identify a student as having dropped out if he or she "left school prior to graduation for any reason except death...and did not enter another school or a high school equivalency program".[5]

Table 1 presents the means and standard deviations of the annual dropout rate and the unemployment rate for New York school districts by academic year. The dropout rate is highest in 1978–1979 (4.1%), and falls quite steadily through 1986–1987 (3.4%). Looking at the statewide data, it is difficult to identify any effect of the early 1980s' economic slump.

The mean dropout rate for districts in the sample across all years is 3.7%. This figure is substantially lower than many estimates of the national dropout rate.[6] These estimates, however, are usually calculated as the proportion of students in a particular cohort who, after a number of years, have not graduated and are not in school. They are therefore not comparable to the yearly rate used in this analysis. Yearly national dropout rates for 10th through 12th graders reported by Kominski (1990) range between 4.7% and 6.6%.[7]

4. EMPIRICAL MODEL

Let p_{it} represent the proportion of district i's students, grades 9 through 12, who drop out in a given year t. It is assumed that:

Table 1. Dropout and unemployment rates for New York State by year 1978–1979 through 1986–1987* (standard deviations in parentheses)

Year	Dropout rate†	Unemployment rate
1978–1979	0.0412 (0.025)	0.0677 (0.015)
1979–1980	0.0407 (0.025)	0.0720 (0.018)
1980–1981	0.0406 (0.025)	0.0769 (0.021)
1981–1982	0.0377 (0.024)	0.0782 (0.021)
1982–1983	0.0359 (0.023)	0.0944 (0.026)
1983–1984	0.0370 (0.025)	0.0747 (0.021)
1984–1985	0.0357 (0.023)	0.0667 (0.021)
1985–1986	0.0345 (0.024)	0.0666 (0.022)
1986–1987	0.0338 (0.023)	0.0566 (0.020)

Source: New York Education Department, *Institutional Master File*.

*Excludes New York City.

†Weighted by district high school enrollment.

$$p_{it} = \beta' \mathbf{X}_{it} + v_i + u_t + \epsilon_{it}, \quad (2)$$

where $\mathbf{X}_{it}$ is a vector of independent variables that includes a measure of labor market conditions, v_i represents district-specific heterogeneity that is time invariant, u_t stands for the time effects that have statewide impacts in any particular year, and ϵ_{it} is a disturbance term. Equation (2) is estimated using weighted least squares, with district and time dummies on the right-hand side in order to control for the effects of v_i and u_t, respectively.[8]

If unobserved factors such as the community's taste for education are stable over time, then the addition of district-specific dummies should make it possible to obtain unbiased estimates of β.

The advantage of the linear probability model described above is that the estimated coefficients are easily interpreted. However, because p_{it} is equal to zero for approximately 3% of the observations in the sample, the model is not strictly appropriate (Maddala, 1983, p. 30). In order to accommodate these observations and to investigate the sensitivity of the linear probability model results, we also estimated a variation of the logit model suggested by Cox (1970, p. 33).[9] The logit results were generally consistent with those presented below. Those instances in which the two models produced differing results are noted.[10]

The primary variable of interest in the vector $\mathbf{X}_{it}$ is the average county unemployment rate over the academic year, intended as a measure of labor market conditions.[11] Student and district characteristics such as the proportion of students who are Black, the proportion who are Hispanic, the proportion whose families receive government support, and total district enrollment are also included as independent variables. Finally, the vector $\mathbf{X}_{it}$ includes measures of the quality and flow of educational resources (inputs) to students. For instance, we include the mean assignment experience and total teaching experience of teachers in the district, the proportion of teachers with more than a masters degree, the proportion with less than a masters degree, the proportion tenured, and the proportion who taught in the district the previous year. (The proportion of teachers who taught in the district in the previous year is included as a crude measure of district-specific human capital. A full list of variables, their definitions, means and standard deviations are displayed in Table 2.) In general, if the quality or quantity of an educational input increases, this should increase the return to schooling, and therefore be associated with a decrease in the dropout rate.

