Unemployment, Vacancies, and "Full Employment" in the Irish Manufacturing Sector

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UNEMPLOYMENT, VACANCIES, AND "FULL EMPLOYMENT" IN THE IRISH MANUFACTURING SECTOR

by

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The most frequently used indicator of Irish labour market conditions is the unemployment rate. The target of "full employment" has usually been defined by choosing the unemployment rate believed to correspond to an acceptable level of "involuntary" unemployment. This rate was set at 2 per cent in the NIEC 1967 report, and at 4 per cent in the NESC 1975 report. Neither of these studies contained an analysis of the implications of the target unemployment rate for the rate of wage inflation. On the basis of the evidence for the years 1953-71, Slattery (1976/77) suggested that an unemployment rate of 3 per cent is consistent with a 4.5 per cent rate of price inflation.

Part of the difficulty in attempting to define "full employment" in the Irish context lies in the absence of any data on vacancies. In Britain, where an official vacancies series has been available since the Second World War, it has been suggested that the balance between vacancies (V) and unemployment (U) or (U-V)/U, should be used in preference to the unemployment rate on its own to measure the tightness of the labour market (Dow and Dicks-Mireaux, 1958). The British series on vacancies has been used extensively to analyse the nature of the shift in the level of unemployment that occurred in the late 1960s (Gujarati, 1972; Bowers *et al.*, 1972; Evans, 1975).

In the present paper the results of an attempt to construct a consistent series on vacancies in the Irish manufacturing sector are presented. This new series is then applied to testing for structural changes in the level of unemployment during the 1970s, and to the definition of the "full employment" target.

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The Irish Vacancies Data

The only officially published series on vacancies appears in *The Trend of Employment and Unemployment* and refers to "vacancies notified at and filled through National Manpower Service Offices and the Local Employment Offices." Before the introduction of the National Manpower Service these related mainly to the vacancies for works financed from Central Government Funds, and the number declined from 37.5 thousand in 1960 to 15.5 thousand in 1971. In recent years there has been an increase in the number of vacancies notified, and presumably a broadening of the coverage of the series, but it is too early to attempt to use these data to construct a time series on vacancies.

The Confederation of Irish Industries and the Economic and Social Research Institute (CII-ESRI) have since the last quarter of 1968 administered a questionnaire to a sample of firms in the manufacturing sector which includes the following set of questions:

"Could more be produced with present resources? If 'No' was this due to

Insufficient capacity
Insufficient skilled male labour
Insufficient skilled female labour
Insufficient unskilled male labour
Insufficient unskilled female labour
Insufficient raw materials
Insufficient cash or credit
Any other reason?"

In the second quarter of 1974 the questionnaire was altered and "insufficient demand" was included among the list of possible constraints on expanding production. In building up a consistent series on vacancies from these responses, firms giving "insufficient demand" as a constraint on output were reclassified as "yes" answers to the parent question.

A number of objections to the use of this survey information to construct a "vacancies" series needs to be considered.

1. The data refer to the *proportion of firms* reporting a shortage of labour, and cannot be converted into a series on the actual number of vacancies.

2. The firms are weighted by turnover to derive the overall proportion for manufacturing industry. When dealing with a series for vacancies it would be preferable to weight by employment.
3. Firms must answer the questions in this part of the questionnaire by a yes/no answer. No information is obtained about the magnitude of the labour shortage.
4. Firms are required to give only one reason for inability to expand production. If a firm experiences both a labour shortage and some other constraint on production it is not clear which will be given as the cause of inability to expand production.
5. Firms may wish to hire additional workers even when not expanding production. The answer to this question will not reflect vacancies arising due to the need to replace attrition from the existing work force.
6. Finally, and perhaps most significantly, the CII-ESRI survey covers only those firms which are already in production. New firms setting up in Ireland and attempting to recruit their labour force are not reflected in the data.

