

Decline in Youth Participation in Canada in the 1990s: Structural or Cyclical?

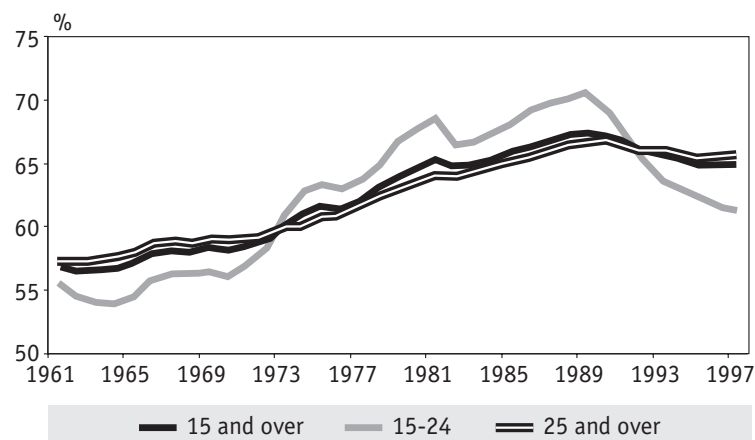
Richard Archambault and Louis Grignon*

Canadian participation rates increased from the 1960s to the end of the 1980s (Chart 1). However, since the early 1990s, there have been sizeable declines. Between 1989 and 1997, the aggregate participation rate dropped by 2.7 percentage points, while the rate for the 15-24 age group decreased by 9.4 percentage points.¹ At the same time, the proportion of young people attending school full-time increased by 10.5 percentage points. For 15- to 24-year-olds, the decline in the participation rate continued throughout the 1990s, while the aggregate participation rate and that for those aged 25 and over have remained stable since 1995.

The major decline in youth participation rates in the 1990s and the concomitant increase in school enrolment raise some important questions. Are both phenomena essentially cyclical in nature and likely to reverse themselves completely or significantly in the coming years if the economy continues to improve? Or do they reflect a greater commitment by young people to education which will lead to future generations of better educated and more productive workers? What impact has changes to Unemployment Insurance, social assistance and minimum wages had on the school-to-work transition of young people?

In identifying the causes of the decline in the youth participation rate and the increase in school enrolment since the early 1990s we hope to understand better their policy implications and predict their future evolution. This study decomposes the youth participation rate into three distinct rates (participation rates for full-time students, participation rate for non-students and full-time school enrolment rate) and four demographic groups (men, women, the 15-19 age group and the 20-24 age group). This breakdown makes it possible to take into account differences in behaviour between students and non-students concerning their participation in the labour force and outside it. It will also help to explain changes

Chart 1 Participation Rate by Age Group, Canada 1961-1997



in the school enrolment rate as a distinct phenomenon rather than as merely a determinant of the participation rates.

Interpreting the Data: a Descriptive Analysis

The youth participation rate tends to fall during recessions and to recover during economic expansion. After the 1981-82 recession the youth participation rate fell to a low point, then began to rise. However, after the 1990-92 recession, the rate continued to decline, falling to 57.5 per cent in 1997, from 66.9 per cent in 1989.

There were significant differences in the decline by age group and sex (Chart 3). The participation rates of males and females aged 15 to 19 decreased by 12.4 and 10.3 percentage points respectively over the 1989-97 period. In the 20-24 age group, the rates dropped by 5.7 percentage points for men and 6.7 points for women. Since the end of the last recession, only males aged 20-24 have experienced a slight increase, beginning in 1995. A convergence of male and female par-

Chart 2 Participation Rate, Ages 15-24

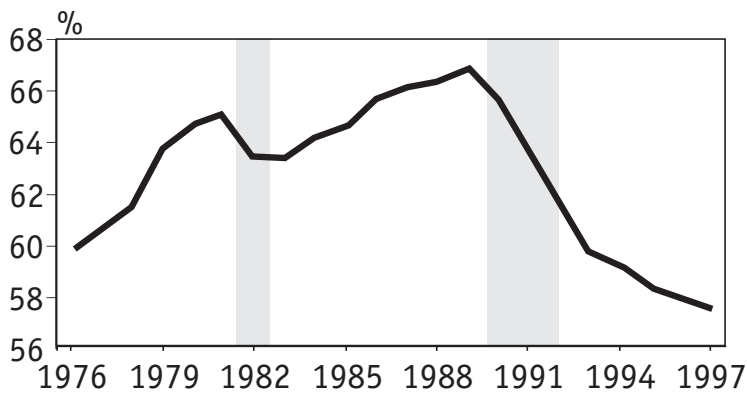


Chart 3 Participation Rate, Four Age Groups

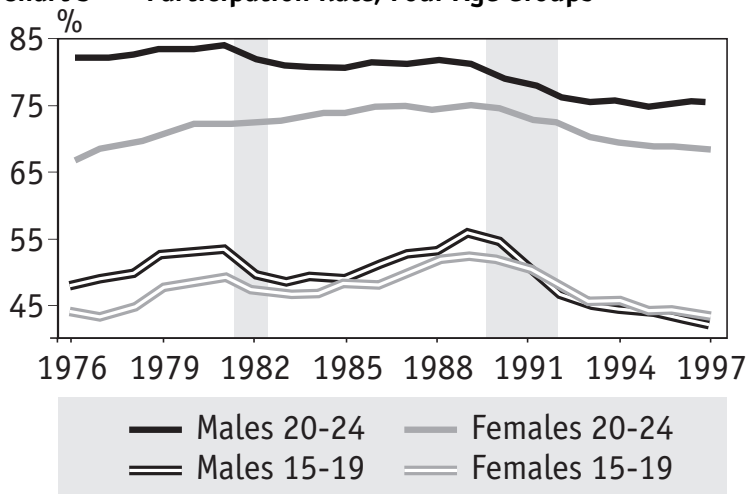
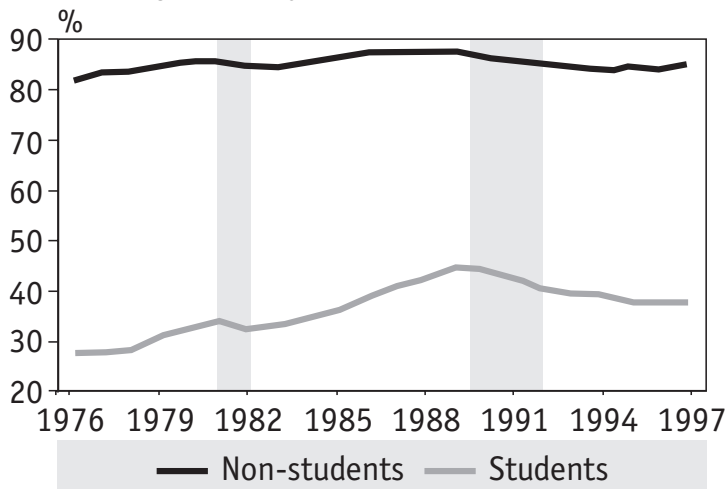


Chart 4 Student/Non-Student Participation Rates, Ages 15-24 yrs



ticipation rates can also be observed. In the 15-19 age group, the rates for both sexes have been almost the same since 1991. However, among 20- to 24-year-olds, the difference between male and female participation rates, which was 15.5 percentage points in 1976, narrowed to four percentage points by the early 1990s, then widened to 7.2 percentage points in 1997.