5. RESULTS

Table 3 presents three specifications of the linear probability model discussed above. Turning first to the student variable results, the estimated coefficient of Hispanic is positive and statistically significant in each specification. This suggests that an increase in the proportion of Hispanic students leads to an increase in the district dropout rate. A number of researchers have noted that Hispanics are more likely to drop out of high school than their White peers; however, there has been little progress in explaining the root causes of these behavioral patterns.[12] In contrast, an increase in the proportion of Black students is not associated with a significant change in the district dropout rate.[13]

The level of enrollment is positively related to the district dropout rate. It is not entirely clear why larger districts should have less success in retaining students, although it could be that marginal students in these districts are more prone to "slip through the cracks of the system". Similarly, an increase in the proportion of students whose families receive government support is also associated with an increase in the dropout rate. This finding is consistent with results from other studies that show economic background to be an important predictor of dropout behavior (Rumberger, 1987, p. 110).

The estimated coefficients of the educational input variables are, for the most part, statistically insignificant at conventional levels.[14] For instance, there is no evidence that the proportion of tenured teachers affects the dropout rate, nor is there evidence that mean assignment experience or district-specific experience is associated with changes in the dropout rate. However, the proportion of teachers with less than a masters degree is positively related to the proportion of students who drop out, and there is some evidence that larger class sizes are associated with an increase in the dropout rate.[15] Also, contrary to what one might expect, there is evidence that an increase in mean teaching experience leads to a worsening of the dropout problem.

Finally, the results offer support for the hypothesis that a slack labor market discourages students from dropping out. Concentrating first on the specification presented in the first column, the estimated coefficient of the unemployment variable is negative and clearly significant. According to this estimate, a 1 percentage point increase in the unemployment rate is associated with a decrease of 0.00077 in the proportion of high school students who drop out. Thus, a district with a dropout rate equal to the state average (0.037) can expect a decrease in its dropout rate of 2% with a 1 percentage point increase in the county unemployment rate.

It is possible that students respond differently to changes in the unemployment rate according to the initial level of unemployment. For instance, Duncan (1965, p. 128) argued that after a certain point job prospects for youth were largely unaffected by rises in the unemployment rate. However, when the square of the unemployment rate is added to the estimations to capture this possible nonlinearity (second column of Table 3), its coefficient is not significantly different from zero, although it is positive as this argument would suggest.

Table 2. Variable definitions and descriptive statistics 1978–1986 ($n = 5520$)

Variable	Definition	Mean (S.D.)
Dropout rate*§	Proportion of district's students, grades 9–12, who drop out between 1 July and 30 June	0.037(0.023)
Black*	Proportion of district's students, grades 9–12, who are Black	0.037(0.110)
Hispanic*	Proportion of district's students, grades 9–12, who are Hispanic	0.011(0.028)
Welfare*	Proportion of district's students, grades 9–12, whose families' primary means of support is a public welfare program	0.125(0.101)
Enrollment*	District enrollment, grades 9–12	953.92(1141.72)
Tenured†	Proportion of district's high school teachers with tenure	0.805(0.113)
In district last year†	Proportion of district's high school teachers who taught in the district the previous year	0.928(0.063)
Less than masters†	Proportion of district's high school teachers with less than a master's degree	0.412(0.198)
Greater than masters†	Proportion of district's high school teachers with greater than a master's degree	0.210(0.159)
Mean assignment experience†	Mean years of experience for the district's high school teachers in the particular assignment	10.63(2.53)
Mean teaching experience†	Mean years of total teaching experience for the district's high school teachers	14.64(2.73)
Mean class size†	Mean class size taught by district's high school teachers	18.40(4.38)
Unemployment‡ rate	Average unemployment rate for the district's county, July–June	0.073(0.023)

*Source: New York State Education Department, *Institutional Master Files.*
†Source: New York State Education Department, *Personnel Master Files.*
‡Source: New York State Department of Labor, *Resident Employment Status of the Civilian Labor Force 1974–1990.*
§Weighted by district high school enrollment.

