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Employment Impact of Fringe Benefits in Canadian Manufacturing Sector: 1957-1965

Syed M. A. Hameed

The paper analyzes the growing costs of various fringe benefits in Canada and their impact on expanding employment. The empirical evidence is in support of fringe barrier hypothesis but not until labour turnover costs are added to fringe costs. It emphasizes that Canadian data on fringe benefits and overtime are extremely inadequate therefore, at the present time, no conclusive study is possible without collecting data on overtime, describing the causes of assigning it internally in a factory. This study attempted to fill in this gap by suggesting that external factors such as skill shortages and capacity output are not significant determinants of overtime.

In the United States, in recent years, considerable concern has been expressed about the phenomenon of high unemployment coexisting with high incidence of overtime. In 1963, it was estimated that about 7 percent of all manufacturing work was being done on overtime, while unemployment was in the neighbourhood of 5 percent. Notable labour leaders in that country argued in favor of spreading this overtime to create new jobs. Walter Reuther, testifying before the Joint Economic Committee, estimated that 650,000 additionals jobs could be created in 1962 by eliminating three-fourth of the existing overtime [1]. In the same year Wall

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1 See Joseph W. GARBARINO, « Fringe Benefits and Overtime as Barriers to Expanding Employment », *Industrial and Labor Relations Review*, Vol. 17, No. 3 April, 1964, pp. 426-442.

Street Journal reported that in order to reduce the incidence of overtime a bill was in the making which would require double time for overtime [2].

In Canada, during the period 1957-65, average annual unemployment exceeded 5 percent, ranging between 3.9 and 7.2 percent [3]. During the same period, costs of overtime shift and other payments averaged 9 percent of payroll, actually increasing in the manufacturing sector from 3.2 percent in 1957 to 5.2 percent in 1965 [4]. But surprisingly the argument about spreading overtime to create new jobs did not receive as much public attention in Canada as it did in the United States. Certainly a new dimension in this argument, namely the costs of fringe benefits as a barrier to expanding employment has featured nowhere in Canadian literature.

The purpose of this paper is to examine whether the growing cost of various fringe benefits in Canada has tended to work as a barrier against expanding employment. Such an enquiry, as developed in the United States, has been termed the « fringe barrier » hypothesis. It states that with an increase in the cost of employee-related benefits, relative to direct wages, employers find it economical to restrict employment in favor of overtime.

Costs of fringe benefits in Canada are increasing as a result of payments required by law (such as unemployment insurance, workmen's compensation and old age security) and collectively bargained fringe benefits (which include paid vacations, statutory holidays, rest periods, pension plans, group life insurance, survivor benefits, severance pay, special bonuses and free meals. [5]. The latter set of fringe benefits were mainly bargained as non-wage items during the wage-freeze of the World War II period. The trend toward longer paid absence, in particular, has continued ever since.

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[2] *The Wall Street Journal,* Pacific Coast ed., May 14, 1963, p. 1, quoted in GARBARINO *Ibid.*

[3] Sylvia OSTRY, *Unemployment in Canada,* D.B.S. 1968, p. 18.

[4] See Industrial Relations Counsellors Service, Inc., *Fringe Benefit Costs in Canada,* Toronto (for the years 1957, 59, 61 and 63) and Thorne Group, *Fringe Benefit Costs in Canada,* 1965.

[5] Since workers are generally interested in obtaining overtime, it might be regarded as a fringe benefit. But for the purpose of this paper, both conceptually and in the manner in which fringe benefit statistics are developed, overtime costs are completely independent of fringe benefit costs. For computation of statistics, see Note on Statistical Sources appended with this paper.

Between 1957 and 1965, cost of payments required by law has in-
creased from 2.6 to 3.2 percent of the payroll in the manufacturing sector
and from 2.2 to 4.5 percent in the non-manufacturing sector of the eco-
nomy [6]. It is suspected that higher percentage increase in the non-manu-
facturing sector may be due to the fact that although employment in
agriculture, forestry and mining fell in this sector, service producing in-
dustries (transportation, public utilities, trade, finance and service) for
the first time in the late fifties outstripped employment in manufacturing
sector. These workers, coincidentally, happened to be white collar workers
with relatively more liberal provisions for paid absences and other em-
ployee related benefits, compared with the blue collar work force in the
manufacturing sector. Cost of such legally required payments may con-
tinue to increase as new social security legislation (such as Canada Pen-
sion Plan, 1966 and Medicare, 1968) cover larger numbers of the work
force.

