Irish Manufacturing Industry - Recent Wage, Price and Productivity Developments

J. G. Keenan

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IRISH MANUFACTURING INDUSTRY – RECENT WAGE, PRICE AND PRODUCTIVITY DEVELOPMENTS

J.G. Keenan*

Introduction

Economic theory suggests that increases in money wages paid by firms greater than increases in output prices will lead to a fall in employment if there is not compensating productivity growth or flexibility of profit margins. The main aims of this paper are to consider, firstly, developments in the cost structure of Irish manufacturing industry if only the basic terms of the National Wage Agreements had been paid and secondly, to consider actual developments in the cost structure. To the extent that our traded goods are not perfect substitutes for traded goods elsewhere in the world economy we can influence the world price of Irish traded goods, so that the more our goods deviate from the "perfect substitutes" position the less the effect on output and employment of any adverse cost developments. In this paper the influence of cost increases on output prices is not considered; rather it is thought that the primary effect of these influences will be on output rather than price so that the "price taker" model is being implicitly assumed. Section 1 of the paper outlines some relevant theoretical considerations which are not highlighted in many treatments of the model. This framework is then used in Section 2 to consider the developments of industry labour costs under the basic terms of the National Wage Agreements since the end of 1975. Section 3 contrasts the proposals under these wage agreements with actual developments using earnings data.

1. *Theoretical Considerations*

The demand for labour and the supply of labour are both considered to be functions of a real wage. However, particularly in an open economy, there may be large differences between the absolute level of and changes in the real wage paid by firms and the gross real wage of workers, so that statements by employers that their real wages have increased and by employees that their real wages have fallen can both be true for the same time period. Assuming that in the context of workers wage agreements with firms it is their gross wage before tax deductions that is of concern to them, for our purposes we consider the differences arising from two reasons,[1] firstly, because of divergences between movements in the aggregate price index facing workers and the output price at the factory gate received by firms, secondly, because of employment taxes paid by firms on wages paid to workers. Equations (1) and (2) present standard labour demand and supply equations reorganised to give a more useful presentation for our purposes.

*The author is an economist in the Central Bank. The views expressed in the paper are those of the author and not necessarily those of the Central Bank.

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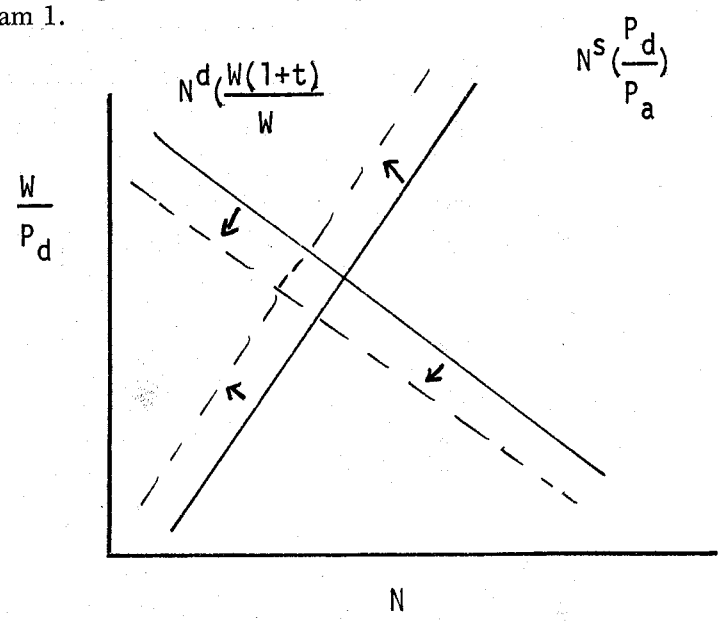
$$(1) \quad N^D = N^D\left(\frac{W(1+t)}{P_d}\right) = N^D\left(\frac{W(1+t)}{W} \; \frac{W}{P_d}\right);$$

$$(2) \quad N^S = N^S\left(\frac{W}{P_a}\right) = N^S\left(\frac{W}{P_d} \; \frac{P_d}{P_a}\right);$$

where N^D = demand for labour
N^S = supply of labour
P_d = output price received by firms (excluding taxes)
P_a = aggregate price index of consumption goods purchased by workers
W = money wage rate (net of employment taxes)
t = proportional employment tax on money wages paid by firms.

