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Unemployment, Cost and Availability of Accommodation and Wage Changes in Ontario

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The purpose of this paper is to determine whether there are consistent and significant relationships between wages changes, unemployment and cost and availability of accommodation in urban areas in Ontario.

Introduction

During the past decade several studies have been conducted concerning relationships between wages and other selected variables for the U.K., the U.S. and Canada¹. Basically these studies have attempted to link wage changes over time with such variables as unemployment, price changes, profit changes ; and, with varying degrees of success, the authors of the studies have established « trade offs » between wage changes and unemployment and significant relationships between wage changes and the other independent variables named above. The present study

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¹ See for example A. W. PHILLIP, « The Relationship between Unemployment and the Rate of Change of Money Wages in the United Kingdom, 1862-1857 », *Econometrica* XXV (1958), 283-299 ; P. SAMUELSON and R. SOLOW, « Analytical Aspects of Anti-Inflationary Policy », *American Economic Review*, XXXII (1960), 308-313 ; George PERRY, *Unemployment, Money Wage Rates and Inflation* (Cambridge, Mass. M.I.T. Press, 1966) ; G. L. REUBER, R. G. BODKIN, E. P. BOND and T. R. ROBINSON, *Price Stability and High Employment: The Options For Canadian Economic Policy*, for the Economic Council of Canada (Ottawa, Queen's Printer, 1966).

is in similar vein to those mentioned above, inasmuch as wage changes and unemployment are two of the variables analysed. However, in this study, cost and availability of accommodation are used as the other independent variables besides unemployment rates, and a cross sectional approach is substituted for the time series approach.

The purpose then of this study is to determine whether there are consistent and significant relationships between wage changes, unemployment and cost and availability of accommodation in urban areas in Ontario.

It was felt that a significant relationship between wage changes and unemployment would indicate that structural unemployment was similar, city-to-city throughout the Province, and that a city with a given average unemployment level could expect local wage changes to fall within certain predictable limits.

The authors hold that cost and availability of accommodation should also play a substantial role in determining wage changes in urban areas. The reasoning here is that employers in areas with above-average accommodation costs — the largest single family budget outlay — would have to compensate with higher wages in order to retain existing local labour supplies and/or attract additional labour from other areas. Availability of accommodation on the other hand can be seen as influencing the elasticity of local labour supplies : in as much as poor availability would tend to restrict the inflow of additional labour from elsewhere, and under such condition wages would tend to rise as employers bid against one another for restricted local labour supplies.

In summation, therefore, it was anticipated that wage changes throughout Ontario would vary inversely with unemployment rates and availability of accommodation, and directly with cost of accommodation.

Source and Nature of the Data

Wage data were obtained from Table No. 4 of the D.B.S. monthly publication *Employment and Average Weekly and Salaries* (Cat. No. 72-002). The unemployment and accommodation data were obtained from unpublished tables compiled by the Department of Manpower and Immigration for use by local Canada Manpower Centre Offices.

Average weekly wages and salaries were chosen as bases for wage change calculations rather than the alternative, hourly earnings, for it was felt that the latter would not reflect adequately overall changes in wage

levels in many of the cities covered by the study. Hourly earnings in most of the cities in fact covered manufacturing only, and in some instances these earning figures could, in the short run at least, reflect internal wage policies of individual large companies rather than local economic conditions.

It was realized of course that average wages and salaries would be affected by such factors as overtime and certain seasonal changes, but these shortcomings were considered to be more acceptable than those attributable to hourly rate data.

The unemployment rate figures used were month-end inventories of unemployed clients at local Canada Manpower Centre Offices, expressed as percentages of estimated local labour forces. Such percentages cannot of course be considered as completely accurate indicators of the absolute levels of local unemployment, but for city-to-city comparison purposes they would appear to be adequate.

The weekly cost of room and board (R & B) in the various cities was used as a cost of accommodation measure. Other cost of accommodation data were available, such as apartment rents, house rents and house purchase prices, but none of these alternative measures appeared to change sufficiently over a two year period to allow them to be considered as reliable indicators of local accommodation costs. Room and board prices on the other hand changed fairly rapidly; reflecting no doubt not only basic local accommodation price changes but also changes in such as local prices for such as food, laundry, etc.

