Relations industrielles
Industrial Relations

Hidden Unemployement by Age and Sex in Canada : 1957-1970
Le chômage déguisé par âge et sexe au Canada : 1957-1970

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Volume 30, Number 2, 1975

URI: https://id.erudit.org/iderudit/028605ar
DOI: https://doi.org/10.7202/028605ar

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Publisher(s)

Département des relations industrielles de l'Université Laval

ISSN

0034-379X (print)
1703-8138 (digital)

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Cite this article

Ruggeri, G. (1975). Hidden Unemployement by Age and Sex in Canada : 1957-1970. *Relations industrielles / Industrial Relations*, *30*(2), 181–199. https://doi.org/10.7202/028605ar

Article abstract

This study presents yearly estimates of hidden unemployment and job requirements for full employment in Canada by age and sex for the period 1957 to 1970. The method employed in deriving these estimates involved the calculation of the potential labour force, total and by specific age-sex groups, and the formulation of a relationship relating group employment to total employment.

Hidden Unemployment by Age and Sex in Canada 1957-1970

Giuseppe C. Ruggeri

This study presents yearly estimates of hidden unemployment and job requirements for full employment in Canada by age and sex for the period 1957 to 1970. The method employed in deriving these estimates involved the calculation of the potential labour force, total and by specific age-sex groups, and the formulation of a relationship relating group employment to total employment.

Although the unemployment rate is probably the most closely watched and most frequently debated of the economic statistics it is an inaccurate indicator of the potential labor input unutilized. The reported unemployment rate is affected by changes in the demand for labor induced by fluctuations in economic activity and by variations in the supply of labor that may arise exogenously or may be induced by cyclical fluctuations in employment opportunities. For example, to the extent that worsening economic conditions produce a net withdrawal of workers from the labor force, the unemployment rate will tend to underestimate the degree of unutilized labor at less than full employment.

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More reliable estimates of the potential unutilized labor, which may be called « the unemployeement

* The author is thankful for the research assistance of Soo-Yee Wong and the valuable comments of his colleague T.D. Harris. Financial assistance from the Chancellor's Fund at Lakehead University is gratefully acknowledged.

gap »[1] can be derived by replacing the actual labor force (which is dependent on the level of economic activity) with the potential labor force (the number of workers that are willing to offer their services for remuneration when the economy is operating at full employment[2]) and by adding to measured unemployment the amount of hidden unemployment, defined as the difference between the potential and the actual labor force. It is the purpose of this paper to provide estimates of this hidden unemployment in Canada by age and sex during the period 1957-1970, and to calculate the unemployment gaps and the job requirements for full employment by age and sex during the sample period.

METHOD AND DATA

The first step in the analysis involves the calculation of the potential labor force, total and by specific groups. The potential labor force is usually estimated by adjusting the actual labor force for cyclical variations in employment opportunities.[3]

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[1] The « unemployment gap » is the ratio of actual plus hidden unemployment to the potential labor force. Kenneth STRAND and Thomas DERNBURG have called this ratio the « gap unemployment rate », « Cyclical Variation in Civilian Labor Force Participation, » *Review of Economics and Statistics,* Vol. 46, No. 4, Nov. 1964, p. 386. It would be preferable to use man-hours instead of men in calculating the unemployment gap. However, doing this, in addition to requiring the determination of « normal » hours worked at full employment, would prevent a direct comparison between the unemployment gap (estimated from man-hours) and the unemployment rate (estimated from number of workers). Even the calculation of the unemployment rate from man-hours would not solve the problem because, at less than normal hours, recorded hours worked are likely to differ in the short-run from actual productive hours : See R.J. BALL and E.B.A. ST. CYR, « Short-term Employment Functions in British Manufacturing Industry », *Review of Economic Studies,* Vol. 33, No. 3, July 1966, pp. 179-207.

[2] The definition of full employment is partly arbitrary. In this study full employment is associated with the three percent unemployment norm suggested by the Economic Council of Canada *Economic Goals for Canada to 1970* : *First Annual Review,* Ottawa, Queen's Printer, 1965, pp. 37-38.

[3] See, for example, A.J. TELLA, « The Relation of Labor Force to Employment, » *Industrial and Labor Relations Review,* Vol. 17, No. 3, April 1964, pp. 445-469 ; and « Labor Force Sensitivity to Employment by Age and Sex, » *Industrial Relations,* Vol. 4, No. 2, February 1965, pp. 69-83 ; J. MINCER, « Labor Force Participation and Unemployment, » in *Aspects of Labor Economics,* Princeton, Princeton University Press, 1962, pp. 63-105 ; and « Labor Force Participation and Unemployment : A Review of Recent Evidence, » in R.A. GORDON and M.S. GORDON, eds., *Prosperity and Unemployment,* New York, John Wiley and Sons, 1966, pp. 75-106 ; K. STRAND and T. DERNBURG, « Cyclical Variation in