Participation rates for the 15-24 age group can be separated out for full-time students and non-students (including part-time students) (Chart 4). These groups have very different participation rates. Over the period as a whole, the rate for non-students was on average 50 percentage points higher than that for students. However, between 1976 and 1989, the student participation rate increased more than the non-student rate. From 1989 to 1997, the student participation rate dropped by 6.7 percentage points, while the non-student participation rate fell by only 2.2 percentage points. Since the end of the last recession, and particularly since 1994, the non-student participation rate has begun to increase gradually. On the other hand, the student participation rate has stabilized at about 38 per cent since 1995. Stronger cyclical sensitivity can be observed in the participation rate of students than in that of non-students, as shown in the shaded areas.

The two groups most affected by the declining participation rate in the 1990s were male and female students aged 15-19 (Chart 5). From 1989 to 1997, the participation rate of male students in this age group declined by 11.4 percentage points, while that of their female counterparts fell by 8.9 percentage points. In contrast, for students aged 20-24, participation rates were higher in 1997 than in 1989. Males and females in this group registered increases of 1.4 and 2.1 percentage points respectively over the period. It should be noted that in both the 15-19 and 20-24 age groups, female student participation rates were appreciably higher than those of their male counterparts.

Between 1989 and 1997, the participation rate of non-students (Chart 6) declined less than that of students. The declines in non-student participation rates for males and females aged 15-19 were 4.4 and 5.4 percentage points respectively, while the rates for men and women aged 20-24 fell by 1.1 and 2.5 percentage points, respectively.

The decrease in youth participation rates was accompanied by a strong increase in the school

enrolment rate. School enrolment among 15- to 24-year-olds increased by 10.5 percentage points (Chart 7), following a rise of 6.9 percentage points in 1976-89. Economic downturns seem to be marked by a more rapid increase in the school enrolment rate, as shown in the shaded areas in Chart 2.6.

Increases in the school enrolment rate differed from one demographic group to another (Chart 8). School enrolment for 15- to 19-year-olds was similar for men and women. However, a more rapid increase in school enrolment can be observed among women aged 20-24 than among males of the same age. From 1989 to 1997, women and men aged 20-24 exhibited the greatest rise in school enrolment, with increases of 14.4 and 10 percentage points, respectively. For the 15-19 age group, this period was marked by more modest increases (5.7 and 6.1 percentage points for men and women, respectively).

The 9.4 percentage point drop in the youth participation rate between 1989 and 1997 is the result of both decreases of 6.7 and 2.2 percentage points for students and non-students, respectively, and an increase of 10.2 percentage points in the school enrolment rate. A rise in school enrolment gives more weight to the student participation rate within the aggregate participation rate. When the participation rates of students and non-students remain constant, an increase in school enrolment translates into a decline in the aggregate participation rate. From 1976 to 1997, the participation rate of students was nearly 50 percentage points lower, on average, than that of non-students. Since school enrolment has increased by 17.4 percentage points since 1976, the effect on the youth participation rate has been considerable.

Jennings (1998) analysed aggregate participation rates to determine what proportions of the decrease among 15- to 24-year-olds could be attributed to changes in school enrolment, and student and non-student participation. His results indicate that 44 per cent of the drop in the aggregate rate between 1989 and 1996, is accounted for by the increase in school enrolment, while decreases in the student and non-student participation rates accounted for 38 per cent and 18 per cent of the drop respectively.

Chart 9 shows the historical relationship between the school enrolment rate and the participation rate. It suggests that there was no stable re-

Chart 5 Student Participation Rate, Four Age Groups

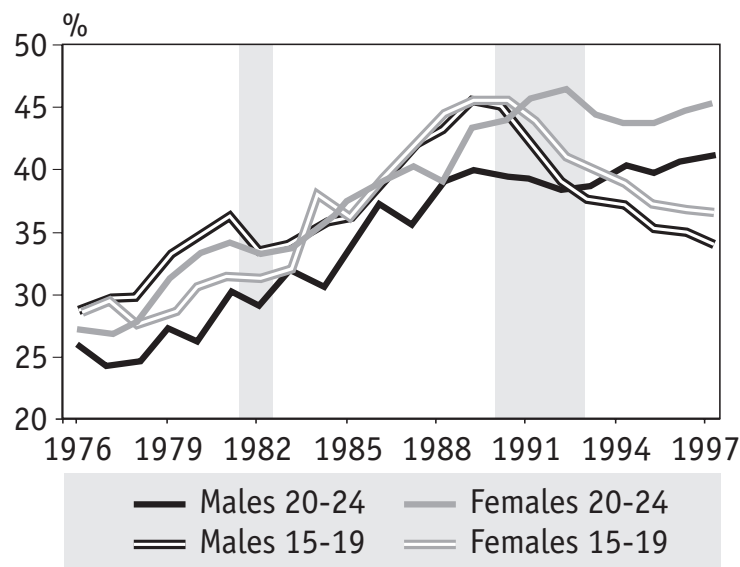
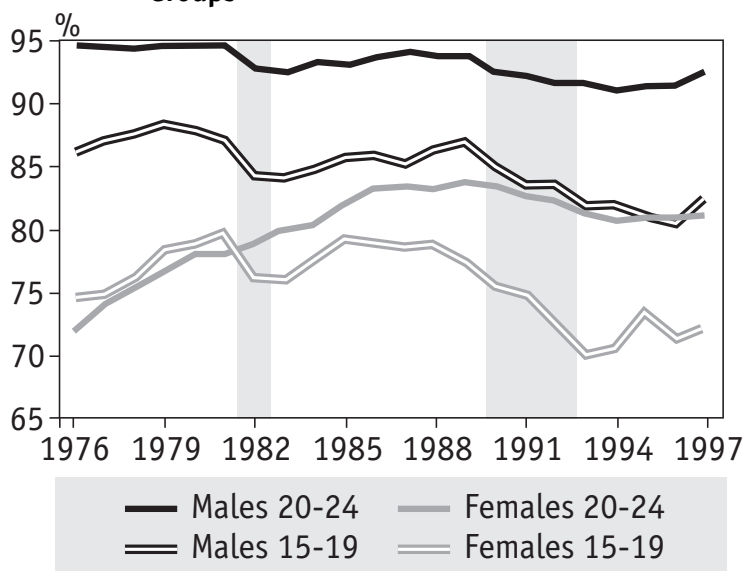


Chart 6 Non-Student Participation Rate, Four Age Groups



lationship between the two rates from 1976 to 1997. Rather, there were three distinct episodes. The first covered the period from 1976 to 1981 and was characterised by a rise in the participation rate, along with a slight drop in the school enrolment rate. The second, between 1983 and 1989, was characterised by a simultaneous increase in both rates. The third, since 1989, featured a negative relationship between the participation rate and school enrolment, i.e. an increase in school enrolment accompanied by a decrease in the aggregate participation rate.