There are no Canadian studies which analyze the employment im-
pact of financing such public and private social security programs and
other collectively bargained fringe benefits. The problem seems to be
two-fold. First, it appears that one of the immediate research needs in
this area is to examine whether increasing cost of fringe benefits has
limited employment in favour of overtime. Secondly, public policy im-
plications of this research may be studied subsequently to determine
whether legislative measures (such as double time for overtime) should
be considered to offset the impact, if any. The scope of this study is not
broad enough to make meaningful public policy recommendations as
they must also depend on a comprehensive analysis of other institutional,
economic and political factors affecting legislative action.

A MODEL

A regression model has been constructed to test this hypothesis and
to examine the Garbarino-MacDonald controversy over breakeven point,
after which overtime becomes a preferred option [7]. In the determination
of the breakeven point, MacDonald has considered the cost of labour
turnover a crucial variable and suggested that Garbarino could refute the
existence of fringe barrier because he did not include the cost of labour

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6 Industrial Relations Counsellors Service, Inc., and Thorne Group (*Ibid.*).

7 Joseph L. GARBARINO (*op. cit.*) and Robert M. MacDONALD, « The Fringe
Barrier Hypothesis and Overtime Behavior », *Industrial and Labor Relations Review,*
Vol. 19, No. 4 (July, 1966), pp. 562-569.

turnover in his model. Our model is in agreement with MacDonald and therefore includes yearly estimates of labour turnover with other exploratory variables. The « fringe barrier » hypothesis is tested by examining the following relationships which may be considered as its essential components.

(1) It is hypothesized that during the nine-year period under study (1957-1965), costs of fringe benefits as a percentage of payroll, F (which are equal to costs of fringe benefits required by law, R plus the costs of collectively bargained fringe costs, B) have worked as a disincentive for employers in hiring additional workers ($\triangle$E). The proposition is not in the nature of establishing a causality but indicative of an economic choice. That is, higher fringe benefit costs compared with the costs of overtime do not cause a reduction in employment *per se,* because causality depends to a much greater extent on other considerations such as levels of gross output and stock of business capital. In a more specific context, it means that although fringe costs and employment statistics in Canadian manufacturing increased in an absolute sense [8], an indeterminate number of workers may have failed to find jobs if employers decided to choose overtime costs rather than hire additional workers who add employee-related fringe costs to the payroll. The purpose of this research is to analyze relative rather than absolute impact of fringe costs on employment. Thus, if such a phenomenon has existed in the Canadian manufacturing sector, we should expect a negative correlation coefficient between F. and $\triangle$E.

(a) Employers undertake premium payment on overtime hours when they exceed their normal schedule of production intending to achieve capacity level of output. Five measures of productive capacity have been used in the United States with varying degrees of success in collecting data on this economic indicator [9]. Garbarino used capacity data from McGraw-Hill surveys to indicate the relationship between the use of overtime and productive capacity. No such statistics are available in Canada but for the purpose of this paper, two of the five methods referred

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[8] Employment in manufacturing increased from 1,340,925 in 1957 to 1,482,516 in 1965 (*Employment and Payroll,* D.B.S.) ; total costs of fringe benefits also increased in absolute dollar terms from 774 million to roughly 2 billion during the same period (calculations based on statistics from Industrial Relations Counsellors Service, Inc. *op. cit.*).

[9] For detailed discussion of these methods, see Almarin PHILLIPS, « Industrial Capacity : An Appraisal of Measures of Capacity », *American Economic Review,* Vol. LIII, No. 2 (May 1963).

to above, were tried and statistics from one of the more successful me-
thods were used [10].

Apart from an expected positive correlation between capacity output
and overtime, one might also visualize that employers faced with a pro-
blem of skill shortages would tend to use overtime as an alternative. But
how do we measure skill shortages ? The concept which comes closest to
measuring skill shortages is structural unemployment, although the latter
is caused by major shifts in consumer demand, technological changes,
exhaustion of natural resources and changes in the organization of in-
dustry [11]. Measurement of structural unemployment itself is fairly con-
troversial but in one of their studies, Department of Manpower and Im-
migration defined it as a differential between job vacancy and unemploy-
ment rates [12].

A third and crucial variable for this study, affecting the use of over-
time, is the cost of fringe benefits itself. Therefore, it may now be hypo-
thesized that if variations in overtime cost (O), during the period under
study, can be accounted for by fringe costs, in equal or greater measure,
than capacity output (C) or structural unemployment (u), we would find
an indirect evidence of the existence of fringe barrier hypothesis.