Two alternative hypotheses explaining the reaction of workers to changing employment conditions have been advanced with equal theoretical plausibility : the « discouraged-worker » and the « added-worker » hypothesis. The former implies that workers drop out of the labor force when employment opportunities dwindle and re-enter when economic conditions improve, whereas the latter assumes that some workers are temporarily pressured into seeking employment during sluggish periods to compensate for the loss of income due to unemployment of the primary worker in the family. Although the relative magnitude of the two effects cannot be determined a priori, the implications of any difference are easily identifiable. If the discouraged-worker effect, for example, prevails then measured unemployment will underestimate the loss of men (or man-hours), the resulting loss of output, and the full employment job requirements when the economy is operating below potential. Empirical evidence on the relative strength of the two effects can be obtained by fitting a participation rate function in the form : [4]

$$(1) \qquad (L_i/P_i)_t = a_{0i} + a_{1i}\,(E/P)_{t-1} + a_{2i}T$$

Civilian Labor Force Participation, » *Review of Economics and Statistics,* Vol. 46, No. 4, November 1964, pp. 378-91 ; T. DERNBURG and K. STRAND, « Hidden Unemployment 1953-62 : A Quantitative Analysis by Age and Sex, » *American Economic Review,* Vol. 56, No. 1, March 1965, pp. 71-95 ; P. PROULX, « La Variabilité Cyclique du Taux de Participation à la Main-d'oeuvre au Canada, » *Canadian Journal of Economics,* Vol. 2, No. 2, May 1969, pp. 268-277 ; L. OFFICER and P.R. ANDERSON, « Labour Force Participation in Canada, » *Canadian Journal of Economics,* Vol. 2, No. 2, May 1969, pp. 278-87 ; R. SWIDINSKY, « Unemployment and Labour Force Participation : the Canadian Experience, » *Industrial Relations Quartely Review,* Vol. 27, No. 1, Spring 1973, pp. 56-75.

[4] The predominance of the discouraged-worker effect is indicated by a statistically significant positive sign of a_{1i} and the prevalence of the added-worker effect by a negative sign. A statistically insignificant value of a_{1i} suggests that over the cycle the two effects are either absent or countervailing (the second case is sometimes considered as a separate hypothesis and is called the « offset hypothesis » : see STRAND and DERNBURG, « Cyclical Variation in Civilian Labor Force Participation, » p. 381. STRAND and DERNBURG (*ibid.*, p. 382) found that both the discouraged-worker and the added-worker effects are present during the business cycle, but at different times : a fall in aggregate employment is initially associated with a considerable discouragement effect but, as employment continues to fall, the pressures on some marginal workers to enter the labor force mount and partially offset the discouragement effect.

where L_i = labor force in the ith group,
P_i = population of working age in the ith group,
E = total employment,
P = total population of working age, and
T = time trend assuming the value of 1 in the first period, 2 in the second period and so on. [5]

Equation (1) was fitted to seasonally adjusted quarterly observations for five age groups by sex in Canada during the period 1957-70. [6] The estimated coefficients and the relative t-values, shown in Table 1, indicate that labor force participation rates are associated in a statistically significant way (the coefficient for males of age 45-64 is nearly significant at the 5 percent level, the theoretical value of t being 2.20), to aggregate employment in five out of ten groups. Moreover, in these five groups the estimated coefficients are always positive and, therefore, lend support to the discouraged-worker hypothesis in the case of males of age 14-19, 65 and over, and females of age 14-19, 20-24, and 25-44 (at the 5 percent level of significance). Finally, all male groups present a significant negative trend in participation rates whereas females (except for the age groups 14-19 and 65 and over) show a significant positive trend, indicating a change in the sex composition of labor force during the sample period in favor of women. [7]

The second step requires the derivation of an expression relating group employment to total employment. This relation was estimated for the same groups as in Equation (1) in the form :

$$(2) \quad (E_i/P)_t = b_{oi} + b_{1i}(E/P)_t + b_{2i}T + b_{3i}(P_i/P)_t$$

[5] The linear trend is used to approximate the non-cyclical factors. Inspection of the scatter diagrams of specific participation rates against time shows that the trend was not uniformly linear for all groups ; this factor perhaps explains the low values of the D.-W. statistic.

[6] The data used can be found in Statistics Canada, *Seasonally-Adjusted Labour Force Statistics* : *January* 1953 *to December* 1972, Cat. No. 71-201, Ottawa, Information Canada, 1973.

[7] R. SWIDINSKY estimated Equation (1) using seasonally adjusted quarterly data for the same groups in Canada during the period 1953-1966. His estimates of a_{1i} and/or their standard errors differ considerably from those prsented in Table 1, especially in the case of males of age 25-44 and 45-64, and females of all ages. This difference suggests that the cyclical variability of the labor force is very sensitive to the sample period used. R. SWIDINSKY, « Unemployment and Labour Force Participation : the Canadian Experience, » p. 61.

The results, shown in Table 2, reveal that a given increase in aggregate employment is shared unequally by the various groups : men receive a consistently larger share than women (or absorb a greater proportion of a drop in employment) and within each sex group the highest absolute change occurs in the 45-64 age group for males and 25-44 for females. In addition, the significant negative trend for all male age groups and females of age 14-19 and 65 and over, coupled with the positive trend for females in the age 20-64, implies a qualitative modification in the structure of employment and a secular increase in the employment share of prime-age female workers.