Chart 7 School Enrolment Rate, 15-24-Year-Olds

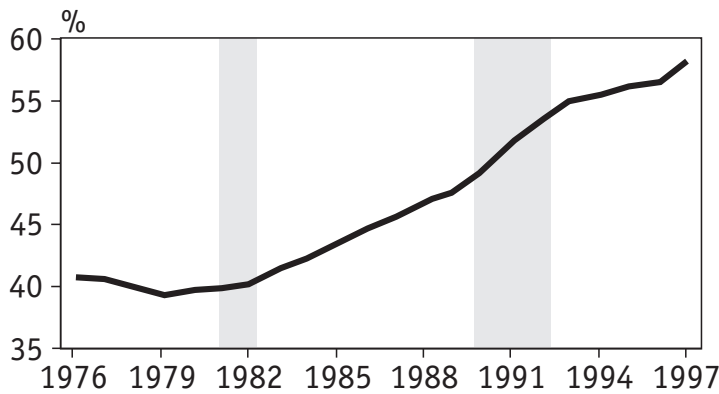


Chart 8 School Enrolment Rate, Four Age Groups

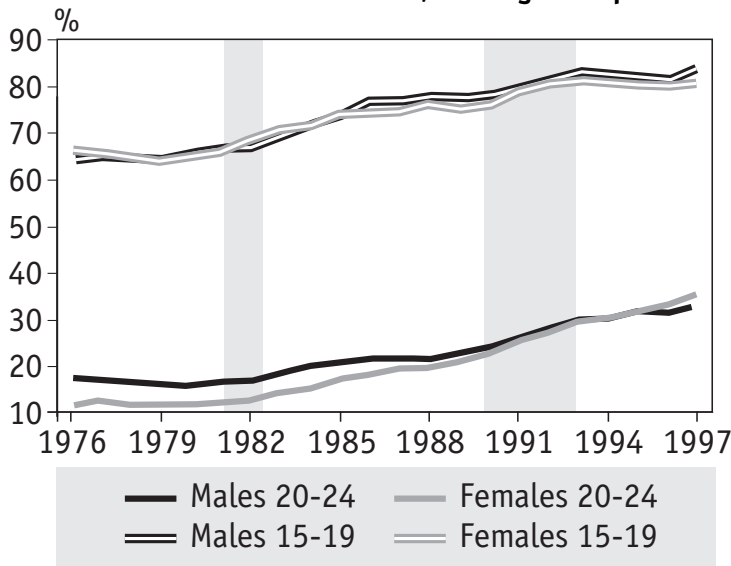
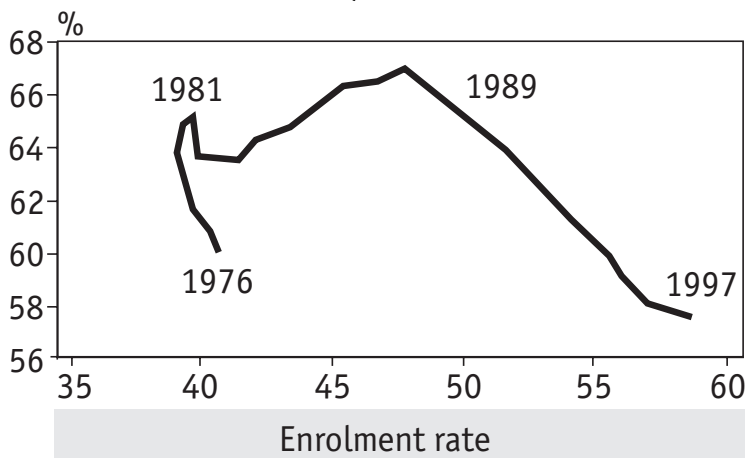


Chart 9 Relationship Between Participation and School Enrolment Rates, 15-24-Year-Olds



The increase in school enrolment was accompanied by a decline in the proportion of young people who were neither in school nor in the labour force (Chart 10). Between 1976 and 1997, this proportion decreased by 4.6 percentage points, a 45 per cent drop from its 1976 level. In 1997, only 5.7 per cent of young people aged 15 to 24 were neither in the labour force (working or looking for work) nor pursuing studies. The proportion of young people who were neither in school nor working fell by 5.8 percentage points over the same period, a 34 per cent drop from 1976. In 1997, 11.1 per cent of young people were neither working nor attending school.

A comparison of the demographic groups (Charts 11 and 12) shows that women aged 20-24 registered much higher rates of non-participation and non-enrolment in school than the other three groups. The number of women in this group with young children probably accounts for this result. Non-participation and non-enrolment fell for all categories of young people, with the exception of men aged 20-24, whose rate increased slightly between 1976 and 1997.

Analysis of Youth Participation Rates

The Model

In analysing youth participation rates, we break down the participation rate of young men and women aged 15-24 into three components — the student participation rate, non-student participation rate and school enrolment rate. The school enrolment rate is the full-time student population as a proportion of the youth population. Mathematically, the participation rate (PR) is expressed as the sum of the student participation rate (SPR) and the non-student participation rate (NSPR), weighted by the school enrolment rate (SER); thus, $PR = SER * SPR + (1 - SER) * NSPR$. This decomposition makes it possible to take into account behavioural differences between students and non-students, and to treat the SER as a phenomenon to be explained rather than a determinant of the participation rates.

All rates are estimated for 15- to 24-year-olds using two approaches. The first, an aggregate approach, analyses the 15-24 age group, while the second, a disaggregated approach, analyses four age groups, men and women aged 15-19 and 20-

24. The model's equations are presented in Appendix 1. The analysis by demographic group makes it possible to identify behavioural differences among groups. For comparison purposes, we also estimate an aggregate participation rate equation for the 15-24 age group and for each demographic group separately. Each equation to be estimated contains the same explanatory variables.

The explanatory variables are as follows: one cyclical variable, deviations from the trend ($E - \bar{E}$) in the employment rate for 25- to 54-year-olds,² and five structural variables. The structural variables are the average real wage (w), the relative minimum wage (rmw), an employment insurance variable (ei), a social assistance variable (sa), and the rate of return to education ($rreduc$).

In theory, the cycle has an indeterminate effect on SPRs, NSPRs and SERs. When economic activity declines and job prospects deteriorate, two types of effects are observed: a "discouraged worker effect," which leads workers to withdraw from the labour force, and an "added worker effect," which leads other workers to enter the labour market to boost family income when a member of the household has lost his or her job.

Average real wages and relative minimum wages also have a priori indeterminate signs. The effect these variables may have on participation and school enrolment rates will depend on the income and substitution effects.³

Studies by Card and Riddell (1992, 1996) conclude that an increase in the generosity of unemployment insurance has a positive effect on the participation rate. Moreover, this effect is greater among weakly attached workers (i.e. the 15-24 age group) than among workers who are strongly attached to the labour market (i.e. the 25-54 age group). This conclusion is also consistent with that of Ferrall (1994). The more generous the UI program, the more likely young people are to enter the labour force. Accordingly, the unemployment insurance program could be expected to have a negative impact on the decision of whether or not to attend school full time.