The first three points suggest that at best the index of vacancies based on this question should be treated as an ordinal measure of the demand for labour. A theoretical justification for the use of such an index could be elaborated along the lines of the arguments that have been used to justify the construction of an index of expected inflation using the responses to a question about whether the interviewee expects prices to rise in the coming period (see Carlson and Parkin, 1975). The second three points listed above indicate that an index of vacancies based on the responses to this question is at most the lower limit of the actual level of vacancies. The omission of new firms from the survey is especially important in this context and must be borne in mind throughout the discussion that follows.

Despite these reservations, it is possible that valuable new information about labour market conditions may be gained from the responses to this part of the survey. Table 1 sets out the proportion of firms that reported production was constrained due to labour shortages over the period 1969-76.* The figures are given for four categories of labour separately and for all categories combined. The official unemployment rate in manufacturing industry is also shown. It may be seen that

*In 1974 a new sample was selected and the survey conducted on a monthly basis. Comparison of the responses for the new and old sample shows virtually identical results. The vacancy index from the quarterly sample for 1974:1 was 8.4% compared with 8.3% from the monthly survey in March 1974. This is the only overlapping observation.

TABLE 1: UNEMPLOYMENT AND "VACANCIES", MANUFACTURING INDUSTRY, 1969-1976.

Year	Quarter	Unemployment(1)	"VACANCIES"(2)				
			Total	Skilled Male	Skilled Female	Unskilled Male	Unskilled Female
1969	1	5.8	10.7	n.a.	n.a.	n.a.	n.a.
	2	4.7	19.2	5.3	6.2	4.3	3.4
	3	4.3	21.3	4.5	8.4	0.6	7.8
	4	4.6	14.6	5.7	4.7	0.9	3.3
1970	1	5.4	11.8	3.0	5.5	1.5	1.8
	2	6.0	9.6	2.4	3.9	1.2	2.1
	3	5.4	13.7	2.2	5.9	2.6	3.0
	4	5.2	8 7	1 7	3.9	1.4	1.7
1971	1	6.2	9.9	0.9	5.6	1.2	2.2
	2	5.9	8.3	1.3	5.8	0.3	0.9
	3	5.5	11.4	1.5	6.8	0.0	3.1
	4	6.6	1.6	0.4	0.0	0.0	1.2
1972	1	7.6	6.5	1 7	3.6	0.0	1.2
	2	6.9	6.8	1.9	3 7	0.0	1.2
	3	6.5	4.6	0.8	2 7	1.1	0.0
	4	6.3	7 7	1.9	3.9	0.0	1.9
1973	1	6 7	8.0	2.8	2.1	0.3	2.8
	2	5 8	7 7	4.7	2.5	0.0	0.9
	3	5 4	15 4	3.2	9.0	1.1	2.1
	4	5 3	10.4	2.9	2.9	0.0	4.6
1974	1	6 2	13 7	3 1	5 6	1.3	3.7
	2	6.0	11.4	4 1	3.2	1.5	2.6
	3	6 3	7 2	3 1	1 7	0.6	1.8
	4	8.5	1.9	0.9	0 7	0.3	0.0
1975	1	12 4	2 1	0 1	3.0	0.0	0.0
	2	12.4	0.4	0 1	0.3	0.0	0.0
	3	12.2	0.7	0.0	0 7	0.0	0.0
	4	12 3	1 1	0 1	0.6	0.0	0.4
1976	1	12 8	0 7	0.0	0 7	0.0	0.0
	2	11 7	0.5	0 1	0.4	0.0	0.0

Notes (1) Unemployment the percentage of Insured Persons on the Live Register for all Manufacturing Industries.