TABLE 1

Estimated Participation Rate Functions by Age and Sex in Canada : 1957-70

Age and Sex	a_0	a_1	a_2	R^2	*D.W.*
Males					
14-19	— 21.6111	1.3284*	— .2286*	.752	.53
		(4.40)	(— 10.42)		
20-24	100.0471	— .1443	— .1611*	.919	.71
		(— .88)	(— 13.34)		
25-44	99.5016	— .0285	— .0185*	.688	.54
		(— .64)	(— 5.66)		
45.64	87.2771	.1093	— .0400*	.813	.87
		(2.07)	(— 10.31)		
65 +	— .1366	.6642*	— .2376*	.965	.79
		(5.34)	(— 26.07)		
Females					
14-19	2.7848	.5908*	— .0713*	.400	.79
		(3.37)	(— 5.54)		
20-24	— 9.3806	1.0767*	.2130*	.956	.71
		(5.54)	(14.68)		
25-44	9.1798	.3047*	.2513*	.981	.46
		(2.49	(27.96)		
45-64	26.6940	— .0701	.2714*	.964	.32
		(— .41)	(21.83)		
65 +	5.2311	.0058	.0051	.424	.50
		(.07)	(.82)		
Total :					
Both Sexes	36.4726	.3388*	.0213*	.815	.53
		(4.95)	(4.24)		

Note : the numbers in brackets are the estimated t-values. * Indicates a minimum level of significance of 5%.

TABLE 2

Relationship between Aggregate Employment and Age Specific Employment in Canada : 1957-70.

Age and Sex	b_0	b_1	b_2	b_3	R^2	*D.W.*
Males						
14-19	— 0.548	.1596*	— .00002	.4067	.882	.94
		(14.25)	(— 2.00)	(1.30)		
20-24	— .0683	.1680*	— .00005*	.4644*	.986	1.37
		(19.19)	(— 6.67)	(19.92)		
25-44	.0185	.1803*	— .00036*	.3845*	.987	.45
		(7.98)	(— 10.72)	(5.71)		
45-64	— .1707	.2081*	— .00011*	1.3880*	.922	.76
		(18.05)	(— 14.52)	(17.91)		
65 +	.0099	.0343*	— .00018*	— .1707	.988	.90
		(19.00)	(— 14.37	(— 1.82)		
Females						
14-19	— .0280	.0743*	— .00003*	.1646*	.838	.96
		(6.91)	(— 3.64)	(5.41)		
20-24	— .0426	.0676*	.00007*	.6108*	.990	.84
		(7.50)	(9.04)	(18.55)		
25-44	— .1497	.1149*	.00067*	.6826*	.988	.96
		(6.97)	(19.43)	(10.72)		
45-64	— .1980	.0699*	.00006*	1.5451*	.999	1.27
		(5.52)	(3.82)	(16.59)		
65 +	— .0209	.0156*	— .00002*	.2915*	.234	.58
		(2.84)	(— 3.91)	(3.91)		

Note : the numbers in brackets are the estimated t-values. * Indicates a minimum level of significance of 5%.

The relationship between changes in aggregate employment and age-specific labor force, employment and unemployment can be elucidated by analyzing the response coefficients (stationary derivatives) and the corresponding elasticities calculated from Equations (1) and (2).

The average response of the group labor force and employment to an instantaneous change in total employment can be estimated from the stationary solutions of Equation (1) and (2) as :

$$(3) \quad dL_i/dE = a_{1i}(\bar{P}_i/\bar{P}),$$

$$(4) \quad dE_i/dE = b_{1i}, \text{ and}$$

$$(5) \quad dL_i/dE_i = (dL_i/dE)\ (dE/dE_i) = (a_{1i}/b_{1i})\ (\bar{P}_i/\bar{P})$$

where d means absolute change in the variable, and
— indicates the average value of the variable over the sample period.

The above stationary derivatives can be transformed into the corresponding elasticities in order to provide comparable indexes of specific labor force and employment response to changes in aggregate employment :

$$(6) \quad \varepsilon_1 = (dL_i/dE)\ (\bar{E}/\bar{L}_i) = a_{1i}\ (\bar{E}/\bar{P})\ (\bar{P}_i/\bar{L}_i),$$

$$(7) \quad \varepsilon_2 = (dE_i/dE)\ (\bar{E}/\bar{E}_i) = b_{1i}\ (\bar{E}/\bar{E}_i), \text{ and}$$

$$(8) \quad \varepsilon_3 = (dL_i/dE_i)\ (\bar{E}_i/\bar{L}_i) = \varepsilon_1/\ \varepsilon_2.$$

The estimated group employment elasticities, shown in Table 3, present a definite U-shape for both sexes and suggest that workers at both ends of the age scale are the most sensitive to fluctuations in general economic activity. The same pattern characterizes the distribution of the male labor force elasticities, whereas in the case of females the elasticities follow an inverted-U distribution skewed to the right. One might infer that a saucer is the generally common shape of group labor force and employment elasticities and attribute the irregular distribution of the female labor force to the fact that the attitudes of women towards remunerative work shifted considerably during the sample period. [8] Finally,

[8] DERNBURG and STRAND found a U-shape for the specific labor force and employment elasticities in the case of both males and females. This result may suggest that the labor market for women was more stable in the U.S. during 1953-62 than it was in Canada during 1957-70. T. DERNBURG and K. STRAND, « Hidden Unemployment 1953-62 : A Quantitative Analysis by Age and Sex, » Table 4, p. 82.

if workers were classified as primary or marginal according to the size of the group labor force elasticity, one would identify as marginal workers in Canada males of age 14-19 and 65 and over, and females of age 14-24.

TABLE 3

Elasticities and Response Coefficients Derived from Equations (1) and (2).