We expect social assistance might have a negative effect on participation rates and an uncertain effect on school enrolment rates. Unlike the unemployment insurance program, which requires that claimants work a minimum number of weeks to qualify for benefits, social assistance programs

Chart 10 Percentage of Young People Neither in School nor Employed, 15-24-Year-Olds

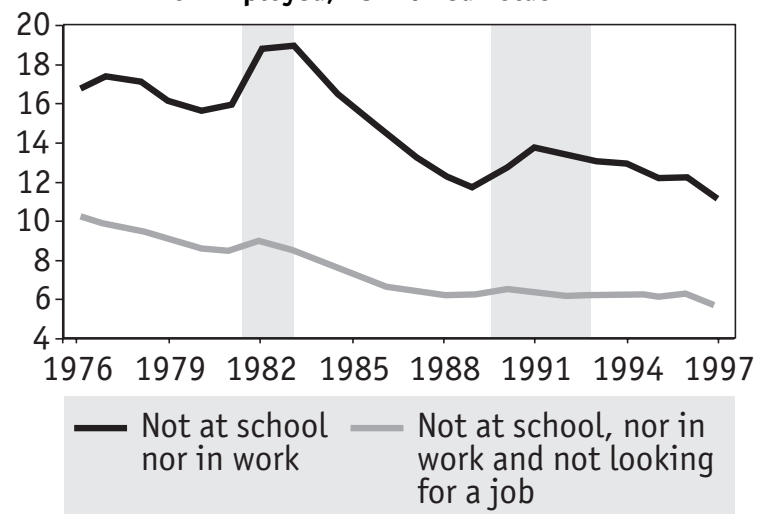
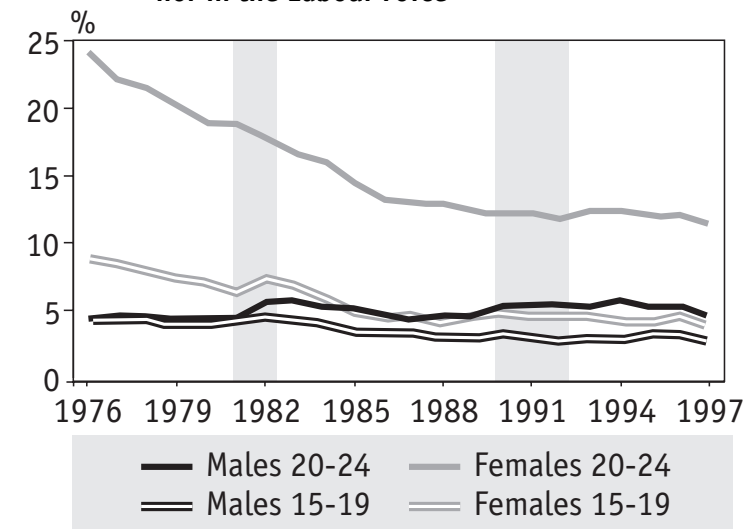
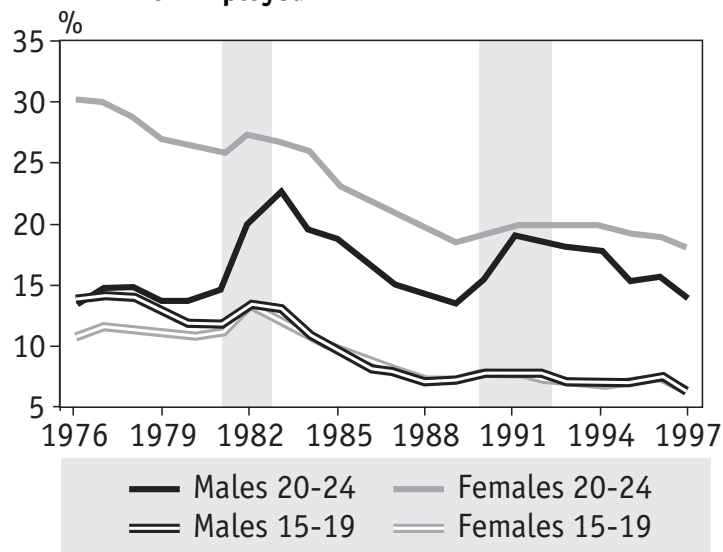


Chart 11 Percentage of Young People Neither in School nor in the Labour Force



require no previous work experience in order to qualify. Moreover, for every \$1 a beneficiary earns in the labour market, \$1 is generally deducted from social assistance benefits.⁴ Thus, for a social assistance beneficiary to give up his or her benefits and enter the labour force, the income from work must at least equal the benefit plus a premium reflecting the fixed costs associated with having a job. The effect of social assistance on school enrolment rates is uncertain because the rules differ from one province to another (National Council on Welfare, 1997-98). For example, full-time students in post-secondary educational institutions are eligible for social assistance in

Chart 12 Percentage of Young People Neither in School nor Employed



some provinces only if they meet specific criteria. On the other hand, in other provinces, a student cannot apply for social assistance before leaving school.

We have also investigated the possibility of using the rate of return to education as an additional variable to characterize the decision of whether or not to be a full-time student. Unfortunately, data for this variable are of poor quality and available only from the mid-1980s, which has the effect of reducing the estimation period. We therefore rejected this variable.

Econometric Approach

The participation and enrolment rate equations are estimated using a SUR estimation procedure, on five regional equations⁵ (Atlantic, Quebec, Ontario, Prairies and British Columbia). This method provides 95 observations.⁶ Since our objective is to explain the drop in participation rates nationally, we impose an equality constraint on the regional coefficients.⁷ In other words, we force the determinants to have the same impact on participation and school enrolment rates in each region.

The model is estimated in first difference in order to take into account the presence of unit roots in most of the series used. Our results are interpreted as percentage point change on the endogenous variables. In addition, we use a quadratic form in treating the relative minimum wage variable so as to take into account the fact the higher

the minimum wage, the larger the number of individuals will be covered by it.

Results of the Analysis

Estimation Results

By and large, regression results are satisfactory (See Table A1 -A5 in the appendix for the regression for the 15-24 age group. See Archambault and Grignon, 1999, for regression results for 5-year age groups). They show the importance of economic conditions and the modest effect of public policy programs on the decisions to participate in the labour market and go to school.

The cyclical variable is significant and positive in all the estimated participation rate equations, indicating the prevalence of the discouraged worker phenomenon. The strongest effects were observed in the equations for students, particularly in the 15-19 age group. The effect of the cycle on school enrolment rates is negative, as we expected, and of less magnitude than the effect on participation rates. One percentage point increase in the employment rate of the 25-54 age group has an effect of between 0.7 and 0.9 of a percentage point on the overall 15-24 participation rate, 1.2 to 1.5 of a percentage point on the student participation rate, 0.3 of a percentage point on the non-student participation rate and -0.5 to -0.8 of a percentage point on the school enrolment rate.

The unemployment insurance variable is significant and of the anticipated sign in four of the 20 estimated equations. In each of the school enrolment equations, this variable has a positive sign, contrary to what one might expect. The unemployment insurance variable was excluded in the estimation of school enrolment rates.⁸ The social assistance variable is significantly different from zero and of the anticipated sign in 75 per cent of the estimated equations. The average real wage is also significant in 75 per cent of the estimated equations.⁹ The relative minimum wage has significant effects in 30 per cent of the estimated equations.

Regression diagnostics are satisfactory in most of the 20 estimated equations, with no serious problems. Most of the Durbin Watson statistics are close to 2 while the value of others is between the lower and upper limits of the Durbin table, i.e. in the grey area where the presence of autocorrelation in the error term can be neither accepted

nor rejected. However, certain equations seem to have suffered from multicollinearity. In certain estimates, withdrawing a variable has a major impact on the estimation of the other parameters. A longer estimation period would no doubt help rectify this problem.¹⁰

Simulation Results

Dynamic simulations of each component of the 20 estimated equations for 1990-96 were performed to assess the cumulative impact of each of the explanatory variables on changes in the participation and school enrolment rates.¹¹ The results of the aggregated and disaggregated approaches for the 15-24 age group are presented in Table 1.¹² The simulation results for the four age groups are found in Table A5 and A6 of the appendix.