Equation (1) presents the demand for labour as a function of the real wage paid by firms to workers excluding employment taxes (i.e., $\frac{W}{P_d}$) and the ratio of the gross money wage of firms to the net money wage, the former being equal to the money wage paid to workers (i.e., the net money wage) plus employment taxes. In equation (2) the supply of labour is presented as a function of $(\frac{W}{P_d})$ and the ratio of the output price received by firms to the aggregate price index faced by workers in purchasing a representative basket of consumption goods. This ratio highlights the fact that if consumer prices on average increase more than the firms output price, workers will require an increase in money wages greater than the increase in output price received by the firms to maintain their purchasing power. This would push up the real wage of firms and tend to lower employment and output. All workers tend to use the same aggregate price index of consumer goods in wage negotiations but the output price received by firms varies from industry to industry so that the same money wage demand will have different output and employment effects in different industries and even on different firms within the same industry. Consequently, the implications of an equal pay increase to all industrial workers can only be assessed by a detailed examination of each industry.

The following results are easy to prove and are demonstrated with the aid of diagram 1.



The demand for labour and supply of labour curves are now defined for fixed $\frac{W(1+t)}{W}$ and $\frac{P_d}{P_a}$ ratios, respectively. Any increase in employment tax rate t rotates/shifts the demand curve to the left and results in a fall in the level of employment and the net real wage $\frac{W}{P_d}$ and an increase in the gross real wage $\frac{W(1+t)}{P_d}$. Likewise, for given output prices, if consumer goods prices increase faster than output prices, the supply of labour curve shifts upwards to the left and, other things equal, employment will fall as firms' real wage increases. The fall in employment is greater, the greater the real wage resistance is. Note that these results occur even though workers have an actual fall in their real wage if the labour market is to clear. If they refuse to accept this cut in living standards, which implies non clearance of the market, the employment fall is greater and the market stays in disequilibrium. It is clear, therefore, that the wage ratio $\frac{W(1+t)}{W}$ and the price ratio $\frac{P_d}{P_a}$ may cause large divergences between firms and workers real wages so that developments in one may be no guide at all to developments in the other.

For our purposes, the variations in the price ratio represent changes in the "terms of trade" facing firms and industries, the latter being defined as the ratio of factory gate prices to domestic and imported consumption goods at market prices. This is evident from the fact that the consumption price index is a weighted average of domestic consumption goods market prices (P_{cd} below) and imported consumption goods market prices (P_{cm} below), where both of these indices are inclusive of indirect taxes, with the weights equal to the share of these goods in total consumption. These shares are represented by α and $(1-\alpha)$ respectively in equation (3) below.

$$(3) \qquad P_a = \alpha P_{cd} + (1-\alpha) P_{cm}$$

Dividing through by P_d and letting Δ denote the proportionate change in the relevant ratio, we have, assuming constant shares:

$$\Delta \frac{P_a}{P_d} = \alpha \Delta \frac{P_{cd}}{P_d} + (1-\alpha) \Delta \frac{P_{cm}}{P_d}$$

It is clear, therefore, that if workers seek increases in wages greater than the output price increase received by their firm they are seeking compensation for:

(a) relative price movements of domestic goods at factory gate prices,
(b) changes in the ratio of their firms output price to that of imported consumer goods,
(c) changes in distribution and retail mark-ups, and
(d) changes in indirect taxes.

All of these factors will tend to be exogenous to firms so that unless workers are willing to accept a reduction in real wages instead of seeking compensation for the effect of these changes, employment falls and the burden of

adjustment is carried by those losing employment rather than by all workers in the firm.

In the above discussion no mention has been made of productivity. If a fall in employment occurs because of an increase in the wage ratio or the price ratio mentioned above, then productivity gains may generally be expected to result. These productivity gains are required to offset the effect of rising real wages on the profitability of firms and will not prevent employment from falling but may offset the extent of the decline. Increases in productivity, because of capital stock growth and other factors, may increase the demand for labour and real wages and offset the effects of an increase in the wage ratio or a fall in the price ratio on employment.

2. *Pay Policy and National Wage Agreements*

This section considers the implications of the basic terms of the national wage agreements for movements in the wage rates of firms and workers for eighteen major manufacturing industries, during the period from the third quarter of 1976 to the third quarter of 1981. During this period, for all but the lowest paid industrial workers, the basic terms of these agreements gave fairly uniform money wage increases to workers, while there is evidence of substantial variation in the output price increases received in different industries. This implies that, had these agreements been adhered to they would have led to substantial variations in the development of real wage costs in different industries.