Age an Sex (1)----	ϵ_1 (2)	ϵ_2 (3)	ϵ_3 (4)	$b_{1i} \times 1{,}000$ (5)	$a_{1i}\ (P_i/P) \times 1{,}000$ (6)	(5)−(6) (7)
Males						
14-19	1.694	3.029	.561	146.1*	105.1	41.0
20-24	— .085**	2.118	—.040**	153.8	— 7.6**	161.4
25-44	— .015**	.547	—.028**	165.1	— 5.2**	170.3
45-64	.062	.956	.065	190.5	14.2	176.3
65 +	1.293	1.426	.950	31.4	30.8	.6
Females						
14-19	.976	1.768	.553	68.0	45.2	22.8
20-24	1.050	1.308	.822	61.8	58.0	3.8
25-44	.477	.996	.482	105.2	57.0	48.2
45-64	— .116**	.939	—.127**	64.0	— 9.1**	73.1
65 +	4.054**	2.642	.021**	14.2	.3**	13.9
Total Males				686.9	137.3	546.6
Total Females				313.2	151.4	161.8
Grand Total				1,000.1	288.7	711.4

* The estimated b_{1is} were divided by 1.0926 in order to make their sum equal to one.

** Not significantly different from zero at the 5% significance level.

The net effect of a change in aggregate employment upon total and age-specific unemployment is estimated in the last three columns of Table 3. The creation of 1,000 extra jobs is shown to induce 289 new entrants into the labor force and to lower unemployment by 711 units instead of 1,000.[9]. This table also indicates that the endogenous varia-

[9] It may be argued that the statistically insignificant coefficients should be assigned a value of zero. This procedure would not alter greatly the results presented in Table 3 : the number of workers induced by the extra 1,000 jobs would increase from 137.3 to 150.1 for males, from 151.4 to 160.2 for females, and from 288.7 to 310.3 for both sexes.

tions in the age and sex specific employment and labor force are not closely related and, therefore, a given reduction in aggregate unemployment is unequally shared by the various groups. In particular, for prime-age males a change in employment is fully reflected in the number of men unemployed, whereas in the case of males 65 and over and females 20-24 the actual number of unemployed is not affected by fluctuations in aggregate employment because, in these groups, for each job created (destroyed) nearly an additional worker enters (leaves) the labor force.

ESTIMATES OF HIDDEN UNEMPLOYMENT, UNEMPLOYMENT GAPS AND FULL EMPLOYMENT JOB REQUIREMENTS

The total labor force response coefficient ($A = 288.7/1{,}000 = .2887$) can be used to calculate hidden unemployment, the aggregate unemployment gap and the job requirements for full employment (in percentage terms).

Let

$$(9) \quad E_t = \lambda_1 L_t,$$

$$(10) \quad E^*_t = \lambda_2 L^*_t$$

where λ_1 and λ_2 are respectively the actual and the target employment rates and the symbol * refers to the potential value of the variable.

The value of L^*_t can be expressed as

$$(11) \quad L^*_t = L_t + A\,(E^* - E)_t\,;$$

Substituting (9) and (10) into (11) and solving for L^* yields

$$(12) \quad L^*_t = L_t \left[\frac{1 - \lambda_1 A}{1 - \lambda_2 A}\right].$$

The difference between the potential and the actual labor force, defined as hidden unemployment (HU), is measured as

$$(13) \quad HU_t = (L^* - L)_t = L_t \left[\frac{A\,(\lambda_2 - \lambda_1)}{1 - A\lambda_2}\right],$$

and the aggregate unemployment gap (U^*) is

$$(14) \quad U^*_t = \frac{(U + HU)_t}{L^*_t} = \frac{(-\lambda_1)\,(1 - \lambda_2 A) + A\,(\lambda_2 - \lambda_1)}{1 - A\lambda_1}.$$

The percentage full employment requirement (ER *) is

$$(15) \quad ER^*_t = E^*_t/E_t - = 1 \frac{\lambda_2}{\lambda_1}\left[\frac{1 - \lambda_1 A}{1 - \lambda_2 A}\right] - 1.$$

Given a value of A = .2887 it follows that, on the average during the sample period, a recorded unemployment rate of 5 percent would have been associated with a hidden unemployment rate of .8 percent of the actual labor force and an unemployment gap of 5.75 percent. The reduction in the unemployment rate from 5 percent to 3 percent would have required a 2.62 percent increase in aggregate employment as compared with 2.11 percent in the case where A = 0. [10]

Estimates of hidden unemployment, unemployment gaps and full employment job requirements by age groups and sex can be derived by using the stationary derivatives obtained from Equation (1) and (2). [11] Hidden unemployment for the ith group can be computed as the difference between the two values of the labor force calculated by substituting in the stationary solution of Equation (1) first the potential and then the actual number of employed workers.

$$(16) \quad HU_{it} = a_{li} P_{it} \left[\frac{\lambda_2 L^*_t}{P} - \frac{\lambda_1 L_t}{P}\right].$$

Similarly, the specific employment requirements (in number of workers) can be derived from the stationary solution of Equation (2) as

$$(17) \quad ER_{it} = b_{li} (\lambda_2 L^*_t - \lambda_1 L_t).$$

Finally, the unemployment gap by group can be calculated as

$$(18) \quad U^*_{it} = 1 - (E_{it}/L^*_{it}).$$

---

[10] If A = 0, then expressions (12) to (15) are reduced to :

(12') $L^* = L$,

(13') $HU = 0$,

(14') $U^* = 1 - \lambda_1 = U$, and

(15') $ER^* = (\lambda_2/\lambda_1) - 1$.