The simulations do a fairly good job reproducing the observed declines in the student participation rate, with simulated drops of 5.0 and 4.5 percentage points for the aggregated and disaggregated approaches respectively, compared with an observed drop of 6.5 percentage points. Our simulations reproduce 77 per cent (aggregated) and 70 per cent (disaggregated) of the drop in the student participation rate between 1990 and 1996 and 61 per cent and 121 per cent of the decrease in the non-student rate. On the other hand, the simulation of school enrolment rates reproduce respectively 134 per cent and 100 per cent of the observed increase. The preceding results could explain 94 per cent and 85 per cent, respectively, of the observed changes in the participation rate calculated for 15- to 24-year-olds using the aggregated or disaggregated approach, compared with 96 per cent and 86 per cent of the estimated participation rate for this age group in 1990-96. Thus, it seems that the aggregated approach is better at reproducing the decline in the youth participation rate than the disaggregated approach. However, the disaggregated approach enable us to identify behavioural differences among the four demographic groups.

The cyclical variable explains between 48 and 33 per cent of the drop of the overall participation rate in the 15-24 age group between 1990 and 1996. The cycle explains between 67 per cent and 54 per cent of the decline in the student participation rate, between 35 per cent and 39 per cent of the decline in the non-student participation rate and between 19 per cent and 33 per cent of the

increase in the school enrolment rate. The cycle appears to make a greater contribution to the decrease in the participation rate in the 15-19 age group than in the 20-24 age group (Table A-6 in the appendix). Among women aged 15-19, slightly more than 49 per cent of the decrease appears to be due to cyclical fluctuations, as opposed to only 19 per cent in the 20-24 age group. Among men aged 15-19, the economic cycle's contribution to the decrease in the aggregate participation rate is 41 per cent, as opposed to 40 per cent among men aged 20-24.

Among the structural variables, increases in the relative minimum wage explain between 9 and 3 per cent of the decline in the participation rate for the 15-24 age group. The effect of the minimum wage is greater among students than among non-students, contributing 12 per cent and 1 per cent according to the disaggregated approach. However, according to the aggregated approach, the effect of the relative minimum wage is nil for both groups although there is an important effect on the school enrolment rate. Using both approaches, the changes made to unemployment insurance during the 1990s have a modest effect on the participation rate among 15-24 year-olds. These changes explain only 2-3 per cent of the decline in the participation rate in the 15-24 age group during the 1990s, or about 0.2 percentage point. The contribution of social assistance and average real wages to the youth participation rate is negligible, regardless of the approach used.

Conclusion

To our knowledge, this study is the first to model jointly the decisions on whether to attend school or to participate in the labour force. Unlike other studies, it treats the decision to attend school as a phenomenon to be explained rather than a determinant of participation rates. Although hampered by data limitations, our approach enables us to distinguish significant and distinct cyclical effects on participation rates and the school enrolment rate. It therefore enables us to better measure cyclical and structural effects on participation and school enrolment among young Canadians.

This study performs a multivariate analysis by applying a SUR econometric estimation procedure to the data on participation and school enrolment rates among men and women aged 15-19

Table 1 Results of simulations for the 15-24 age group (1990-96)

	Cycle	EI	SA	W	RMW	Trend	Total	Residual	Observed
Contribution in percentage points									
Aggregated approach, both sexes, 15-24 age group									
Students	-4.36	-0.33	-0.41	0.20	0.00	-0.06	-4.98	-1.49	-6.47
Non-students	-0.83	0.00	-0.05	-0.22	0.00	-0.32	-1.43	-0.91	-2.33
School enrolment	2.39	0.00	-0.11	-0.14	0.69	6.62	9.45	-2.18	7.28
Calculated ¹	-3.74	-0.17	-0.19	0.05	-0.29	-2.95	-7.28	-0.44	-7.72
Estimated ²	-2.76	0.00	0.00	0.00	-0.70	-3.94	-7.09	-0.63	-7.72
Disaggregated approach, weighted sum of the four demographic groups									
Students	-3.47	-0.29	0.08	-0.06	-0.80	0.03	-4.51	-1.96	-6.47
Non-students	-0.90	0.00	0.08	0.03	-0.03	-1.99	-2.81	0.48	-2.33
School enrolment	1.41	0.00	0.03	-0.09	-0.03	6.00	7.32	-0.04	7.28
Calculated ¹	-2.82	-0.21	0.07	0.00	-0.25	-3.35	-6.56	-1.16	-7.72
Estimated ²	-2.54	0.00	0.06	-0.12	-0.39	-3.66	-6.64	-1.18	-7.72
Contribution in percentage points									
Aggregated approach, both genders, 15-24 age group									
Students	67	5	6	-3	0	1	77	23	100
Non-students	35	0	2	10	0	14	61	39	100
School enrolment	33	0	-1	2	9	91	134	-34	100
Calculated	48	2	2	-1	4	38	94	7	100
Estimated	36	0	0	0	9	51	96	4	100
Disaggregated approach									
Students	54	4	-1	1	12	0	70	30	100
Non-students	39	0	-3	-1	1	85	121	-21	100
School enrolment	19	0	0	-1	0	82	101	-1	100
Calculated	37	3	-1	0	3	43	85	15	100
Estimated	33	0	-1	2	5	47	86	14	100

1 Calculated = SER*SPR+(1-SER)*NSPR,

2 Estimated: participation rate estimated directly, without decomposition

and 20-24 in the five major Canadian regions but no regional results, between 1976 and 1996. First difference estimates are used to avoid the spurious correlation problem with non-stationary variables.

The study considers several economic policy variables among the possible influences on the evolution of participation rates: minimum wage as a proportion of the industrial hourly wage rate, an index of the disincentive effects of the employment/unemployment insurance, and the real average level of social assistance benefits paid to a couple with two children.

Our results indicate the business cycle has some significant effects on the youth labour force participation rate:

- The business cycle accounts for 33 to 50 per cent of the total decline in the youth participation rate from 1989 to 1996, or 2.8-3.7 percentage points of the 7.7 percentage point decline.
- The participation rates of students and young people aged 15-19 are more affected by the business cycle than those of other young people. Our estimates suggest the cyclical sensitivity of participation rates of 15- to 19-year-olds is slightly greater than that of young people aged 20-24 and that the participation rate of students is between four to five times more sensitive than that of non-students.
- The participation rates among 15- to 19-year-old women are as sensitive to the business cycle as are those of their male counterparts, while among women aged 20-24, sensitivity to the business cycle is a little more than 60 per cent that of men.
- School enrolment is also cyclical, as a certain number of youth go back to school because they have difficulty finding work. Our estimates suggest that, for every 100 young people who leave the labour force as a result of the cyclical job situation, 50-65 go back to school.

This last observation is good news, since the overall decline in the youth participation rate is accompanied by a decrease in the percentage of young people who are neither attending school nor in employment or looking for a job. The proportion of young people who do not attend school full-time or work went from 16.8 per cent in 1976 to 11.1 per cent in 1997. The proportion of youth who were neither in the labour force nor students

rose from 10.3 per cent to 5.7 per cent over the same period. Our results indicate that the decrease in the youth participation rate and the concomitant increase in the school enrolment rate in the 1990s are mainly structural in nature, even though the business cycle played an important role, especially in accounting for the declining youth participation rate.