(b) Since both overtime and fringe benefits are cost items to an employer
and mutually exclusive by definition and by the manner in which sta-
tistics were computed, it is implicit in the fringe barrier phenomenon
that an employer has a certain degree of freedom in substituting one
for the other. On this assumption, a positive and significant correlation
between these two factors may be interpreted as an existence of a certain
degree of substitution.

(2) It is also implicit in the hypothesis that employers, in their decision
to minimize costs, compare not only the costs of fringe benefits but the
combination of fringe costs plus the cost of adding new employees (i.e.,
the cost of labour turnover) with the overtime cost. Garbarino's estimates
showed overtime costs to be much more expensive than fringe costs
because he disregarded turnover costs. Thus, it is MacDonald's conten-
tion that the fringe barrier hypothesis was never adequately tested by

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[10] See Note on Statistical Sources for the method of computing capacity output
data.

[11] H. D. WOODS and Sylvia OSTRY, *Labour Policy and Labour Economics in
Canada,* Toronto, MacMillan of Canada, 1962, pp. 377-78.

[12] See Note on Statistical Sources.

Garbarino. He cites other studies in support of his position that the cost of adding employees (labour turnover plus fringe benefits) is greater than cost of paying overtime [13]. This may be tested in a multiple regression analysis by adding labour turnover cost, T to fringe cost and observe change, if any, in the percentage of variation explained in the dependent variable, $\triangle E$.

(3) Another way of testing the hypothesis, although negatively, is to suggest that during the same period, overtime cost, O, has *not* been an important consideration in hiring additional workers, $\triangle E$, thus implying a lack of significant correlation between O and $\triangle E$.

It should be sufficient to test the above three components of the hypothesis to establish validity of fringe barrier phenomenon. But further extensions of the same argument may also be tested by examining the behaviour and determination of overtime. Additional sub-hypotheses are therefore presented below :

(4) There are no conclusive studies on the behaviour and determination of overtime. Consequently, Garbarino seems to be of the opinion that overtime occurs on account of the internal factory circumstances, such as equipment breakdowns, absenteeism, errors in schedules plus a few other factors like union work rules and skill shortages. MacDonald agrees that the above factors do influence overtime but questions the role of work rules and skill shortages as the determinants of the change in overtime since 1956. Since the existing statistics on overtime are still inadequate and do not mention the reasons or relative importance of any of the internal factors which are responsible in assigning overtime in a plant, it is not possible to settle the above controversy.

Internal factory bottlenecks cannot be analyzed till the statistics on specific causes of assigning overtime are collected. But in a limited sense it is quite possible to analyze at a micro level, the change in union work rules affecting overtime. The following hypotheses are expected to bring out the relative importance of fringe costs in comparison with the level of capacity output or skill shortages.

STATISTICAL ESTIMATES

A number of equations, relating to the foregoing hypotheses were empirically estimated. Results of only two of these equations are being

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[13]   J. Ross WETZEL, « Current Developments in Factory Overtime », *Employment and Earnings*, May 1965, pp. vii-viii.

presented in the following paragraphs. Equation (1) testing hypotheses
(1) to (3) is estimated with the rate of change of employment ($\triangle$E) as
a dependent variable and fringe cost required by law (R), collectively
bargained fringe cost (B), cost of labor turnover (T), overtime cost (O)
and capacity output (C) as explanatory variables. In Equation (2) O is
regressed against total fringe costs (F), structural unemployment (u) and
capacity output (C) to test (a) and (b) of hypothesis 4. These two equa-
tions were estimated, using aggregative annual data [14]. Results of the
application of multiple correlation technique are provided below, with
sampling errors noted within parentheses : —

$$\triangle E_t = a + b_1 R_t + b_2 B_t + b_3 T_t + b_4 O_t + b_5 C_t \ldots (1)$$

$$= 4.80918 - 0.52415 R - 0.07749 B - 0.16736 T$$

$$(.14641) \qquad (.07606) \qquad (.05908)$$

$$+ 0.044251 O + 0.35221 C$$

$$(.06588) \qquad (.06592)$$

$$O_t = a + b_1 F_t + b_2 u_t + b_3 C_t \qquad \qquad \ldots (2)$$

$$= 26.01527 + 0.54866 F - .00125 u + .20124 C$$

$$(.24223) \qquad (.10257) \qquad (.40407)$$

Tables 1 and 2 contain further details of estimating equations (1) and
(2) respectively, with partial correlation coefficients provided at the bot-
tom. A brief explanation of these statistical estimates are as follows : —

(1). The first element of the fringe barrier hypothesis, namely, the in-
fluence of fringe costs in the decision to hire additional workers has
received inconclusive support. It may be observed (Table 1) that in mul-
tiple correlation analysis, combined cost of fringe benefits (i.e., R and
B) has no relationship with the rate of change in employment ($\triangle$E).