[11] DERNBURG and STRAND developed a simultaneous equation system to estimate the potential labor force and the related statistics « Hidden Unemployment 1953-62 : A Quantitative Analysis by Age and Sex. » pp. 83-93. Their method traces the time path of the potential labor force, given the trend in population, and incorporates the time lags specified in their model, whereas my estimates of the potential labor force refer to the number of workers that would have offered their services for remuneration had full employment been maintained throughout the entire sample period.

The yearly values of HU_i, ER_i, and U_i^* so estimated for Canada during the period 1957-70 are presented in Tables 4 and 5. [12] Several characteristics of the behavior of these variables should be emphasized :

a. the total amount of hidden unemployment fluctuated, as expected, with the level of economic activity, reaching a peak of 69,000 workers in the 1961 recession and a low of 22,000 in the high employment year of 1966 ;

b. females accounted on the average for 52 percent of hidden unemployment although they made up only 29 percent of the labor force. This result is due to the fact that among males the largest component of the labor force, males of age 20-64, is insensitive to changes in economic activity, whereas in the case of females the most cyclically sensitive groups are the largest ones, females of age 14-44. This fact also explains why during recessions the increase in the reported unemployment rate for females was less than the corresponding increase for males ;

c. nearly all hidden unemployment was generated by males of age 14-19 and 65 and over, and by females of age 14-44 ;

d. the unemployment gap exceeded consistently the reported unemployment rate, but the difference between the two rates fluctuated with the business cycle. During the recession year of 1961, for example, hidden unemployment would have added one percentage point to the unemployment rate (resulting from a .6 percentage point increase in the unemployment rate for men and 2.0 percentage points in the rate for women). Among the specific age groups the difference between the two rates, in percentage points, was highest for males of age 14-19 (5.6), and females of age 20-24 (4.1) and 14-19 (3.6) ;

e. total job requirements for full employment followed a cyclical pattern because both of its components, (.97L − E) and (.97HU), moved in the same direction in response to business fluctuations. During the 1970 economic slump, for example, the creation of 300,000 additional jobs would have been required to reduce the unemployment rate from the actual value of 5.9 to the target 3.0 percent. The difference between

[12] The yearly values are averages of the quarterly estimates. The effects of assigning zero to the statistically insignificant coefficients in Equation (1) are easily identifiable in Table 4 : the estimates of total hidden unemployment would be reduced by a maximum of 5,300 workers in 1961 and a minimum of 1,700 workers in 1966.

TABLE 4

Estimates of Hidden Unemployment and Full Employment Job Requirements by Age and Sex : Canada, 1957-70. (thousands of workers)

	Hidden Unemployment						*Employment Requirements*					
	1957	*1958*	*1960*	*1961*	*1966*	*1970*	*1957*	*1958*	*1960*	*1961*	*1966*	*1970*
Males												
14-19	8.2	19.2	20.4	23.7	8.2	21.8	17.8	44.4	45.6	49.3	9.7	43.9
20-24	— .6	— 1.5	— 1.4	— 1.6	— .6	— 1.7	18.7	46.8	48.0	51.9	10.2	46.2
25-44	— .5	— 1.2	— 1.2	— 1.4	— .4	— 1.0	20.1	50.2	51.5	55.7	11.0	49.6
45-64	1.3	3.0	3.1	3.5	1.0	2.5	23.2	57.9	59.5	64.2	12.7	57.2
65 +	3.4	7.8	7.7	8.6	2.5	6.2	3.8	9.5	9.8	10.6	2.1	9.4
Total	11.8	27.3	28.6	33.0	10.8	28.0	83.6	208.8	214.4	231.7	45.7	206.3
Females												
14-19	3.6	8.4	8.9	10.3	3.5	9.2	8.3	20.7	21.2	22.9	4.5	20.4
20-24	5.1	11.6	11.5	12.9	4.2	12.5	7.5	18.8	19.3	20.8	4.1	18.6
25-44	5.9	13.4	13.3	14.9	4.1	10.3	12.8	32.0	32.8	35.5	7.0	31.6
45-64	— .8	— 1.9	— 1.9	— 2.2	— .7	— 1.8	7.8	19.5	20.0	21.6	4.3	19.2
65 +	.0	.1	.1	.1	.0	.1	1.7	4.3	4.4	4.8	.9	4.3
Total	13.8	31.7	31.8	36.0	11.2	30.3	38.1	95.3	97.7	105.6	20.8	94.1
Both Sexes	25.6	59.0	60.4	69.0	22.0	58.3	121.6	304.1	312.2	337.3	66.7	300.3

TABLE 5

Unemployment Rates (U) and Unemployment Gaps (U*) by Age and Sex: Canada, 1957-70.
(percent)