Since 1975, the CSO has published price indices of manufacturing output prices excluding VAT. Customs and excise duties are included in this index, so that for our purposes we have to exclude consideration of the Drink, Tobacco and Motor Industries where substantial changes in the duty rate are included in the CSO indices and, so, do not properly reflect the output price increase received by firms. For the industries considered, the price ratio $\frac{P_d}{P_a}$ is set equal to the ratio of the relevant manufacturing output price index to the Consumer Price Index.

The money wage of firms is calculated as the money wage paid to workers before income tax plus the employers social insurance contribution.[2] This money wage divided by the output price index equals the wage of firms at constant prices and is used as a measure of the firms real wage. The real wage of workers is taken as the ratio of the money wage before taxes to the Consumer Price Index. The analysis in Section 1 above was cast in terms of movements in wage rates. Unfortunately, data on wage rates in manufacturing industry are not available with only average earnings data being published. Initial wage rates for each industrial group were assumed and the basic terms of the wage agreements from end-1975 applied to these. The method of deriving these wage rates is described in the Appendix. For our purposes the absolute level of the wage rate is unimportant; rather we are interested in the percentage change in various aggregates over the period.

Table 1 below presents the results for many of the aggregates mentioned above, if only the basic terms of the agreement had been paid. The industries are ranked in ascending order of their assumed wage rate at the beginning of

Table 1 Wage Agreement Development in Major Industrial Groups, September 1976 - September 1981

INDUSTRIAL GROUP NACE Classification	% Change in Output Prices ΔP_d*	% Change in Ratio of Output Prices to Consumer Prices $\Delta\left(\frac{P_d}{P_a}\right)$	% Change Firms Real Wage $\Delta\left(\frac{W(1+t)}{P_d}\right)$	% Change Workers Real Wage $\Delta\left(\frac{W}{P_a}\right)$	% Change in Ratio of Firms to Workers Money Wage $\Delta(W(1+t)/W)$	% Change in Firms Real Wage using Average Manufacturing Output Prices	Assumed Average Workers Wage Rate end-1975 £
Clothing	67.5	-15.9	10.8	-3.0	-4.0	-0.4	26.36
Processing and Preserving of Fruit and Vegetables	92.3	-3.5	-8.8	-10.9	-1.1	-5.8	36.47
Leather and Footwear	46.4	-26.5	21.0	-10.1	-1.1	-4.9	36.63
Bread, Biscuits and Flour Confectionery	91.7	-3.7	-8.9	-11.5	-0.9	-6.2	37.52
Electrical Engineering	65.7	-16.8	5.8	-11.2	-0.8	-5.9	37.84
Mechanical Engineering	77.5	-10.9	-0.2	-10.5	-0.7	-4.9	38.44
Timber and Furniture	79.5	-9.8	-1.4	-10.5	-0.7	-4.9	38.48
Textiles	69.9	-14.7	3.3	-11.3	-0.6	-5.8	38.73
Metal Articles	83.7	-7.8	-4.0	-11.0	-0.5	-5.3	39.82
Manufacture of Sugar and Cocoa, etc.	89.6	-4.7	-8.1	-12.3	-0.2	-6.4	40.46
Grain Milling, etc.	74.8	-12.2	-1.7	-13.7	0.0	-7.7	42.55
Manufacture of Dairy Products	72.6	-13.3	-0.6	-13.8	0.0	-7.8	42.58
Processing of Plastics	65.1	-17.1	4.8	-13.3	0.2	-7.1	43.42
Paper and Paper Products	89.1	-5.1	-8.7	-13.5	0.2	-7.3	43.68
Slaughtering and Preserving of Meat	84.8	-7.2	-6.8	-14.0	0.6	-7.5	45.24
Chemicals	92.6	-3.3	-10.6	-14.5	1.1	-7.5	48.85
Non-Metallic Products	111.2	6.0	-18.6	-14.8	1.3	-7.7	49.62
Rubber	101.3	1.1	-14.8	-15.6	2.0	-7.9	54.45

* Δ denotes the proportionate change.