(2). However, as a second element of the fringe hypothesis, if we include
the cost of labour turnover, the relationship becomes quite significant,
giving us a correlation coefficient of .72. It may be recalled that in the
Garbarino-MacDonald controversy, labour turnover cost was considered
important in the determination of breakeven point. Our empirical results
for the Canadian manufacturing sector during the period 1957-1965,
suggest that fringe costs by themselves are not important in the decision

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[14] See Note on Statistical Sources.

TABLE 1

Results of Regression of R,B,T,O, and C on △ E (1957-1965)

$$\triangle \quad E = a + b_1 R_t + b_2 B_t + b_3 T_t + b_4 O_t + b_5 C_t$$

Estimated Regression Coefficients of :

Explanatory Variables	Constant Term a	Fringe Cost Required by Law b_1R	Collectively Bargained Fringe Cost b_2B	Labour Turnover Cost b_3T	Overtime Cost b_4O	Capacity Output b_5C	Multiple Correlation Coefficients R	Percentage of Variation Accounted for: $100 \times R^2$
R and B	100.50540	−.03763	.03174				.08	.70
R,B and T	114.69161	.07151	.00040	.24247			.72	51.28
R,B,T and O	−30.82959	.04902	−.01622	.24567	.02745		.72	51.76
R,B,T,O, and C	4.80918	−.52415	−.07749	−.16736	.04251	.35221	.80	64.10
S_b		(.14641)	(.07606)	(.05908)	(.06588)	(.06592)		(2.57584)
D-W	2.69962							

Partial Correlation Coefficients

Correlation Between	Variables Held Constant	Correlation (rp) Coefficients of Partial
△ E and R	B,T,O,C	−.45
△ E and B	R,T,O,C	−.26
△ E and T	R,B,O,C	−.56
△ E and O	R,B,T,C	.17
△ E and C	R,B,T,O	.51

TABLE 2

Results of Regression of F,u and C on O (1957-1965)

$$O_t = a + b_1 F_t + b_2 u_t + b_3 C_t$$

Estimated Regression Coefficients of :

Explanatory Variables	Constant Term a	Total Fringe Costs $b_1 F$	Structural Unemployment $b_2 u$	Capacity Output $b_3 C$	Simple/Multiple Correlation Coefficients	Percentage of Variation accounted for
F	31.86500	.69358	—	—	.96	93.76
F and u	32.53570	.71559	−.03297	—	.96	93.76
F, u and C	26.01527	.54866	−.00125	.20124	.97	93.86
S_b		(.24223)	(.10257)	(.40407)		
D − W	(2.15897)					

Partial Correlation Coefficients

Correlation Between	Variables Held Constant	Coefficients of Partial Correlation (rp)
O and F	u and C	.38
O and u	F and C	−.003
O and C	F and u	.13

to hire additional workers. But with the addition of labour turnover cost to the total cost of fringe benefits, the employer decision on the basis of comparative costs and economic logic becomes simpler. The total package of fringe and turnover costs being greater than overtime cost, he would tend to restrict hiring workers in favor of overtime.

It is interesting to note that in the partial correlation analysis, when costs of labour turnover, overtime and capacity output are held constant, legally required fringe benefit costs do seem to influence the hiring of additional workers. The sign is also negative, indicating that an increase in fringe costs is associated with a decrease in employment. Or in other words, fringe costs during the period under study, have acted somewhat as a barrier in the hiring process. It may also be observed that capacity output (C) has shown a respectable partial correlation (rp = .51) with the change in employment ($\triangle E$). In fact this coefficient of partial correlation is higher than what it is for fringe cost required by law (R). This has strong indications that employment decision rests primarily on current levels of gross product [15].