	1957		*1958*		*1960*		*1961*		*1966*		*1970*	
	U	*U**	*U*	*U**	*U*	*U**	*U*	*U**	*U*	*U**	*U*	*U**
Males												
14-19	11.2	13.2	16.6	21.2	16.4	22.0	16.4	22.0	9.7	11.3	15.0	18.6
20-24	8.2	8.1	12.7	12.4	12.2	12.0	11.8	11.8	5.3	5.2	10.5	10.3
25-44	4.5	4.4	6.9	6.9	6.9	6.8	7.3	7.2	2.9	2.8	5.0	4.9
45-64	4.3	4.4	6.7	6.9	6.9	7.1	7.3	7.6	4.6	4.6	5.0	5.2
65 +	4.3	5.9	5.5	9.1	4.7	8.4	5.8	9.8	4.5	6.8	4.3	8.8
Total	5.3	5.4	8.1	8.7	8.1	8.7	8.4	9.0	4.0	4.2	6.6	7.0
Females												
14-19	4.6	6.0	7.4	10.5	8.6	11.5	8.6	12.2	6.4	7.3	11.4	13.5
20-24	2.7	4.9	4.1	7.9	3.9	7.7	4.2	8.3	2.5	3.5	5.1	7.3
25-44	1.9	2.7	2.6	4.7	2.6	4.4	2.4	4.6	2.0	2.3	3.6	4.0
45-64	1.3	1.0	2.4	1.8	2.0	1.5	2.3	1.8	1.7	1.7	1.6	1.4
65 +	.0	.0	.0	.3	.0	.3	2.5	2.7	2.2	2.2	2.3	2.5
Total	2.3	3.2	3.6	4.4	3.6	5.4	3.7	5.7	2.6	3.1	4.5	5.6
Both Sexes	4.6	5.0	7.0	7.9	7.0	7.8	7.1	8.1	3.6	3.9	5.9	6.4

97 percent of the actual labor force and actual employment during the same period was 244,000. If the actual instead of the potential labor force were used to calculate job requirements for full employment, the number of jobs created would have fallen short of required number by 56,000 in 1970. According to the age and sex specific distribution of employment during the sample period, this shortfall from the potential job requirements, which may be called « hidden employment requirements », would have been shared almost equally by males and females.

CONCLUSIONS AND POLICY IMPLICATIONS

The results presented in the previous section show an aggregate unemployment gap in excess of 4 percent throughout the entire sample period (with the exception of 1966) and substantial differences in both the unemployment gaps among the various groups and their responses to cyclical fluctuations in aggregate employment. During the period 1957-70, for example, the average unemployment gap for males of age 14-19 and its average variation were both more than three times those of males of age 25-44.

The existence of segmented labor markets with limited short-run substitubility among non-competing groups renders the goal of aggregate full employment difficult to attain and not necessarily desirable. [13] Since, as shown in Table 3, the largest share of an increase in aggregate employment accrued to those groups with the lowest employment elasticities of the labor force, the attainment of an aggregate employment rate of 97 percent during the 1957-70 period would have likely generated considerable inflationary pressures without reducing to pure frictional levels the unemployment rates of young workers. [14] For example, if the

[13] A discussion of the implications of segmented labor markets for economic policy in Canada can be found in A.W. DONNER and F. LAZAR, « An Econometric Study of Segmented Labor Markets and the Structure of Unemployment : the Canadian Experience, » *International Economic Review,* Vol. 14, No. 2, June 1971, pp. 312-27.

[14] It should be pointed out that under present labor market conditions and productivity trends pressures over prices would probably arise independently of the distribution of employment. Any additional demand for output could be met by a. extending the number of hours worked by the existing stock of employed ; b. hiring workers with previous experience ; or c. employing (if allowed) untrained personnel. Unit costs, and correspondingly prices, are expected to rise in each one of the above cases because in the first two instances wages are pushed up without offsetting increase in productivity whereas in the latter situation wages may not change but marginal product will definitely fall. It is not possible to determine a priori which of the three alternatives is the most inflationary.

extra 300,000 jobs required for full employment in 1970 had been created and allocated according to the age and sex distribution of employment that prevailed during the sample period, the aggregate unemployment rate of 3.0 percent would have been associated with unemployment gaps of 10.2 and 4.4 for males of age 14-19 and 20-24, 8.2 and 4.0 for females of age 14-19 and 20-24, 2.1 for males of age 45-64, and 1.1 for females of age 25-44.

In the presence of segmented labor markets aggregate demand policies alone cannot eliminate involuntary unemployment even if they succeed in reaching the desirable aggregate target. A policy-maker who does not subscribe to the theory that people over 65 years of age should be legislated out of the labor force and that youth ought to be in school or be patiently waiting for the opportunity to obtain gainful employment faces two major problems : the selection of the socially optimal aggregate rate of unemployment (the rate that minimizes the social cost of inflation and unemployment) and the provision of permanent employment opportunities for those workers plagued by endemicly high unemployment rates due to prolonged job-search periods or excessive turnover rates. None of the existing policies is suitable for the task.

The unemployment insurance program benefits those who are temporarily out of work, but cannot help workers seeking their first job, those who are chronically unemployed, and those who leave the labor force being discouraged by the lack of employment opportunities. The provisions for early retirement, increasingly discussed and gradually implemented, have uncertain effects upon unemployment. The reduction in the total number of years required to retire with full pension with a particular firm or industry increases the degree of internal upward mobility, modifies the wage structure and perhaps the industrial distribution of employment, but will be able to affect the unemployment rate only to the extent that the full pension induces those workers to quit the labor force. The various job-creating programs (winter works, opportunities for youth, local initiative programs and the like) are temporary measures of a seasonal and countercyclical nature and, therefore, are of limited usefulness in achieving permanent effects.