Availability of accommodation, as recorded in Canada Manpower Centre tables, was according to the scale very good, good, fair, poor and very poor.

Treatment of the Data

The wages changes (\dot{W}_t) were calculated using the formula

$$\dot{W}_t = \frac{W_t - W_{t-1}}{W_{t-1}}$$

where W_t is the average local wage for the July-December period of 1968 and W_{t-1} the average local wage for the same period in 1967. Unemployment percentages (U_t) were the local averages for the July-December 1968 period.

For convenience purposes cost and availability of room and board were combined into a single composite variable by weighting weekly local room and board costs inversely according to local availability of such accommodation. A simple linear process of weighting was adopted, with very good availability being given a weight of unity and the availabilities good, fair, poor and very poor accorded the weights, 2, 3, 4 and 5 respectively. Thus the accommodation variable (A_t) is the product of local room and board costs and the weight assigned to local availabilities.

Twenty-eight complete sets of observations were available — the limiting factor being the availability of wage data — and all sets were used in the initial analysis. The time period constraint was imposed by the unemployment data which was available for the time period July-December 1968 only. Table 1, at the end of the article, gives all the data used in the analysis.

Empirical Tests

The main hypothesis to be tested is that unemployment and the cost and availability of accommodation play an important role in the determination of wage changes in urban areas in Ontario. In testing for the impact of U_t and A_t on W_t it was decided to remove initially the city of St. Thomas from our cross sectional linear regression. In 1968 workers in St. Thomas gained an earnings increase of 17.7% which was more than double the 7.7% the average earnings increase for the other 27 cities in our available sample size. An explanation of the unique St. Thomas situation will be found below.

A simple cross sectional linear Phillips-type curve between \dot{W}_t and U_t yielded the following results.

$$\dot{W}_t = 9.96 - 0.54 U_t \quad ; \quad r^2 = .24$$

(.19)

This linear Phillips curve was significant at the 99% level and the unemployment variable explained 24% of the variance of \dot{W} in our sample.

Testing the impact of our index cost and available accommodation (A_t) on \dot{W}_t we found :

$$\dot{W}_t = 3.92 + .051 A_t \quad ; \quad r^2 = .30$$

(.016)

The results were also significant at the 99% level and A_t explained 30% of the variance of \dot{W}_t .

The multiple linear regression of W_t on U_t and A_t was discovered to be as follows :

$$\dot{W}_t = 6.26 - .47 U_t + .045 A_t \quad ; \quad R^2 = .48 \\ (.16) \quad (.014)$$

and the slopes were significant at the 99% level.

It was therefore concluded that our independent variables together were able to explain 48% of the wage changes in our sample of Ontario cities. We were able to accept our original hypothesis that unemployment and the cost and availability of accommodation play a significant role in the determination of wage changes in urban areas in the Province.

When our final and unusual observation of St. Thomas was introduced into the multiple linear regression the R^2 fell from .48 to .37 and the significance of the independent variables was considerably reduced. It was then decided to put our regression into the non linear form :

$$\dot{W}_t = a U_t^{-B} \cdot A_t^c$$

converting to the log-linear form we get

$$\text{Log } \dot{W}_t = \text{Log } a - B \text{ Log } U_t + C \text{ Log } A_t$$

Our regression now yielded the following results.

$$\text{Log } \dot{W}_t = .35850 - 0.35819 \text{ Log } U_t + 0.39491 \text{ Log } A_t \quad ; \quad R^2 = .48 \\ (0.10752) \quad (0.14719)$$

U_t is now significant at the 99% level and A_t is significant at the 95% level. In the log-linear form both variables again explain 48% of \dot{W}_t and we are able to accept our original hypothesis.

Concluding Notes

Although the model was able to explain approximately a half of the wage changes in the selected cities during the period under review, a substantial proportion of the wage changes which occurred remain unexplained. It seems probable that the introduction of such additional variables as local changes in value productivity, the local impact of union wage contract and a more exact measure of local living cost would improve considerably the predictability of the model. For instance, a value productivity variable would undoubtedly have played a very significant role in explaining the abnormally high wage change in the city of St. Thomas. The value of labour output in that city was suddenly and considerably increased by the introduction of a large auto assembly plant into an area

which had previously had a relatively small manufacturing sector. Again, it appears reasonable to suppose that success by Canadian automobile workers in securing near wage parity with their U.S. counterparts affected wage changes in cities such as Windsor (See Table at end of article).