(3) Regarding the third component of the hypothesis, namely the influence of overtime cost in hiring additional workers, there is conclusive evidence that both in multiple and partial correlation analyses, it has been the least significant variable — accounting for a negligible percentage of variation in $\triangle E$ under the former technique and a very low partial correlation coefficient with a wrong sign (r_p = .17) under the latter. Standard errors of regression coefficients (S_b) also indicate the fact that at 95% confidence interval the true values of regression coefficients for R, T and C lie in a range defined by two times the standard deviation either side of the point estimate. On the other hand, there are good chances that true values of coefficients of B and O, containing negative values in the confidence interval may actually be zero. In other words, overtime cost and collectively bargained fringe cost [16] have no measurable influence on the decision to hire additional workers; whereas R, T and C have. Eliminating the mention of other variables, we could

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15 For a related discussion on the relationship of various categories of labour input and gross product, see E. KUH, « Income Distribution and Employment Over the Business Cycle » in J.S. DUESENBERRY, G. FROMM, L.P. KLEIN and E. KUH (eds.) *The Brookings Quarterly Econometric Model of the United States,* North Holland Publishing Company, 1965.

16 Perhaps unions could be exonerated from the charge of unduly raising the cost of collectively bargained fringe benefits — at least to the extent that these fringe costs do not deter additional employment.

simply conclude that fringe cost required by law has a significant negative effect on the hiring of additional workers, but overtime cost does not have any influence whatsoever.

The next stage of analysis requires an examination of the behaviour of overtime. Statistical estimates of regressing O against F, u and C are helpful in testing the components of the hypothesis that decision to work existing work force to its maximum, (i.e. work them overtime) is made on the basis of comparative costs involved in paying fringe costs on an additional worker as against the cost of paying premium overtime rate multiplied by the number of overtime hours required.

On the question of what determines overtime, the fringe barrier hypothesis provided a few analytical insights. They were described earlier and the resutls of testing them empirically may now be analyzed (see Table 2) : —

(a) It may be observed that among the independent variables, explaining variation in overtime, fringe cost is the only significant factor. It explained 93.76 percent variation in overtime cost incurred by the Canadian manufacturing sector during the nine-year period under study. The other two exploratory variables, u and C did not contribute anything. Thus suggesting that two of the most plausible external variables are not important in the determination of overtime and therefore, by default, throwing weight in support of the internal production bottlenecks (equipment breakdown, absenteeism, union work rules, etc.) as the possible factors of causation.

(b) There is a strong simple correlation between fringe costs and overtime (r = .96). Also, in the multiple regression, fringe cost has a statistically significant regression coefficient, (0.54866) indicating that if fringe costs go up by one percent, overtime costs will rise by .55 percent (both fringe and overtime costs are percentages of payroll). Thus accepting fringe costs as an important influence on overtime (besides the possible influence of internal factory bottlenecks which we have not been able to measure). Since fringe benefits and overtime are cost items to the employer who has, at least in theory, an option to substitute overtime cost for fringe cost, the above relationship presents a picture of subtitutability in cost decisions of the Canadian manufacturing sector for the period under study. A note of caution is imperative here in view of the poor results of partial correlation analysis. Fringe cost is much less

important (r_p = .38) when unemployment and capacity output are held constant. However, lack of influence of u and C on overtime, pointed out earlier, is further confirmed [17].

CONCLUSIONS

The empirical evidence is in support of fringe barrier hypothesis but not until labour turnover costs are added to fringe costs. Fringe costs by themselves do not affect employment decision (as shown in multiple regression coefficients, Table 1) but (in partial correlation analysis, bottom of Table 1) it appears that if fringe costs are separately identified as those legally required and those bargained collectively, it is only the influence of the former which seems to have some restrictive influence on employment. Collectively bargained fringe benefits have no influence on employment changes. The evidence is not strong enough to advance policy recommendations but it may be argued that government may be well advised to encourage research on the possible impact of passing further social security legislation which may add to the employee related fringe costs. This will make overtime a less expensive alternative, inducing the employers to restrict additional hiring. It is rather early at this stage to suggest legislative restrictions on overtime or higher penalty rates. But if the burden of employee related fringe cost increases, such a measure may become necessary to avoid its adverse effect on expanding employment. It is, however, important to mention the limitations of the study, without basically altering the above conclusions. The following factors may somewhat change the perspective of research in this area and emphasize the need for collecting and refining data on fringe benefits and overtime.