In order to attain and maintain high levels of employment in the aggregate and for each group it is necessary to implement both appropriate aggregate demand measures and a program of selective manpower poli-

cies. [15] The manpower program should aim at changing the pattern of supply and demand for labor, through the introduction of effective training programs and the provision of stable jobs for the disadvantaged, and at improving the operation of the labor market so as to reduce the length of the job-search and the rate of turnover. Raising the productivity and mobility of marginal workers, eliminating all artificial barriers to entry in all professions and occupations, and improving the effectiveness of employment service agencies will reduce the segmentation of the labor market, increase the effective elasticity of the labor supply, lessen the discriminatory pattern of employment against the young and the unskilled, lower the dispersion of unemployment and moderate the inflationary potential of a given expansion in aggregate demand (*i.e.*, shifting the trade-off curve to the left and/or flattening it) thus enhancing the possibilities of reaching high levels of employment, on the aggregate and for all groups, without inflation. [16]

Le chômage déguisé par âge et par sexe au Canada entre 1957 et 1970

Même si le taux de chômage est sans doute le plus suivi et le plus fréquemment discuté de toutes les séries statistiques, il reste un indicateur imprécis du pourcentage de la main-d'œuvre potentielle inutilisée. Le taux de chômage déclaré est influencé par les variations de la demande de travail attribuable aux fluctuations de l'activité économique et les changements dans l'offre de travail provenant de causes extérieures ou engendrées par les oscillations cycliques des occasions d'emploi. Ainsi, dans la mesure où l'aggravation des conditions économiques entraîne le retrait des travailleurs de la force ouvrière, le taux de chômage tend à sous-estimer le pourcentage de la main-d'œuvre inutilisée en regard du plein emploi.

Une estimation plus juste de la main-d'œuvre potentielle inutilisée peut s'obtenir en remplaçant la force ouvrière effective, qui dépend du niveau de l'activité économique, par la main-d'œuvre potentielle, qui comprend les travailleurs disposés à offrir leurs services lorsque l'économie tourne à plein rendement, et en ajoutant au chômage déclaré le chômage déguisé qui est la différence entre la main-d'œuvre effective et la main-d'œuvre potentielle.

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[15] A program of this kind is developed in details in C.C. HOLT, C.D. MacCRAE, S.O. SCHWEITZER and R.F. SMITH, *The Unemployment-Inflation Dilemma : A Manpower Solution,* Washington, D.C., The Urban Institute, 1971.

[16] The anti-inflationary potential of manpower programs is not viewed with optimism by all economists. See, for example, R.E. HALL, « Prospects for Shifting the Phillips Curve through Manpower Policy, » *Brookings Papers on Economic Activity,* No. 3, 1971, pp. 659-701. Manpower programs such as that proposed by Holt and Associates, however, have economic merits which are independent of the program's effectiveness as an anti-inflationary device.

L'objet du présent article est d'établir ce chômage camouflé au Canada, par âge et par sexe, pendant la période de 1957 et 1970 et de tirer de cette analyse quelques conclusions pratiques.

Le premier pas, pour y arriver, consiste à calculer la main-d'œuvre potentielle dans sa totalité et par groupes spécifiques.

On a mis de l'avant deux hypothèses pour expliquer la réaction des travailleurs aux conditions changeantes de l'emploi : l'hypothèse du *travailleur découragé* et celle du *travailleur additionnel.* La première de ces hypothèses suppose que les travailleurs se retirent du marché du travail lorsque les occasions d'emploi diminuent et y retournent quand les conditions économiques s'améliorent. Par ailleurs, dans la deuxième hypothèse, on estime que certains travailleurs sont forcés de rechercher du travail pendant les périodes creuses pour compenser la perte de revenu causée par le chômage du gagne-pain principal de la famille. Par exemple, lorsque prévaut le complexe de découragement le taux de chômage ne révèlera pas les heures-homme perdues, ni le manque à produire qui en résulte, ni le nombre de postes à créer pour assurer le plein emploi.

D'autre part, le taux d'activité de la main-d'œuvre, considéré en regard de dix groupes d'âge, montre que, dans six de ces groupes, les coefficients sont positifs et tendent, par conséquent, à confirmer l'hypothèse du *travailleur découragé* dans le cas des hommes des groupes d'âge 14-19 ans, 45-64 ans et 65 ans et plus ainsi que dans le cas des femmes des groupes d'âge 14-19 ans, 20-24 ans et 25-44 ans.

Les résultats révèlent qu'une augmentation donnée de l'emploi considéré dans sa totalité se partage inégalement d'un groupe à l'autre : les hommes en reçoivent une part plus considérable que les femmes ; de même, ils absorbent une plus grande part des mises en chômage dans le cas de diminution de l'emploi. Pour chaque sexe, le changement le plus marqué se produit dans les groupes d'âge 45-64 ans chez les hommes et 25-44 ans chez les femmes. De plus, la tendance négative qu'on retrouve pour tous les groupes d'âge 14-19 ans et 65 ans et plus, tant chez les hommes que les femmes, associée à la tendance positive chez les femmes dans les groupes d'âge 20-64 ans, dénote une modification qualitative dans la structure de l'emploi et un accroissement constant des jeunes travailleurs dans l'emploi global.

Le résultat des différentes équations d'analyse des séries statistiques permet d'établir pour l'ensemble un graphique en forme de U pour les deux sexes, ce qui indique que les travailleurs, aux deux bouts de l'échelle, sont plus sensibles aux fluctuations de l'activité économique.

De l'analyse statistique précédente, l'auteur tire les constatations suivantes :

A) Au cours de la période, le pourcentage du chômage déguisé a fluctué suivant le niveau de l'activité économique pour atteindre le plafond de 69,000 travailleurs lors de la récession de 1961 et le plancher de 22,000 durant la période d'emploi élevé de 1966.