Our results also indicate that income support and UI have a modest effect on young people's decision to remain in the labour force or to attend school. Changes made to the UI program during the 1990s only account for 3 per cent of the decrease in the youth participation rate over this period, or 0.2 of the 7.7 percentage point decline; these changes have no measurable effect on school enrolment. Changes in the UI program affect the participation rate of mainly young people in school. This rate is much more sensitive to economic and program influences than is the rate of young people who are not in school. It seems that, overall, changes to social assistance have had only a negligible effect on youth participation rates and school enrolment.

Increases in the minimum wage relative to the average industrial hourly wage in several provinces seem to have aggravated the employment situation among young people, the net effect of which has been their withdrawal from the labour force. Increases in the minimum wage account for between 0.3 and 0.7 percentage point, or 3 to 9 per cent of the decrease in the youth participation rate in the 1990s.

Our results indicate the youth participation rate will likely not return to its 1989 level in the near future, given that 50 per cent-60 per cent of the decline seen in the 1990s is structural. By applying the estimated percentage of the total effect attributable to the business cycle to the 8.3 percentage point decrease observed between 1990 and 1997, we can expect, other things being equal, an increase of between 3.2 and 4.1 percentage points in the youth participation rate by the time the economic recovery is complete, assuming that the intensity of economic activity attains a level comparable to that of 1989.

Though our results help explain the importance of some structural and cyclical influences on the evolution of the youth participation rate in the 1990s, they cannot claim to completely account for the decline in youth participation rates.

About 40 per cent of the decline is explained by the deterministic tendency of the model. The nature of the structural forces that have caused the decline in the youth participation rate of the 1990s is still not fully understood. Still less is known about the nature of structural influences on the decision to whether or not attend school.

Much work remains to be done. Longer data series would undoubtedly enable us to obtain stronger, more precise estimates of participation rates and school enrolment. The model does not completely explain the school enrolment rate. The addition of the rate of return to education as a variable might improve the results.

The approach could be expanded to take into account new data released by Statistics Canada in March 1998. These new data make it possible to distinguish part-time students from non-students. They also provide information on the participation of individuals aged 25-29 according to whether or not they are students.

Richard Archambault is an economist and Louis Grignon is Director, Employment Growth and Unemployment Studies, in the Applied Research Branch at Human Resources Development Canada. (louis.grignon@spg.org)

Notes

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Any errors or omissions are the responsibility of the authors. The analysis and opinions expressed in this paper are the authors' and do not necessarily reflect the opinions of Human Resources Development Canada or the federal government.

1. The data on participation and school enrolment rates are calculated on the basis of an annual average of eight months (January-April and September-December). The reason for this method of calculation is that there are two separate surveys on students at Statistics Canada. The first covers the aforementioned eight months while the second covers summer students who expect to return to school in September. We exclude the latter group from the annual average because the two surveys differ greatly methodologically.
2. We use the deviations in the employment rate for 25- to 54-year-olds since this group is less sensitive to

structural changes than the other age groups. Thus, the historical movements in the series of employment rates for 25- to 54-year-olds are predominantly cyclical in nature. We also considered the unemployment rate and the growth rate of gross domestic product as cyclical variables. Unfortunately, the former is determined simultaneously with the unemployment insurance disincentive index and the latter is affected by changes of a structural nature.

3. On this subject, see the Fortin and Fortin (1999) study published in this issue.
4. Some provincial programs allow beneficiaries to earn income under specific rules without being penalized 100 per cent. For example, Quebec's Apport program lets beneficiaries keep some of their employment earnings. The purpose is to encourage beneficiaries to re-enter the labor market.
5. Provincial data are also available. However, in the four Atlantic provinces and two of the Prairie provinces (Manitoba and Saskatchewan), the size of the samples is small and the series exhibit much statistical noise and volatility. To avoid these problems, we preferred to aggregate the series of participation and school enrolment rates of the Atlantic and Prairie provinces.
6. The data on student and non-student participation rates and the school enrolment rate are only available from 1976 to 1997. Moreover, the social assistance and unemployment insurance series ended in 1996 at the time when we were performing our calculations. Equation 6 is a first-difference equation and incorporates a lagged variable. Our reference period is therefore 1978 to 1996, giving us 19 observations per equation for a total of 95 observations.
7. To be "econometrically correct," we should have tested these constraints before imposing them. To do so, we would have had to estimate a model with a free coefficient, which takes us back to square 1, i.e. 95 observations with 70 parameters to be estimated, or five degrees of freedom per equation. With so many parameters to be estimated for so few observations, the power of the tests on the constraints would have been weakened seriously. Moreover, during the preliminary estimates, in which we left the coefficients unconstrained, we observed serious problems with the residuals of some equations. In particular, we obtained series of residuals with a negative slope or strong correlation. We therefore decided to estimate a constrained model.
8. This was done because in the school enrolment rate equations, this variable captures part of the cyclical effect. The general form of the SER series is a positive trend with cyclical movements, while that of the unemployment insurance indicators is a negative trend with cyclical movements. When we include it, the coefficient associated with the unemployment rate among the 25-44 age group, our cyclical variable is marginally significant. Once excluded, the coefficients of our cyclical variable are significantly different from zero.

9. This variable is excluded from the 15- to 19-year-olds equations, since individuals have to be at least 18 years old to qualify for social assistance.
10. The short period available for estimating the model also prevents us from running structural stability tests and which undoubtedly weakens the strength of most of the conventional statistical tests. The only solution that exists in the case of multicollinearity is to add observations; thus, several more years would be required, something we do not have available at this time.
11. The level of the cyclical variable, the employment rate's deviations from the trend, was adjusted using the national output gap series estimated by Finance Canada. To do so, we estimated an equation in which the national employment rate's deviations from the trend are explained by a constant and the contemporaneous output gap, and lagged by one period. We then adjusted the level of deviations in the employment rate by subtracting from it the estimated constant, which was 0.12.
12. To calculate the effect on 15- to 24-year-olds, we weighted the results of simulations of the four demographic groups by using their corresponding weight of the population (student, non-student, total for the school enrolment rate and the overall rate) of each of these groups in relation to the corresponding population of 15- to 24-year-olds.
13. Except in the equations for the 15-19 age group, where the social assistance variable is excluded.

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Appendix 1

Theoretical Model

To determine what factors are responsible for the decline in participation rates among young people aged 15-24, we will use the following identities:

$$(1) \quad PR_j = \sum_{i=1}^4 \alpha_{ij} PR_{ij}$$

$$(2) \quad PR_{ij} = SPR_{ij} * SER_{ij} + NSPR_{ij} * (1 - SER_{ij})$$

and the following behavioural equations:

$$(3) \quad SPR_{ij} = \beta_{10} + \beta_{12} (E_{ij} - \bar{E}_{ij}) + \beta_{13} ui_{ijt} + \beta_{14} sa_{ijt} + \beta_{15} w_{ijt} + \beta_{16} rmw_{ijt} + \epsilon_{ijt}$$

$$(4) \quad NSPR_{ij} = \beta_{20} + \beta_{22} (E_{ij} - \bar{E}_{ij}) + \beta_{23} ui_{ijt} + \beta_{24} sa_{ijt} + \beta_{25} w_{ijt} + \beta_{26} rmw_{ijt} + \epsilon_{ijt}$$

$$(5) \quad SER_{ij} = \beta_{30} + \beta_{32} (E_{ij} - \bar{E}_{ij}) + \beta_{33} ui_{ijt} + \beta_{34} sa_{ijt} + \beta_{35} w_{ijt} + \beta_{36} rmw_{ijt} + \epsilon_{ijt}$$

PR: participation rate

SPR: student participation rate

NSPR: non-student participation rate

SER: school enrolment rate

: deviations in the employment rate for 25- to 54-year-olds from the trend as estimated by an HP filter

ui: unemployment insurance program dissuasion index.

sa: real social assistance benefits received by a couple with two children. The other choice we had for this variable was social assistance benefits received by a single mother, but this choice was more restrictive than the first.

w: average real wages for all workers.

rmw: relative minimum wage, where w_m is the minimum wage and w_h is the average industrial hourly wage.

i: an index corresponding to the four demographic groups, namely men and women aged 15-19 and 20-24 and the aggregate 15-24 age group.

j: an index corresponding to the five Canadian regions.

t: an index to mark time.