In the third column of Table 3 the district unemployment rate is interacted with the student race and the proportion of welfare recipients. The results of this specification suggest that Hispanics and Blacks respond differently than Whites to changes in the unemployment rate.[16] An increase in unemployment is associated with a more pronounced decrease in the dropout rate for Hispanics than for Whites, as the interaction term between unemployment and Hispanic is negative and significant. For Blacks, on the other hand, the interaction term is positive and significant, indicating a positive relationship between unemployment and dropout behavior.[17] One possible explanation for this pattern of results is that for Hispanics the decision to drop out is based more upon an individual-based economic calculation of well-being. For Blacks, and to a lesser extent Whites, familial obligations or noneconomic factors may play a greater role.[18] An alternative explanation is that changes in the unemployment rate measure something different than simply changes in job prospects and wages. For instance, it could be that they are correlated over time with the omitted factors discussed earlier, and are correlated to a different degree for each ethnic group examined.

Finally, in Table 4 we present an estimate of Equation (2) without controls for unobservable district-specific effects. The coefficient of the unemployment variable is positive and significant, suggesting that a worsening of job prospects is associated with an *increase* in the dropout rate. This result underlines the importance of controlling for unobservable district characteristics and suggests that the results of studies without such controls should be interpreted cautiously.

6. CONCLUSION

A slack labor market could affect the schooling decision through two routes: (1) fewer job opportunities could discourage students from dropping out in order to enter the labor market; and (2) family job or income losses could force students to drop out in order to look for work. Our results, which are obtained from an analysis of longitudinal data from 680 public school districts of New York State over

Table 3. Estimates of the linear probability model (absolute *t*-statistics in parentheses)

Variables*	(1)	(2)	(3)
District dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Black	0.012(0.87)	0.012(0.89)	−0.011(0.75)
Hispanic	0.076(4.72)	0.075(4.64)	0.149(5.55)
Welfare	0.009(2.17)	0.009(2.23)	0.007(0.68)
Enrollment†	0.001(1.85)	0.001(2.02)	0.001(2.37)
Tenured	0.001(0.33)	0.001(0.37)	0.001(0.22)
In district last year	−0.002(0.56)	−0.003(0.58)	−0.003(0.59)
Less than masters	0.011(3.12)	0.011(3.01)	0.011(3.09)
Greater than masters	0.004(1.11)	0.004(1.05)	0.004(1.10)
Mean assignment experience†	0.147(1.08)	0.143(1.06)	0.138(1.02)
Mean teaching experience†	0.335(1.61)	0.342(1.64)	0.341(1.65)
Mean class size†	0.086(1.45)	0.086(1.45)	0.095(1.60)
Unemployment rate	−0.077(4.34)	−0.148(2.89)	−0.091(4.20)
Unemployment squared		0.401(1.48)	
Unemployment*Black			0.627(4.67)
Unemployment*Hispanic			−1.369(2.81)
Unemployment*welfare			0.026(0.19)
n	5520	5520	5520
DOF	4820	4819	4817
R^2	0.806	0.806	0.807

*See Table 2 for variable definitions and sources. Dependent variable is equal to p_{it}, the proportion of district *i*'s students, grades 9–12, who drop out in year *t*.
†Coefficient multiplied by 1000.

Table 4. Linear probability model without district controls (absolute *t*-statistics in parentheses)

Variables*	
District dummies	No
Year dummies	Yes
Intercept	−0.025(4.91)
Black	0.033(13.44)
Hispanic	0.022(3.02)
Welfare	0.075(22.24)
Enrollment†	0.002(12.95)
Tenured	0.021(5.47)
In district last year	0.002(0.25)
Less than masters	0.032(16.67)
Greater than masters	−0.011(5.46)
Mean assignment experience†	0.351(2.49)
Mean teaching experience†	−0.240(1.46)
Mean class size†	0.474(7.70)
Unemployment rate	0.033(2.45)
n	5520
DOF	5499
R^2	0.453

*See first note, Table 3.
†Coefficient multiplied by 1000.

nine years, suggest that for the typical district the former effect outweighs the latter. A school district with a yearly high school dropout rate equal to the New York State average (3.7%) can expect to see its dropout rate decrease by a modest 2% with a 1 percentage point increase in the county unemployment rate.