the period. The second last column in Table 1 shows the percentage change in the real wage of industries when each industry's wage rate is deflated by the average increase in manufacturing output prices. From this, if we exclude the clothing industry, we see that the percentage change in each industry's real wage is not very sensitive to the assumed wage rates. This is encouraging as it allows us draw conclusions from the results presented in this table which would not be very different from the conclusions drawn if the true wage rates were known. For example, under the basic terms of the wage agreements, workers in the relatively low wage Leather and Footwear industry would have received an increase of just over 5 per cent more than workers in the relatively high wage Rubber industry. Nevertheless, the real wage of firms in the Rubber industry would have fallen by 14.8 per cent, while the real wage of firms in the Leather and Footwear industries would have increased by 21 per cent. This is mainly because output prices in the Rubber Industry increased by 101.3 per cent and by 46.4 per cent in the Leather and Footwear industry. It is clear that the different changes in real wages between industrial groups are dominated by output price movements. In addition, the percentage change in this column for the Clothing industry is much higher than the other industries because over 95 per cent of the workforce are women with low wage rates and hence benefit most from the basic terms of the wage agreements which were often a combination of minimum flat rate and percentage increases. No other industry is so completely dominated by these factors.

The change in the ratio of firms money wage to workers money wage given in column 5 is not very significant over the period. The ratio fell for all except the high average wage rate industries, the fall being greatest for the lower wage rate industries. This occurs because the social insurance scheme changed from a combination of flat rate and pay related contributios only in 1979 to pay related only, resulting in a benefit to the lower wage industries. Only in the case of the Clothing industry, however, would this result on its own have implied a significant reduction in the real wage rate of firms, the effects in other industries being marginal.

The Consumer Price Index increased by 99.1 per cent over the period. Column 2 indicates that only the Non-Metallic Mineral Products industry and the Rubber industry had increases in output prices greater than the increase in the Consumer Price Index. Clearly in the other industries an attempt by workers to defend their purchasing power through an increase in money wages equal to the increase in consumer prices would push up firms real wage rates. Under the basic terms of the wage agreements money wages increased by a larger percentage for lower paid workers. However, only workers receiving real wage rates of £35 per week or less at the start of the period would have had real gains under the agreements. Of the sixteen industries with adverse movements in the ratio of their output prices to consumer prices, five had increases in their money wages under the basic terms of the wage agreements greater than their output price increase so that real wages increased (see column 3). The real wage increases implied for the Clothing and Leather and Footwear industries are very large. The latter industry's real wage increase is dominated by the lowest output price increase during the period,

while as stated previously, the Clothing industry had most to lose from the operation of minimum flat rate and percentage increases in the wage agreements. Workers in this industry had least to lose in real wages from a strict adherence to the basic terms of the agreements. This coupled with one of the lowest output price increases, pushed up firms wage costs considerably.

At the other end of the wage rate scale, only the Non-Metallic Mineral Products industry and the Rubber industry could have afforded to pay workers increases in money wages equal to the increase in the consumer price index and still have a decline in their real wage rates. The basic terms of the wage agreements represented a reduction of 18.6 per cent and 14.8 per cent, respectively, in their real wage rates.

We conclude this section by noting that while the national wage agreements have had similar effects on the real wage of workers over a wide income span, the effects on the different industries in which these workers are engaged vary greatly, ranging from an increase in the real wage of 21 per cent in the Leather and Footwear industries to a fall of over 18 per cent in the Non-Metallic Mineral Products industry. If basic wage increases were directly linked to the output price increases received in different industrial sectors, income differentials between workers across industry would have widened considerably as is evident from the fact that output prices in the Leather and Footwear industry increased by 46.4 per cent compared to 111.2 per cent in the Non-Metallic Mineral Products industry. Wage agreements which set an industry wide wage increase for workers without regard to the different implications across industry groups can create difficulties for industries subject to intense price competition and hence receiving relatively low output price increases. This represents a cost to the economy to be set against the benefits in terms of reduced industrial unrest which may have occurred from the operation of a national pay norm.

3. *Actual Developments*

The discussion in the last section centred around the implications of the national wage agreements assuming that wage increases were in accordance with the basic terms of the wage agreements. Firms, however, may in certain circumstances plead inability to pay and workers may bargain for productivity related increases under these agreements in addition to the basic terms. Also, the formulation of the wage agreements as a combination of flat rate and percentage increases narrows differentials and creates the possibility of further claims to restore these at a later date. The basic terms of the wage agreements may not therefore be a good guide to actual developments. In looking at actual developments one would ideally like to have wage rate data instead of earnings data which include overtime, bonuses, incentives scheme payments, etc. In this section changes in actual wage rates over the period are approximated by the use of adjusted hourly earnings data. The adjusted hourly earnings data equal average weekly earnings divided by hours worked where each hour worked in excess of forty hours is taken as equivalent to one and a half hours for wage purposes. No distinction is drawn between changes in the nominal wage rates of workers and firms, as it is clear from Table 1 that changes in social insurance rates for employers had

little impact on changes in wage rates over the period. However, any large increases in these in the future will increase industry wage costs and reduce employment prospects.