The 20 equations we will estimate will have the following form:¹³

$$(6) \quad \Delta PR_{ij} = \beta_0 + \beta_1 \Delta T_{ij}(t-1) + \sum_{k=0}^1 \beta_{2k} \Delta (E_{ij} - \bar{E}_{ij})_{t-k} \\ + \sum_{k=0}^1 \beta_{3k} \Delta (u_{ij})_{t-k} + \sum_{k=0}^1 \beta_{4k} \Delta \log(sa_{ij})_{t-k} + \\ \sum_{k=0}^1 \beta_{5k} \Delta \log(w_{ij})_{t-k} + \sum_{k=0}^1 (\beta_{6k} \Delta (wm_{ij}/wh_{ij})_{t-k} \\ + \beta_{7k} \Delta (wm_{ij}/wh_{ij})_{t-k}^2) + \varepsilon_t$$

where

Δ : first difference

$\Delta \log$: rate of growth of (x)

k: an index to mark the lag structure.

The data

PR, SPR, NSPR, SER: The data on youth, student and non-student participation rates and school enrolment rates were taken from Statistics Canada's Labour Force Survey. These series are based on eight-month annual average. The survey covers the participation of full-time and part-time students and non-students during the months of January to April and September to December. The data for the summer months are not compatible with those for the other months because only respondents who intend to return to school in September are treated as students.

E: employment rate for 25-54 year-olds, Statistics Canada's Labour Force Survey

(E): trend in employment rate in the 25-54 age group as estimated by an HP filter

ui: employment insurance program dissuasion index calculated by Tim Sargent of Department of Finance Canada. This variable was made instrumental by estimating it on a constant, lagged by itself and the unemployment insurance index with a constant contemporaneous unemployment rate and lagged by one period.

sa: real social assistance benefits received by a couple with two children. These series were produced by Pierre Lefebvre at the Université du Québec à Montréal for each province.

W: average wages per employee divided by the CPI. Conference Board of Canada.

RMW: WM/WH

WM: Bureau of Labour Information, Human Resources Development Canada

WH: hourly industrial wages, Statistics Canada. There are two series of hourly industrial wages. The first begins in 1961 and ends in March 1983 (D708311), and the current series begins in January 1983 (L59959).

Table A1 Student participation rate equation, both sexes, 15-24 age group

	β	St. dev.	T	β	St. dev.	T
C	0.895	0.384	2.332	1.374	0.316	4.348
T²	-0.032	0.031	1.015	-0.079	0.025	3.131
Endo -1	0.124	0.096	1.296	-	-	-
Gape	1.210	0.133	9.096	1.157	0.138	8.398
Gape -1	0.289	0.193	1.500	0.395	0.123	3.216
UI	0.020	0.012	1.749	0.023	0.010	2.278
UI -1	0.013	0.010	1.354	-	-	-
W	-0.063	0.059	1.065	-	-	-
W-1	-0.070	0.058	1.197	-0.094	0.059	1.587
SA	0.088	0.031	2.860	0.069	0.030	2.304
SA-1	-0.056	0.035	1.604	-0.071	0.033	2.160
RMW	-0.125	0.590	0.212	-	-	-
RMW2	-0.003	0.007	0.422	-	-	-
RMW -1	-0.499	0.588	0.849	-	-	-
RMW2 -1	0.006	0.007	0.986	-	-	-
R²		0.496			0.492	
Adjus. R²		0.409			0.452	
Standard dev. from regression		1.467			1.413	
Durbin Watson		2.374			2.169	

Table A2 Non-Student participation rate equation, both sexes, 15-24 age group

	β	St. dev.	T	β	St. dev.	T
C	0.813	0.296	2.747	0.565	0.222	2.535
T²	-0.073	0.024	3.100	-0.035	0.017	2.039
Endo -1	-0.033	0.099	0.336	-	-	-
Gape	0.326	0.094	3.468	0.305	0.082	3.721
Gape -1	-0.240	0.107	2.239	-	-	-
UI	-0.011	0.008	1.380	-	-	-
UI -1	-0.018	0.007	2.398	-	-	-
SA	-0.022	0.020	1.084	-	-	-
SA-1	-0.019	0.022	0.876	-0.032	0.018	1.773

	β	St. dev.	T	β	St. dev.	T
W	0.053	0.041	1.280	-	-	-
W -1	0.077	0.040	1.943	0.107	0.037	2.876
RMW	-0.416	0.378	1.099	-	-	-
RMW2	0.005	0.004	1.212	-	-	-
RMW -1	-0.501	0.373	-1.344	-	-	-
RMW2 -1	0.005	0.004	1.191	-	-	-
R ²		0.388			0.249	
Adjus. R ²		0.280			0.217	
Standard dev. from regression		0.817			0.874	
Durbin Watson		2.004			2.046	

Table A3 School enrolment rate equation, both sexes, 15-24 age group

	β	St. dev.	T	β	St. dev.	T
C	0.358	0.225	1.591	0.149	0.277	0.538
T ²	0.030	0.019	1.619	0.038	0.024	1.594
Endo -1	0.284	0.093	3.040	0.323	0.087	3.721
Gape	0.089	0.074	1.194	-0.168	0.073	2.293
Gape -1	-0.152	0.083	1.838	-0.353	0.074	4.800
UI	0.034	0.007	4.959	-	-	-
UI -1	-0.001	0.007	0.084	-	-	-
W	0.022	0.012	1.767	-	-	-
W -1	0.017	0.015	1.171	0.066	0.033	2.006
SA	-0.024	0.033	0.715	0.025	0.014	1.832
SA-1	0.055	0.033	1.699	-	-	-
RMW	-0.411	0.379	1.086	-0.670	0.319	2.105
RMW2	0.007	0.004	1.577	0.009	0.004	2.428
RMW -1	1.039	0.360	2.888	0.607	0.308	1.971
RMW2 -1	-0.012	0.004	2.863	-0.007	0.004	1.927
R ²		0.327			0.268	
Adjus. R ²		0.209			0.181	
Standard dev. from regression		0.944			0.961	
Durbin Watson		2.174			2.026	