(2) Vacancies Percentage of Manufacturing firms who say their production is constrained due to Insufficient Labour

relatively few firms reported shortages of labour as a binding constraint over this period. The figure for all categories of labour combined never exceeded 22 per cent, and towards the end of the period it fell to near zero. Predictably enough, a higher proportion of firms reported shortages of skilled than of unskilled labour. Skilled female labour

tended to be the most frequently mentioned, especially in the early 1970s. The "vacancies" series for individual categories of labour are inter-correlated and the series for all categories combined is naturally highly correlated with its components. The correlation coefficients are set out in Table 2. The relatively low correlation between the series for unskilled males and the rest is notable: the proportion mentioning a shortage of unskilled males exceeded 1.5 per cent only twice in the 7-year period.

The Relationship between U and V

There are reasons why the relationship between U and V is expected to be non-linear. A linear relationship would unrealistically postulate that unemployment would fall to zero as vacancies rose to some high level. In fact at low levels of unemployment further increases in vacancies are likely to result in smaller and smaller declines in unemployment. Similarly, at low levels of vacancies the rate of increase in unemployment can be expected to accelerate.

The choice of a functional form for the relationship between U and V therefore takes account of this non-linearity. Two specifications are reported, namely, the double-log and the inverse (t-ratios in parentheses):

$$(1) \quad \ln U = \underset{}{2.33} + \underset{(3.3)}{0.15}S_1 - \underset{(15.4)}{0.27} \ln V \qquad (63.2)$$

$$\bar{R}^2 = 0.89 \quad DW = 2.16$$

$$(2) \quad U = \underset{(15.6)}{5.35} + \underset{(2.4)}{1.35}\, S_1 + \underset{(9.2)}{3.76}\left(\frac{1}{V}\right)$$

$$\bar{R}^2 = 0.75 \quad DW = 1.75$$

The variable S_1 is a seasonal dummy for the first quarter; the equations were originally run with three seasonal dummies but only that for the first quarter was statistically significant.

These findings are satisfactory from a statistical viewpoint, and encourages the use of the V series as one indicator of labour market conditions.

The Effect of Unemployment Compensation

One of the uses to which the V series has been put in Britain is to explore whether a "structural shift" occurred in the unemployment

series in the late 1960s and whether this shift was related to changes in legislation affecting the unemployed. The implications of changes in the Irish unemployment insurance scheme on measured unemployment have been discussed in another context in Walsh (1976). In order to establish whether the UV relationships presented above are shifted by changes in unemployment compensation, an additional variable (UCW) has been introduced. This equals the ratio of unemployment compensation to net earnings and has been discussed in detail in the study cited above. The following results were obtained:

$$\underset{(2.3)}{} \text{(3) } \ln U = \underset{(2.3)}{0.95} + \underset{(4.5)}{0.17}\, S_1 - \underset{(10.4)}{0.22} \ln V + \underset{(3.3)}{0.33} \ln UCW$$

$$\bar{R}^2 = 0.92 \quad DW = 2.11$$

$$\text{(4) } U = \underset{(1.9)}{1.96} + \underset{(1.3)}{1.58} S_1 + \underset{(5.9)}{2.71} \frac{1}{V} + \underset{(3.5)}{0.07}\, UCW$$

$$\bar{R}^2 = 0.82 \quad DW = 1.63$$

UCW is highly significant in both equations. The increasing ratio of unemployment compensation to net earnings seems to move the relationship between U and V outward so that a given degree of labour shortage (as measured by the level of V) is now associated with a higher rate of unemployment than would have been the case in the late 1960s.*

A "Shake-Out" of Hoarded Labour?

Taylor (1972) argued that the rise in measured unemployment associated with each level of vacancies in Britain was not due to changes on the supply side of the labour market but to a deliberate "shake-out" of hoarded labour by employers in the years after 1966. Partly because of the more generous unemployment compensation schemes introduced in recent years, he argued, employers now face lower costs of dismissing and rehiring workers. This encourages them to adjust their actual level of employment more accurately to the level that is desired in the light of current production. The result is an increase in unemployment over what it would have been for each level of vacancies in the past.