(1) Canadian data on fringe benefits and overtime are extremely inadequate. Recently, a joint survey on fringe benefits by the Department of

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[17] Non-availability of published data on structural unemployment in Canada is responsible for luke warm public policy in labour market adjustment. Similarly, private employers also fail to know the extent of skill shortages and the consequent need to adjust the magnitude of overtime. We used some preliminary job vacancy statistics and calculated their differentials over unemployment figures. In this exercise it was supposed that there was a certain amount of structural unemployment which compelled employers to use overtime as a substitute. Thus it was expected that correlation between Q and u will be significant and positive. But in our statistical estimates u has shown no correlation. Further research on this variable will have to wait till reliable job vacancy surveys, currently being conducted by the D.B.S., produce meaningful measures of structural unemployment.

Labour and Dominion Bureau of Statistics has been started which would
be of immense help in future studies of this kind. But no conclusive study
on fringe barrier hypothesis is possible without collecting data on over-
time, describing the causes of assigning it internally in a factory. The
present study attempted to fill in this gap by suggesting that external fac-
tors such as skill shortages and capacity output are not significant deter-
minants of overtime. Therefore, by the process of elimination, internal
factors, as pointed out by Garbarino, may be considered important. A
study of these internal factors plus union work rules may perhaps settle
this controversy by concluding that overtime is determined independently
of fringe costs. Hence in the decision to hire additional workers, the
fringe barrier proposition is not relevant. But till such time these data
are forthcoming, there is no way of refuting the fringe hypothesis.

(2) The above position may lead future research in this area to modify
our earlier conclusion to a certain degree. We have indicated that there
is more evidence in support of fringe barrier hypothesis than there is
against it. Thereby implying that fringe costs have been somewhat res-
ponsible in restricting additional employment in the Canadian manu-
facturing sector, during the period under study. But a more fundamental
issue to examine alongside is to study the basic ingredients of employ-
ment decision which neither Garbarino nor MacDonald have discussed.
This is in relation to Kuh's findings on employment behaviour over
business cycle [18]. He has successfully demonstrated that the employment
decision is based on current and lagged levels of gross produce, stock of
business capital and average work week. The last variable is extremely
relevant for our study because it indicates the extent to which overtime
may be required. Thus Kuh has indirectly accepted the importance of
overtime but not that of fringe benefits in his employment function. Kuh's
position may therefore be interpreted to mean that if his exploratory
variables are basically permissive, fringe cost would not be a strong
barrier. On the other extreme, it is not difficult to envisage that if over-
time premium rate became very high, it will not completely disappear as
some overtime will have to be assigned for internal factory reasons, such
as absenteeism and union work rules. To this extent, fringe barrier hypo-
thesis is only partially valid, operating in a narrow range. It may not
restrict employment in the face of high economic activity which requires
full shift production schedules rather than utilizing a few skilled workers
on an overtime basis. In this sense, fringe costs could perhaps be a barrier

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[18] E. KUH, op. cit.

only in the early phases of an economic recovery, thereon they could only be a damper in marginal cases and not a barrier, *per se.*

Note on Statistical Sources

Employment data were obtained from Dominion Bureau of Statistics, *The General Review of Manufacturing,* Cat. No. 31-201. Fringe benefit costs (legally required and collectively bargained) and overtime costs as percentage of payroll were obtained from *Industrial Relations Counsellors Service,* Inc., and *Thorne Group* for the years 1957, 59, 61, 63 and 65 (extrapolated for the missing years). Labour turnover data were taken from *Hiring and Separation Rates in Certain Industries,* D.B.S. Cat. No. 72-006. Figures in this publication are reported on a monthly basis as rates per hundred persons on payroll. They were averaged on an annual basis and lower of the two (i.e. of separation and hiring) was taken as turnover rate. To calculate total turnover cost in manufacturing the following formula was used : —

$$\text{Labour turnover cost} = [\text{Turnover rate}] \, [\text{Employment}]$$

$$[500 + \frac{500}{\text{AEWC}} \quad \triangle \text{ AEWC} \quad \frac{Y\text{-}1}{Y}]$$

where 500 is estimated per employee dollar cost of hiring, training, etc. (See Willard A. Kerr, « Labour Turnover and its Correlates », *Journal of Applied Psychology,* Vol. XXXI, 4, August, 1947, pp. 366-371 and J. R. Greystoke, C. F. Thompson and J. J. Murphy, « Labour Turnover Survey », *Journal of the Institute of Personnel Management,* Vol. XXXIV, 321, September 1952, pp. 158-165.