B) Les femmes comptent en moyenne pour 52 pour cent du chômage déguisé, bien qu'elles ne forment que 29 pour cent de l'ensemble de la main-d'œuvre. Ceci s'explique par le fait que, chez les hommes, la portion la plus considérable de la

force ouvrière, c'est-à-dire les groupes d'âge 20-64 ans, est peu sensible aux variations de l'activité économique alors que, dans le cas des femmes, les groupes d'âge 14-44 ans sont ceux qui y sont le plus sensibles. Ceci explique aussi pourquoi, durant les récessions, l'accroissement dans le taux déclaré de chômage chez les femmes était moins élevé que l'augmentation correspondante chez les hommes.

C) Presque tout le chômage déguisé provenait des groupes d'âge 14-19 ans et 65 ans et plus chez les hommes ainsi que des groupes d'âge 14-44 ans chez les femmes.

D) Le taux de chômage total (unemployment gap) qui comprend le taux de chômage déclaré et le taux de chômage déguisé par rapport à la force ouvrière potentielle, dépassait, ce qui est normal, le taux du chômage déclaré, mais la différence entre les deux taux variait selon le rythme des affaires. Pendant l'année de récession de 1961, par exemple, le chômage déguisé aurait augmenté d'un point le taux du chômage déclaré.

E) Les emplois requis pour assurer le plein emploi a suivi une courbe cyclique parce que deux de ses composantes jouaient dans le même sens par réaction aux fluctuations économiques.

De cette étude, l'auteur tire les conclusions concrètes suivantes.

L'existence de marchés du travail segmentés rend difficile et possiblement indésirable la recherche du plein emploi. Puisque la plus grande part d'une augmentation dans l'emploi global provenait des groupes d'emploi les moins flexibles de la force ouvrière, l'obtention d'un taux global d'emploi de 97 pour cent pendant la période 1957-1970 aurait produit de fortes pressions inflationnistes sans ramener le taux de chômage chez les jeunes travailleurs à un type de chômage frictionnel. Ainsi, si les 300,000 emplois supplémentaires nécessaires pour atteindre le plein emploi en 1970 avaient été créés et remplis suivant la répartition de l'âge et du sexe de l'emploi qui prévalait pendant la période sous étude, le taux de chômage global de 3.0 pour cent aurait donné des taux de chômage déguisé respectivement de 10.2 et de 4.4 pour les hommes du groupe d'âge de 14-19 ans et 20-24 ans et de 8.2 et 4.0 pour les femmes des groupes d'âge 14-19 ans et 20-24 ans, alors que ce taux n'aurait été de 2.1 pour cent pour les hommes des groupes d'âge 45-64 ans et de 1.1 pour les femmes des groupes d'âge 25-44 ans.

Face à des marchés de travail segmentés, des mesures politiques ne peuvent pas éliminer le chômage involontaire, même si elles atteignent le but désiré. Un programmeur qui ne souscrit pas à la théorie que les travailleurs de plus de 65 ans doivent être mis à la retraite et que les jeunes doivent rester à l'école ou attendre patiemment l'occasion de trouver un emploi affronte deux problèmes : la recherche d'un taux de chômage qui minimise le coût social de l'inflation et du chômage et la création d'emplois pour les travailleurs frappés par les hauts taux de chômage chronique dont les causes sont les longs délais dans la recherche d'un emploi et des taux excessifs de roulement de la main-d'œuvre. Aucune parmi les politiques existantes ne favorise pareille entreprise.

Les programmes d'assurance-chômage bénéficient à ceux qui sont temporairement sans travail, mais ne peuvent aider les travailleurs qui sont à la recherche de leur premier emploi, ni les chômeurs chroniques, ni ceux qui, découragés, quittent

le marché du travail faute d'occasions d'emploi. Les mesures favorisant la retraite anticipée qu'on discute de plus en plus n'ont guère d'effets positifs sur le chômage, parce que cela ne signifie pas que le retraité quitte le marché du travail. De même, la mise en œuvre de programmes de création d'emploi (travaux d'hiver, projets d'initiatives locales, etc...) ne sont que des mesures temporaires, saisonnières ou anticycliques n'ayant qu'une utilité limitée.

Pour obtenir et maintenir un haut niveau de l'emploi global et de l'emploi dans chaque groupe d'âge distinct, il est nécessaire de mettre en œuvre à la fois des mesures appropriées concernant la demande de travail et des politiques sélectives de main-d'œuvre. Les programmes de main-d'œuvre doivent tendre à changer le modèle de l'offre et de la demande de travail par l'établissement de programmes efficaces de formation professionnelle et la création d'emplois stables pour les personnes handicapées, à améliorer le fonctionnement du marché du travail de façon à diminuer la durée du temps consacré à la recherche de travail et le taux de roulement de la main-d'oeuvre. Par l'accroissement de la productivité et de la mobilité des travailleurs marginaux et l'élimination des barrières artificielles fermant l'accès aux professions et la revalorisation des services de placement, la segmentation du marché du travail pourrait être réduite ; l'élasticité de l'offre de travail, accrue ; la discrimination contre les jeunes et les ouvriers non qualifiés, atténuée ; l'émiettement du chômage diminué et le danger de poussées inflationnistes engendrées par une trop forte expansion de la demande de main-d'œuvre, amoindri.