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*UCW is in fact very highly correlated with a dummy variable to reflect the introduction of the pay-related supplement in 1974. The sample was split into two sub-periods, 1968:1-1974:1 and 1974:2-1976:2, and a Chow-test for non-homogeneity with the double-log specification yielded $F_{8,24}=4.1$ which is significant at the .05 level. This break unfortunately coincides with the change in the sample in March 1974, but this new sampling procedure does not seem to have altered the estimate of vacancies obtained. See preceding footnote.

Taylor uses the phrase "labour hoarding" in this sense, and proposes an index equal to

$$H=(1-Q/N/(Q/N)^*)\ 100$$

where Q, N represent the volume of output and employed labour, and the starred values are predicted from the trend line $Q/N=Ae^{rt}$ (using seasonally adjusted data), where t is a time index and e is the base of the natural logarithms. The index was adjusted by settting the lowest value equal to zero, so that only non-negative values were recorded.

This index provides an index of unutilised labour to the extent that a fall in the rate of growth of labour productivity from its trend can be attributed to the existence of an excessive level of employed labour.† The results of calculating this index are set out in Table 3. Despite its fairly erratic time path, the index shows clear evidence of labour hoarding during the recession of 1974/75. Labour productivity declined as output growth ceased, indicating that despite the unprecedented rise in unemployment the level of employment was higher than was ideal from employers' viewpoint. 1975 was the first year since 1956 when productivity per person employed in manufacturing industry did not increase.

These findings suggest that the upward movement in U relative to V associated with the rising value of UCW in the previous section could not be accounted for by the alternative hypothesis of a decrease in labour hoarding in recent years. All the eivednce suggests that as the unemployment rate rose to unprecedented levels in 1974/75 the amount of underutilized labour held by industry was also at a high level. The explanation for the shift in the UV relationship cannot lie in a disappearance of labour hoarding.

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*Taylor measured the trend value of productivity by joining peaks of the cycle in the original data

†Starting from a Cobb Douglas production function with disembodied technical change labour productivity equals $Q/L=ae^{rt}\left(\frac{K}{L}\right)^d$ and since K I should tend to rise in a recession if labour were a fully variable factor production Q L should behave counter cyclically instead of procyclically as is normally the case The index H described in text measures the cyclical behaviour of Q/L and hence the degree to which L is not a fully variable input Examination of the data suggests that in fact employment does adjust to the fall in output, but with a significant lag Thus although the value of output in manufacturing reached a trough in mid 1975 the numbers employed were still declining in early 1976

TABLE 2: Intercorrelations between "vacancies" for various categories of labour (1969:II - 1976:II)

Total	1.00			
Skilled Males	0.83	1.00		
Skilled Females	0.89	0.56	1.00	
Unskilled Males	0.64	0.51	0.49	1.00
Unskilled Females	0.86	0.68	0.67	0.34	1.00

TABLE 3: Index of labour hoarding in Manufacturing Industry (1969:I - 1976:II)

1969:	I	8.5	1973:	I	0.0
	II	1.1		II	1.2
	III	4.2		III	1.8
	IV	5.4		IV	5.6
1970:	I	7.8	1974:	I	0.3
	II	8.0		II	3.7
	III	8.5		III	5.1
	IV	5.3		IV	8.1
1971:	I	7.5	1975:	I	8.7
	II	4.8		II	8.7
	III	5.1		III	8.4
	IV	4.8		IV	5.8
1972:	I	6.3			
	II	5.2			
	III	5.4			
	IV	3.1			

For definition, see text.

An Application: The Definition of "Full Employment"

Zero net excess demand or supply for labour may be said to exist on aggregate when the number of unfilled vacancies equals the number of unemployed job seekers. This does not correspond to the Friedman concept of the "natural rate of unemployment", which is the unemployment rate consistent with a stable rate of wage inflation and the absence of unanticipated price inflation. Friedman (1968) remarked that the "natural" rate

need not correspond to equality between the number unemployed and the number of job vacancies. For any given structure of the labour market there will be some equilibrium relation between these two magnitudes but there is no reason why it should be one of equality (p. 8).