AEWC is annual employee wage cost which is 52 x average weekly wages and salaries, obtained from *The General Review of Manufacturing.*

In order to compute capacity output figures, two statistical series were needed : (1) indicies of manufacturing production, (2) net stock of fixed capital. The first one was obtained from the *Annual Supplement to the Monthly Index of Industrial Production,* D.B.S. Cat. No. 61-005 ; and the second one from the *Estimates of Fixed Capital Flows and Stocks, Manufacturing,* D.B.S. (Unpublished date). Capacity output data were developed by plotting IMP figures for a much longer period (1926-1965). A trend line was calculated for the peak production years and these values were adjusted for the growth of capital stock. A second method was also tried by calculating capital/output ratios for non-recession years and trend values were obtained for these years, to be subsequently adjusted by IMP. The second method required log relationship in calculating trend values and appeared somewhat unrealistic compared with the capacity output figures obtained through the first method. Hence it was rejected. For further details on concept and use of capacity output see Charles L. Shultze, « Use of Capacity Measures for Short-Run Economic Analysis », *AER,* Vol. LIII, No. 2, May 1963 ; and Frank DeLeeuw, « The Concept of Capacity », *Journal of the American Statistical Association,* December 1962.

Structural unemployment figures were obtained from the Department of Manpower and Immigration from one of their projects on *Measurement of Structural Unemployment* (Unpublished).

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L'IMPACT DES AVANTAGES D'APPOINT SUR L'EMPLOI DANS L'INDUSTRIE MANUFACTURIÈRE CANADIENNE

L'objet de cet article est de vérifier si l'accroissement constant du coût des avantages d'appoint au Canada tend à freiner l'expansion de l'emploi. On a fait aux États-Unis une telle enquête qui visait à rendre compte jusqu'à quel point l'augmentation de ces mesures (fringe barrier hypothesis) pouvaient faire obstacle à l'expansion de l'emploi. Il s'agit au fond d'une hypothèse de travail qui peut ainsi s'énoncer : lorsqu'il y a augmentation du coût des avantages d'appoint accordés aux employés par rapport aux salaires directs, les employeurs préfèrent favoriser le travail supplémentaire au détriment de l'expansion de l'emploi.

L'augmentation du coût des avantages d'appoint au Canada résulte des prestations imposées par la loi (assurance-chômage, accidents du travail, pensions de vieillesse), et des avantages d'appoint obtenus par négociation collective. (vacances payées, jours fériés, repos intercalaires, indemnité de fin d'emploi, indemnités spéciales, repas gratuits). Cette dernière catégorie d'avantages d'appoint était généralement rangée dans les questions non salariales pendant la période du gel des salaires au cours de la deuxième guerre mondiale. C'est ainsi que, par exemple, la tendance à accorder des absences rénumérées s'est maintenue depuis cette époque.

UN MODÈLE

On a mis au point un modèle de regression afin de vérifier la valeur de cet obstacle et on s'est beaucoup intéressé à la controverse Garbarino-MacDonald concernant le seuil au-delà duquel le travail supplémentaire devient l'option préférée. Dans la détermination de ce seuil, MacDonald a considéré le roulement de la main-d'œuvre comme une variable décisive et laisse entendre que Garbarino pouvait réfuter l'existence d'un pareil obstacle parce qu'il ne comprenait pas le coût du roulement de la main-d'œuvre dans le modèle. Celle qu'on propose ici est conforme à celle de MacDonald et, en conséquence, elle inclut d'année en année les données relatives au roulement de la main-d'œuvre en même temps que les autres variables qui ont fait l'objet d'études. On a vérifié l'hypothèse en analysant les divers types de relations suivantes qui en constituent les composants essentiels.

(1) On a posé l'hypothèse que, pendant la période de neuf ans (1957-1965) qui a fait l'objet d'analyses, le coût des avantages accessoires apprécié en pourcentage de la feuille de paie, F (qui comprend le coût des avantages d'appoint imposés par la législation, R plus le coût des avantages d'appoint négociés collectivement, B) ont eu pour effet de détourner les employeurs de l'embauchage d'employés supplémentaire ($\triangle E$). La proposition n'est pas de nature à établir un lien de causalité, mais elle laisse présager un choix fait pour des motifs d'ordre économique.

(2) Selon MacDonald, Garbarino n'a jamais contrôlé valablement l'hypothèse. Il cite à l'appui de son point de vue d'autres études selon lesquelles le coût de l'embauche d'employés supplémentaires (roulement de la main-d'œuvre et avantages accessoires) dépasse le coût du paiement des heures supplémentaires. On peut vérifier ce fait dans une analyse de régression multiple en ajoutant le coût du roulement de la main-d'œuvre, T, au coût des avantages d'appoint pour ensuite observer le changement, s'il se produit, dans le pourcentage de variation expliqué dans la variable dépendante $\triangle E$.