Table A4 Participation rate equation, both sexes, 15-24 age group

	β	St. dev.	T	β	St. dev.	T
C	0.777	0.264	2.940	0.730	0.196	3.722
T²	-0.095	0.022	4.236	-0.092	0.016	5.674
Endo -1	-0.025	0.092	0.275	-0.260	0.091	2.866
Gape	0.578	0.067	8.661	0.686	0.056	12.320
Gape -1	0.109	0.091	1.196	0.424	0.092	4.601
UI	-0.018	0.006	2.858	-	-	-
UI -1	-0.020	0.005	3.755	-0.018	0.006	3.107
W	-0.004	0.014	0.301	-	-	-
W -1	-0.007	0.018	0.406	-	-	-
SA	0.055	0.038	1.475	-	-	-
SA-1	0.005	0.035	0.135	-	-	-
RMW	-0.158	0.459	0.345	-	-	-
RMW2	-0.001	0.005	0.206	-	-	-
RMW -1	-2.280	0.414	5.508	-1.147	0.387	2.962
RMW2 -1	0.026	0.005	5.345	0.010	0.004	2.325
R²		0.541			0.576	
Adjust. R²		0.461			0.543	
Standard dev. from regression		1.036			0.938	
Durbin Watson		2.221			2.044	

Table A5 Results of simulations, by age group, percentage point contributions

	Cycle	UI	SA	W	RMW	Trend	Total	Res.	Observed
Men 15-19									
Students	-3.81	0.00	0.00	-0.24	-1.16	-0.77	-5.97	-4.11	-10.08
Non-Students	-2.29	0.00	0.00	0.27	-0.27	-3.63	-5.92	1.42	-4.51
School enrol.	2.25	0.00	0.00	-0.38	-0.13	2.60	4.34	-0.34	4.00
Calculated ¹	-4.37	0.00	0.00	0.04	-0.89	-2.42	-7.65	-2.92	-10.57
Estimated ²	-3.85	0.00	0.00	-0.35	-1.56	-1.80	-7.55	-3.34	-10.90
Women 15-19									
Students	-4.38	-0.50	0.00	0.00	0.00	-2.37	-7.25	-1.44	-8.69
Non-Students	-2.42	0.00	0.00	0.00	0.00	-4.77	-7.19	3.00	-4.20

	Cycle	UI	SA	W	RMW	Trend	Total	Res.	Observed
School enrol.	1.27	0.00	0.00	-0.25	0.00	3.92	4.95	-1.67	3.28
Calculated	-4.36	-0.39	0.00	0.07	0.00	-3.98	-8.66	-0.18	-8.84
Estimated	-4.23	0.00	0.00	0.00	0.00	-4.74	-8.97	-0.51	-9.48
Men 20-24									
Students	-1.01	0.00	0.60	-0.38	-0.41	3.02	1.81	-0.56	1.25
Non-Students	-0.80	0.00	-0.03	0.00	0.00	-0.79	-1.63	0.53	-1.10
School enrol.	1.51	0.00	-0.21	0.23	0.00	7.83	9.36	-2.10	7.27
Calculated	-1.66	0.00	0.23	-0.22	-0.10	-3.71	-5.45	1.25	-4.20
Estimated	-1.80	0.00	0.22	0.00	0.00	-4.48	-6.06	2.00	-4.06
Women 20-24									
Students	-2.66	-2.10	0.00	0.46	0.00	5.51	1.22	-0.36	0.85
Non-Students	-0.23	0.00	0.23	0.00	0.00	-2.06	-2.06	-0.49	-2.55
School enrol.	0.64	0.00	0.32	0.00	0.00	9.37	10.33	0.04	10.37
Calculated	-1.06	-0.48	0.05	0.11	0.00	-3.31	-4.69	-0.82	-5.51
Estimated	-0.43	0.00	0.00	-0.13	0.00	-3.62	-4.17	-0.54	-4.71

1 Calculated = $ser * spr + (1 - ser) * nspr$

2 Estimated: participation rate estimated directly without decomposition

Table A6 Results of simulations, percent contributions

	Cycle	UI	SA	W	RMW	Trend	Total	Res.	Observed
Men 15-19									
Students	0.38	0.00	0.00	0.02	0.11	0.08	0.59	0.41	1
Non-Students	0.51	0.00	0.00	-0.06	0.06	0.81	1.31	-0.31	1
School enrol.	0.56	0.00	0.00	-0.09	-0.03	0.65	1.09	-0.09	1
Calculated	0.41	0.00	0.00	0.00	0.08	0.23	0.72	0.28	1
Estimated	0.35	0.00	0.00	0.03	0.14	0.17	0.69	0.31	1
Women 15-19									
Students	0.50	0.06	0.00	0.00	0.00	0.27	0.83	0.17	1
Non-Students	0.58	0.00	0.00	0.00	0.00	1.14	1.71	-0.71	1
School enrol.	0.39	0.00	0.00	-0.08	0.00	1.20	1.51	-0.51	1
Calculated	0.49	0.04	0.00	-0.01	0.00	0.45	0.98	0.02	1
Estimated	0.45	0.00	0.00	0.00	0.00	0.50	0.95	0.05	1

	Cycle	UI	SA	W	RMW	Trend	Total	Res.	Observed
Men 20-24									
Students	-0.81	0.00	0.48	-0.31	-0.33	2.42	1.45	-0.45	1
Non-Students	0.73	0.00	0.03	0.00	0.00	0.72	1.48	-0.48	1
School enrol.	0.21	0.00	-0.03	0.03	0.00	1.08	1.29	-0.29	1
Calculated	0.40	0.00	-0.06	0.05	0.02	0.88	1.30	-0.30	1
Estimated	0.44	0.00	-0.05	0.00	0.00	1.10	1.49	-0.49	1
Women 20-24									
Students	-3.12	-2.46	0.00	0.54	0.00	6.46	1.42	-0.42	1
Non-Students	0.09	0.00	-0.09	0.00	0.00	0.81	0.81	0.19	1
School enrol.	0.06	0.00	0.03	0.00	0.00	0.90	1.00	0.00	1
Calculated	0.19	0.09	-0.01	-0.02	0.00	0.60	0.85	0.15	1
Estimated	0.09	0.00	0.00	0.03	0.00	0.77	0.88	0.12	1

Table A7 Changes observed in participation, school enrolment, inactivity and non-employment rates between 1976 and 1997

	Men		Women		Total	Men		Women		Total
	15-19	20-24	15-19	20-24	15-24	15-19	20-24	15-19	20-24	15-24
	Participation rate					School enrolment rate				
$\Delta 1976-89$	7.7	-1.0	8.5	8.3	7.0	8.7	5.1	13.3	9.3	6.9
$\Delta 1989-97$	-12.4	-5.7	-10.3	-6.7	-9.4	5.7	10.0	6.1	14.4	10.5
Total	-4.7	-6.7	-1.8	1.6	-2.4	14.4	15.1	19.4	23.7	17.4
	Student participation rate					Non-student participation rate				
$\Delta 1976-89$	16.7	13.8	18.2	14.4	16.5	0.8	-0.9	2.9	11.8	5.3
$\Delta 1989-97$	-11.4	1.4	-8.9	2.1	-6.7	-4.4	-1.1	-5.4	-2.5	-2.3
Total	5.3	15.2	9.3	16.5	9.8	-3.6	-2.0	-2.5	9.3	3.0
	Percentage of youths neither in school nor in labour force					Percentage of youths neither at school nor in employment				
$\Delta 1976-89$	-1.4	0.3	-4.2	-11.8	-4.0	-3.4	0.2	-6.5	-11.8	-5.0
$\Delta 1989-97$	-0.2	-0.1	-0.7	-1.0	-0.6	-0.9	0.4	-1.0	-0.5	-0.7
Total	-1.6	0.2	-4.9	-12.8	-4.6	-4.3	0.6	-7.5	-12.3	-5.7