Table 2 below presents the actual developments in wage costs over the period. From column 1 we can see that in seventeen of the eighteen industrial groups considered, the increase in actual wage rates was greater than the increase in the Consumer Price Index while for the Bread, Biscuits and Flour Confectionery industry wage rates increased by 0.4 per cent less than the increase in consumer prices. The actual increases suggest that workers in all industry groups received increases above the basic terms of the wage agreements. The implications for firms real wage rates are considered in column 5. The additional increases granted were sufficiently large for the real wage rates of firms in seventeen industries considered to increase over the period, while only five industries had increased real wage rates for firms implied under the basic terms of the wage agreements. The exception is the Non-Metallic Mineral Product industry which had the largest increase in output prices.

The effects of rising real wage rates on output and employment can be offset either wholly or in part by increases in productivity. In Table 2 changes in productivity are estimated by the changes in the output per man hour series. Output per man hour actually fell in five industries although by less than 1 per cent per annum. In the Meat industry, output per man hour increased by over 9 per cent per annum. On examination of the industry, however, it is clear that this arises because the volume of production in the base period, the third quarter of 1976, was well below the average for the quarter. The results for this industry therefore should be treated with caution and are not considered further below. Of the remaining industries, the Electrical Engineering, Paper and Printing Products, Chemicals and Rubber industries had an annual average productivity growth of 2½ per cent or more.

Nominal unit wage costs are normally used in comparing changes in wages with changes in productivity. However, when prices change and there are substantial differences in price changes between industries, real unit wage costs give a clearer picture of developments over time within and between industries. The last column in Table 2 gives the annual average growth in real unit wage costs over the period. Eight industrial groups had increases in real wage rates per unit of output of no less than 3½ per cent per annum. The Leather and Footwear industry was the worst affected, but a substantial deterioration in wage costs occurred in each of these industries. The growth in productivity was not nearly sufficient to compensate for wage increases given the output price increases obtained. Indeed, in only the Non Metallic Mineral Products industry and the Rubber industry were wage increases matched by a larger increase in productivity so that the real wage cost per unit of output actually fell. In most other industries, given the actual developments in real unit wage costs, it seems inevitable that they will economise further in their use of labour, or if this is not possible, the weaker firms may have to cease operating as presently constituted. Unless there is a rapid reversal of past trends, employment in the existing firms in these industries is more likely to contract than to expand.

Table 2 Actual Wage Cost Developments in Major Industrial Groups, September 1976 - September 1981

INDUSTRIAL GROUP	% Change Workers Real Wage Rate	% Change Firms Money Wage Rate	% Change Output per Man Hour	% Change Nominal Unit Wage Costs	% Change Firms Real Wage Rate	% Change Real Unit Wage Costs	Annual Average Growth in Real Unit Wage Costs
Clothing	12.7	124.5*	1.0	122.3*	34.0*	32.7*	5.8*
Processing and Preserving of Fruit and Vegetables	13.5	126.1	9.0	107.4	17.6	7.9	1.5
Leather and Footwear	12.5	124.1*	6.1	111.0*	53.1*	44.1*	7.6*
Bread, Biscuits and Flour Confectionery	-0.4	98.4	-4.8	108.4	3.5	8.7	1.7
Electrical Engineering	8.1	115.3	13.0	90.5	30.0	15.0	2.8
Mechanical Engineering	7.0	113.0	1.3	110.3	20.0	18.5	3.5
Timber and Furniture	4.2	107.4	-2.5	112.7	15.5	18.5	3.5
Textiles	8.5	116.0	8.9	98.3	27.1	16.7	3.6
Metal Articles	8.2	115.4	10.7	94.6	17.3	5.7	1.2
Manufacture of Sugar and Cocoa, etc.	17.0	133.0	-4.5	144.0	22.8	28.6	5.2
Grain Milling, etc.	14.9	128.9	3.9	120.3	30.9	26.0	4.7
Manufacture of Dairy Products	15.1	129.3	-2.9	136.1	32.9	36.8	6.5
Processing of Plastics	9.6	118.2	-5.0	129.7	32.2	39.2	6.8
Paper and Paper Products	19.6	138.1	19.8	98.7	25.9	5.1	1.0
Slaughtering and Preserving of Meat	25.1	149.2	55.5	60.3	34.8	-13.3	-2.8
Chemicals	20.1	139.1	18.6	101.6	24.1	4.7	0.9
Non-Metallic Products	5.1	109.2	5.9	97.5	-0.9	-6.5	-1.3
Rubber	1.3	101.8	19.3	69.2	0.2	-16.1	-3.5

* The percentage increase in these industries would be slightly less if the wage subsidies granted between April 1981-April 1982 under the Employers Employment Contributions Scheme were included. The conclusions, however, would be the same.