He also pointed out that " we have as yet devised no methods to estimate accurately and readily the natural rate of interest or unemployment." We can, however, use the results presented in the first parts of this paper to try to clarify the meaning of " full employment ". The estimated UV relationship allows us to answer the question: How low would U fall if V rose to a level corresponding to a fairly generalised shortage of labour ? This is one way of trying to operationalise the concept of full employment. In Table 4 the results of this application of the double-log UV relationship are shown. The level of U associated with various combinations of V and UCW has been calculated. It may be seen that only if V rises to 50 per cent will U fall to 4.5 per cent (UCW equal to 75 per cent, which is about its current level). The highest level of V actually recorded was 21 per cent in 1969:3, when U was 4.3 per cent.

TABLE 4: The Level of U, the unemployment rate in manufacturing industry, associated with various combinations of V (proportion of firms reporting labour shortages) and UCW (ratio of unemployment compensation to net earnings)

V	UCW	U
25	75	5.3
25	50	4.6
30	75	5.0
30	50	4.4
35	75	4.9
35	50	4.3
40	75	4.8
40	50	4.2
45	75	4.6
45	50	4.1
50	75	4.5
50	50	4.0

Note: Based on equation 3 (see text) with $S_1=0$. The predicted values of U obtained from equation 4 are all higher than the corresponding values above: the asymptote for equation 4 is U=5.5 for UCW=50 and U=7.2 for UCW=75.

If the pressure of demand were to regain that level with present levels of UCW the unemployment rate would not fall below 5.5 per cent.

Over most of the period 1968-76 the non-agricultural unemployment rate exceeded the unemployment rate in manufacturing by a significant margin, but with the sharp rise in manufacturing unemployment in 1975 this gap disappeared. To reflect this non-linear association between U_{na} and U_m the following equation was estimated:

$$U_{na} = -4.13+6.47 \ln U_m \qquad \bar{R}^2 = 0.93$$

The value of U_{na} corresponding to $U_m=4.5$ is 5.6 per cent. This suggests that a level of non-agricultural unemployment in the region of five and a half per cent corresponds to "full employment" in Irish conditions. While substantially lower than the current rate of over 10 per cent, this is still a very high level of unemployment, and suggests that employers would begin to experience substantial difficulty in recruiting additional workers long before the unemployment rate had fallen to the level traditionally associated with "full employment" in Ireland. The imbalance between the composition of the Live Register—in terms of age, occupation, skill level, and region of the country—and the requirements of employers presumably accounts for this finding, but there is room for further research to clarify this point.

Summary

In this article, a new series relating to the level of labour shortages or vacancies in Irish manufacturing industry has been presented. Although subject to a number of major limitations this series appears to contain important information on the level of the demand for labour that is not contained in more familiar indices such as the unemployment rate.

The new series was applied to testing whether the substantial rise in unemployment compensation relative to net earnings affected the level of measured unemployment after 1974. The results strongly support the hypothesis that measured unemployment is now higher at each level of demand for labour than was the case before 1974. There is no evidence that the sharp rise in unemployment in recent years can be attributed to a "shakeout" of hoarded labour or a change in the way employers adjust their actual labour force to the desired level.

The estimated relationship between vacancies and unemployment was applied to the operationalisation of the concept of "full employment". From this exercise it seems that even if half the

existing firms in the manufacturing sector were reporting that a shortage of labour was a constraint on production, the unemployment rate would not fall below 4.5 per cent. Presumably this situation would result in intense upward pressure on wage rates, especially in view of the fact that our index of vacancies probably understates the actual additional labour requirements of industry.

The gap between the present level of non-agricultural unemployment (which is about 12 per cent) and the 5½ per cent that may be taken as corresponding to "full employment" measures the most that we can hope to achieve by an expansion of the demand for labour. To reduce the rate below 5½ per cent will, in addition, require effective policies which improve the balance between the characteristics of the unemployed and the attributes sought by employers.

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