However, differences exist in how Whites, Hispanics, and Blacks respond to changes in the unemployment rate. White and Hispanic students are less likely to leave school as economic conditions worsen; Black students are more likely to leave school. Exactly what motivates these behavioral differences is unclear.

Changes in educational inputs such as teacher experience and education are not generally good predictors of district dropout rates. This result is in keeping with findings from previous cross-sectional studies (see, for instance, Ehrenberg and Brewer, 1994), and provides additional support to the well-known Hanushek (1989) argument that increased educational spending has little impact on student outcomes.

Finally, estimation of a model without controls for district-specific effects generated substantially different results. The estimated coefficient of the unemployment variable became positive and significant, implying that the true negative relationship between unemployment and the dropout rate is masked if unobservable district characteristics are not accounted for. Without substantially better controls for community characteristics that are likely correlated with labor market conditions and the probability that a student leaves school, cross-sectional studies can obviously produce quite misleading results.

Acknowledgements—We thank Charles Beach and Ronald Ehrenberg for comments on earlier drafts.

NOTES

1. In other words, a decrease in real wages during a recession could also contribute to the decision to remain in school. It should be noted, however, that the cyclical behavior of real wages is still disputed (see Neftci, 1978; Keane *et al.*, 1988; Mocan and Topyan, 1993).
2. Zwerling and Thomason (1992) found that, controlling for the local unemployment rate, increases in the state average manufacturing wage were associated with a lower probability of dropping out.
3. The direction of the bias is difficult to determine with certainty (Brown, 1980, p. 120).
4. Because of their special nature, Boards of Cooperative Educational Services and school districts in New York City were excluded from the sample. There are approximately 700 school districts in New York State outside of New York City; the exact number varies slightly according to the specific year.
5. Researchers have noted a host of problems schools encounter in identifying dropouts (e.g. Hammack, 1986; Natriello *et al.*, 1986). The fact that the dependent variable is measured with error will decrease the precision of the estimates, but otherwise should not affect the analysis.
6. For instance, the national dropout rate computed from *High School and Beyond* data is 13.6% (Center for Education Statistics, 1987, p. 18).
7. Kominski (1990, p. 308) presents evidence that 9th graders have much lower dropout rates than other high school students. This suggests that yearly national dropout rates that included 9th graders would be smaller in magnitude than the figures presented by Kominski.
8. The appropriate weight is given by the formula $\frac{n_{it}}{p_{it}(1-p_{it})}$, where n_{it} is the number of 9th through 12th graders in district i, year t (see Maddala, 1983, p. 29).
9. More precisely, we estimated the following model:

$$\log\left\{\frac{p_{it} + (2n_{it})^{-1}}{1-p_{it} + (2n_{it})^{-1}}\right\} = \beta'\mathbf{X}_{it} + v_i + u_t + \epsilon_{it},$$