Notwithstanding the absence of the above-mentioned data, however, the statistical analysis carried out supports the original hypothesis that local unemployment and cost and availability of accommodation are significant determinants of urban wage changes in Ontario.

TABLE 1

Wages Rates, Wage Rate Changes, Average Annual Unemployment Rates, Cost and Availability of Accommodation: By City: Ontario 1968-69.

	City	W_t	W_{t-1}	\dot{W}_t	U_t	Cost of Availab-		A_t
		\$'s	\$'s	%	%	\$'s	R & B	
1	Belleville	94.49	90.06	7.1	2.8	25	3	75
2	Brampton	114.25	106.01	7.8	3.1	30	3	90
3	Brantford	106.16	100.18	6.0	3.0	22	3	66
4	Brockville	110.28	102.66	7.4	3.8	25	3	75
5	Chatham	114.33	105.60	8.3	4.7	24	4	96
6	Cornwall	107.83	100.27	7.5	6.4	26	2	52
7	Ft. William	108.00	102.65	5.2	5.9	25	3	75
8	Guelph	105.50	96.68	9.1	2.9	25	3	75
9	Hamilton	118.40	110.39	7.3	5.2	30	3	90
10	Kingston	110.81	101.90	9.6	4.4	27	3	81
11	Kitchener	103.48	94.56	9.4	1.8	25	3	75
12	London	107.76	98.97	8.9	4.1	25	2	50
13	Niagara Falls	106.57	99.45	7.2	5.2	22	3	66
14	North Bay	110.22	106.80	3.2	6.8	22	2	44
15	Oshawa	137.36	124.96	9.9	2.2	25	4	100
16	Ottawa	104.36	97.08	7.5	3.1	28	3	84
17	Peterborough	116.07	110.83	4.7	4.5	25	2	50
18	St. Catharines	125.56	115.20	9.0	6.3	35	3	105
19	St. Thomas	113.27	96.21	17.7	1.7	25	3	75
20	Sarnia	149.10	133.56	11.6	2.9	30	3	90
21	S.S. Marie	126.15	119.93	5.2	5.1	25	1	25
22	Stratford	97.61	90.44	7.9	2.3	25	3	75
23	Sudbury	137.14	126.00	8.8	3.3	35	3	105
24	Timmins	100.58	94.96	5.9	8.6	24	4	96
25	Toronto	116.17	107.81	7.8	2.7	27	3	81
26	Welland	129.11	120.37	7.3	4.7	25	2	50
27	Windsor	133.18	121.00	10.1	4.8	28	3	84
28	Woodstock	104.74	96.49	8.6	1.8	22	3	66

CHANGEMENTS DE SALAIRES EN ONTARIO : CHÔMAGE, COÛT ET DISPONIBILITÉ DE LOGEMENT

Au cours des dix dernières années, plusieurs travaux aux États-Unis, en Grande-Bretagne et au Canada ont étudié les relations entre les changements dans les salaires et certaines variables explicatives telles le chômage et les variations des prix et bénéfices des sociétés. Le texte introduit deux autres variables explicatives : le coût et la disponibilité du logement. Les changements de salaire seraient négativement reliés au taux de chômage et à la disponibilité du logement et directement reliés au coût du logement.

Les données du taux de chômage sont les enregistrements mensuels de chômeurs aux centres de main-d'oeuvre du Canada exprimés en pourcentage de la force ouvrière locale. Le coût et la disponibilité du logement sont groupés en une seule variable en multipliant les coûts du logement par un facteur variant inversement avec la disponibilité du logement. L'étude utilise les données de vingt-huit villes ontariennes et se limite à la période de juillet-décembre 1968, la seule où les données du chômage sont disponibles.

Si on exclut la ville de St. Thomas qui connut au cours de la période une variation anormale des salaires à la suite d'une implantation d'une usine d'assemblage d'automobiles, le taux de chômage et la variable coût et disponibilité du logement expliquent avec une régression multiple linéaire, 48% de la variance des augmentations de salaires dans les villes de l'Ontario. Les pentes des deux variables sont significatives à un niveau de 99%. Une régression logarithmique linéaire donne sensiblement les mêmes résultats pour l'ensemble des vingt-huit villes.

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