Conclusion

Increases in wages above the basic terms of the national wage agreements seem to have been paid in all industries considered. The Clothing, Leather and Footwear and Plastics industries did not have sufficient growth in productivity to prevent the wage cost per unit of output from increasing even under the basic terms of the wage agreements, given the increase in price which they received for their products. The wage increases granted in most other industries, in addition to the basic terms of the wage agreement, have precipitated large increases in real unit labour costs which may have damaged employment prospects in many existing firms across a wide range of industries. When negotiating wage increases, consideration should be given not alone to productivity and consumer price increases, but also to output price increases received by industry and the fact that substantial relative price movements affect firms' capacity to pay a uniform wage increase in all industries.

Notes

1. Firm contributions to workers pension funds should be included in the employers money wage rate. A CSO survey of industrial labour costs in 1975 suggested that these penion fund contributions accounted for 4 per cent of labour costs in total manufacturing industry. So long as this proportion remained constant over the period, the results in the text expressed in percentage change terms would not be altered by the inclusion of these payments. To the extent that the share of employers pension funds contributions in total labour costs increased over the period the increase in firms wages is underestimated in the text.

2. The class A social insurance rate was applied to the quarterly average wage rate data for each group with due regard to the income limit. This method is an approximation used in the absence of distribution of earnings data for each industry.

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APPENDIX

The basic terms of the wage agreements were first applied to estimated male and female wage rates. In the case of males four different weekly wage rate groups were calculated assuming 3rd quarter 1975 levels of £44, £50, £55 and £60 and each industry classified into one of these groups based on a standardised average weekly earnings for the same quarter. The standardized average weekly earnings being the average earnings for a forty hour week in each industry calculated from the official male average weekly earnings for Sept. 1975 figure assuming that each hour worked above forty was paid for at a rate of time and a half. The industries were then grouped into the assumed wage rate groups to which the standardised average weekly earnings were nearest. For females the same procedure was adopted using assumed weekly wage rates of £26, £30, £35 and £44. The aggregate weekly average industrial wage rate figure was then derived through estimating weights for males and females from the official average weekly earnings figures for males, females and all workers and weighting the male and female wage rates by these. The weights and other information are provided in Table 3 below. The procedure therefore ignores the fact that non adult earnings play a part in determining aggregate average earnings in each industrial group so that the weights are calculated as if this element was zero. Given that the weight attributed to non adult earners is likely to be quite small and that the results in percentage change terms are not very sensitive to the assumed wage rate the effect on the results is considered to be inconsequential.

Table 3 Data Used to Calculate Initial Wage Rates

INDUSTRIAL GROUP	Assumed Male Wage Rate	Assumed Female Wage Rate	Weights used for Males	Weights used for Females
Clothing	44	26	0.0197	0.9803
Processing and Preserving of Fruit and Vegetables	44	30	0.4618	0.5382
Leather and Footwear	44	30	0.4732	0.5268
Bread, Biscuits and Flour Confectionery	44	30	0.5368	0.4632
Electrical Engineering	50	30	0.3914	0.6086
Mechanical Engineering	44	26	0.6912	0.3088
Timber and Furniture	44	26	0.6931	0.3069
Textiles	50	26	0.5304	0.4696
Metal Articles	44	26	0.7676	0.2324
Manufacture of Sugar and Cocoa, etc.	50	30	0.5232	0.4768
Grain Milling, etc.	44	26	0.9194	0.0806
Manufacture of Dairy Products	44	35	0.8425	0.1575
Processing of Plastics	50	26	0.7257	0.2743
Paper and Paper Products	50	30	0.6838	0.3162
Slaughtering and Preserving of Meat	50	30	0.7618	0.2382
Chemicals	55	30	0.7435	0.2565
Non Metallic Products	55	30	0.7847	0.2153
Rubber	60	35	0.7780	0.2220