where n_{it} is the number of 9th through 12th graders in district i, year t.
10. We also estimated both the linear probability and the logit specifications using a random effects model, where the intercept terms are assumed to be randomly distributed across districts (Hsiao, 1986, pp. 33–41; Greene, 1990, pp. 485–492). Again, the basic results were in keeping with those reported below.
11. Ideally, one would like to measure labor market conditions with variables that are specific to high school dropouts. For instance, the teenage unemployment rate might replace the overall rate, and average wages for unskilled, nonsupervisory workers could be included as an explanatory variable. However, these more precise measures are not available at the county level for New York State. When average weekly earnings for all workers was used as an additional measure of labor market conditions, it was found to be negatively related to the proportion of students who drop out.
12. For instance, Rumberger (1987, p. 111), in a review of the literature, wrote: "Many of the factors known to be associated with [dropping out] are structural in nature and reveal little of the underlying process. For example, why do Hispanics...have higher dropout rates? Some possible explanations include the use of language in the home, the amount of time parents spend with their children, and the type of 'parenting' style used in the home."
13. Results from the logit estimations, however, are contradictory: they suggest that an increase in the proportion of Black students is indeed associated with an increase in the district dropout rate.
14. This result might be ascribed to the fact that these inputs are measured as district averages. Summers and Wolfe (1977), for instance, argued that their use of student-level data leads to more precise estimates of the relationship between inputs and educational outcomes than had been obtained by previous studies that had used school or district level measures of inputs.
15. In the logit estimations, neither the proportion of teachers with less than a masters degree, nor mean class size were significantly related to district dropout rates.
16. The omitted category consists of Whites and students who are neither White, Black, nor Hispanic.
17. According to the estimates presented in Table 3, a district with 100% Black enrollment would, with a 1 percentage point increase in the county unemployment rate, experience an increase of $-0.091*0.01+0.627*1*0.01=0.00537$ in the proportion of students who drop out in a given year.
18. Interestingly, Rumberger (1983, p. 201) reports that Hispanic students are much more likely than White or Black students to cite economic reasons for dropping out of school.

REFERENCES

Berger, J. (1992) Dropout rate down sharply for New York schools. *New York Times*, 20 May, A1.

Brown, C. (1980) Equalizing differences in the labor market. *Quarterly Journal of Economics* **94**, 113–134.

Center for Education Statistics, U.S. Department of Education (1987) *Who Drops Out of High School? Findings from High School and Beyond.* U.S. Government Printing Office, Washington, DC.

Cox, D.R. (1970) *Analysis of Binary Data.* Methuen, London.

Duncan, B. (1965) Dropouts and the unemployed. *Journal of Political Economy* **73**, 121–134.

Ehrenberg, R.G. and Brewer, D.J. (1994) Do school and teacher characteristics matter? Evidence from *High School and Beyond. Economics of Education Review* **13**, 1–17.

Greene, W. (1990) *Econometric Analysis.* MacMillan, New York.

Hammack, F.M. (1986) Large school systems' dropout reports: An analysis of definitions, procedure and findings. *Teachers College Record* **87**, 324–341.

Hanushek, E.A. (1989) The impact of differential expenditures on school performance. *Educational Researcher* **18**, 45–62.

Hsiao, C. (1986) *Analysis of Panel Data*. Cambridge University Press, New York.

Keane, M., Moffitt, R. and Runkle, D. (1988) Real wages over the business cycle: Estimating the impact of heterogeneity with micro data. *Journal of Political Economy* **96**, 1232–1266.

Kominski, R. (1990) Estimating the high school dropout rate. *Demography* **27**, 303–310.

Maddala, G.S. (1983) *Limited-Dependent and Qualitative Variables in Econometrics*. Cambridge University Press, New York.

Mocan, N. and Topyan, K. (1993) Real wages over the business cycle: Evidence from a structural time-series model. *Oxford Bulletin of Economics and Statistics* **55**, 363–389.

Natriello, G., Pallas, A.M. and McDill, E.L. (1986) Taking stock: Renewing our research agenda on the causes and consequences of dropping out. *Teachers College Record* **87**, 430–440.

Neftci, S.N. (1978) A time-series analysis of the real wages–employment relationship. *Journal of Political Economy* **86**, 281–291.

New York State Department of Labor (1990) *Resident Employment Status of the Civilian Labor Force 1974–1990*. BLMI Report No. 27. Albany.

Rumberger, R.W. (1983) Dropping out of high school: The influence of race, sex, and family background. *American Educational Research Journal* **20**, 199–220.

Rumberger, R.W. (1987) High school dropouts: A review of issues and evidence. *Review of Educational Research* **57**, 101–121.

Summers, A.A. and Wolfe, B.L. (1977) Do schools make a difference? *American Economic Review* **67**, 639–652.

Zwerling, H. and Thomason, T. (1992) *The Effects of Teacher Unions and Collective Bargaining Laws on Educational Performance*. Queen's Papers in Industrial Relations, QPIR 92-4, Queen's University, Kingston, Ontario.