(3) Une autre façon de vérifier l'hypothèse, quoiqu'elle soit négative, c'est de supposer que, pendant la même période, le coût du travail supplémentaire O n'a pas joué un rôle important dans l'embauchage d'employés additionnels, $\triangle E$, ce qui veut dire qu'il n'y a pas de corrélation vraiment significative entre O et $\triangle E$.

LES DONNÉES STATISTIQUES

D'une façon empirique, on a posé un certain nombre d'équations en regard des hypothèses précédentes. Voici le résultat que donnent deux de ces équations.

$$\triangle E_t = a + b_1 R_t + b_2 B_t + b_3 T_t + b_4 O_t + C_t \quad \ldots \ldots \quad (1)$$

$$= 4.80918 - 0.52415\ R - 0.07749\ B - 0.16736\ T$$
$$ \quad (.14641) \qquad (.07606) \qquad (.05908)$$
$$+ 0.04251\ O + 0.35221\ C$$
$$ \quad (.06588) \qquad (.06592)$$

$$O_t = a + b_1 F_t + b_2 u_t + b_3 C_t \quad \ldots \ldots \quad (2)$$

$$= 26.01527 + 0.54866\ F - .00125\ u + .20124\ C$$
$$ \quad (.24223) \qquad (.10257) \qquad (.40407)$$

Voici maintenant une courte explication de ces données statistiques :

(1) Le premier élément de l'hypothèse, principalement l'influence du coût des avantages d'appoint, dans la décision d'embaucher des employés additionnels ne permet pas d'arriver à une conclusion ferme. On peut observer que dans l'analyse de corrélation multiple le coût global des avantages d'appoint (c'est-à-dire R et B) n'a aucune influence sur le taux de changement dans l'emploi ($\triangle E$).

(2) Cependant, comme deuxième élément de l'hypothèse si nous y incluons le coût du roulement de la main-d'œuvre, le rapport devient fort significatif en donnant un coefficient de corrélation de .72. On peut rappeler que, dans la controverse Garbarino-MacDonald, le coût du roulement de la main-d'œuvre jouait un rôle important dans la détermination du seuil. Les résultats empiriques obtenus en ce qui concerne le secteur de l'industrie manufacturière au Canada pendant la période 1957-1965 ont démontré que, en lui-même, le coût des avantages d'appoint n'a pas une grande influence dans la décision d'embaucher des employés additionnels. Mais, quand on ajoute le coût du roulement de la main-d'œuvre au coût global des avantages accessoires, la décision de l'employeur considérée sous l'angle de la comparaison des coûts et de la logique de l'économie devient plus facile. La somme globale du coût des avantages d'appoint et du roulement de la main-d'œuvre dépassant le coût du travail supplémentaire, l'employeur préfère réduire l'embauchage des travailleurs pour favoriser le travail supplémentaire.

(3) Quand l'on considère le troisième élément de l'hypothèse, c'est-à-dire l'influence du coût du travail supplémentaire sur l'embauchage d'employés additionnels, il faut conclure que, tant dans les analyses de corrélation multiple que partielle, on découvre une variable de peu de signification, puisqu'il n'y a qu'un pourcentage de variation négligeable dans $\triangle E$ selon les analyses de corrélation multiple et un coefficient très bas, dans les analyses de corrélation partielle, soit le signe contraire $r_p = .17$ selon ces dernières.

Conclusions

Les constatations empiriques ne confirment pas l'hypothèse que les avantages d'appoint sont un obstacle à l'expansion de l'emploi tant qu'on n'a pas ajouté à leur coût celui du roulement de la main-d'œuvre. Le coût des avantages accessoires n'influence pas en soi les décisions en matière d'embauchage, mais il ressort que, si l'on distingue le coût des avantages d'appoint imposés par législation de ceux qui résultent de la négociation collective, ce n'est que ceux-là qui semblent avoir quelque effet négatif sur l'emploi. Les avantages d'appoint obtenus par négociation collective n'exercent aucune influence sur les variations dans l'emploi. L'indication n'est pas assez marquée pour permettre d'y aller de recommandations de caractère pratique, mais on peut soutenir que l'État aurait avantage à faire pousser la recherche sur les effets de mesures de sécurité sociale qui sont de nature à accroître le coût des avantages d'appoint. Ceci inciterait moins à faire appel au travail supplémentaire qui porte les employeurs à restreindre l'embauchage.