Chapter 2

Literature Review

2.1 Introduction

For at least fifty years economists have claimed that wages are not solely determined by the balance of supply and demand in the labour market. There is a vast literature, both empirical and theoretical, discussing the reasons behind this contention. Of particular importance was the development of a wide range of studies on the behaviour of trade unions and their impact on the process of wage and employment determination. In this chapter, theoretical studies on trade unionism will be discussed in section 2.2 followed by empirical studies and local empirical studies in section 2.3 and 2.4 respectively. The last section will be conclusion of this chapter.

2.2 Theoretical Studies

The inability of standard competitive analysis to provide a satisfactory explanation for the actual behavior of wages and employment and the existence of both involuntary employment (wages remained high even under high and persistent unemployment rate) and pay inflexibility has paved the way for the development of various theories of labour market.

2.2.1 Wage under Trade Unionism

In the mid 1970s, the study of unionism became one of the main topics in the theoretical and empirical analysis for the labour market. A large amount of economic research was done to assess the effects of trade unions on wages and propose models of union wage objectives and union-firm wage bargaining.

Oswald (1985) in his paper carried out an introductory survey of work on the economic theory of trade union behaviour. It concentrates on recent contribution to the literature and set out a number of results and ideas. He found that economists have attempted to analyze union behaviour by making assumptions about the union's preference in terms of wages and employment. The most commonly used union utility function is a kind of expected utility formulations, which is equivalent, with membership fixed, to the assumption that the union has utilitarian preference.

This function can be written either as

$$\text{(Expected Utility)} \quad U = \frac{n}{m}u(w) + \left[1 - \frac{n}{m}\right]u(b) \tag{2.1}$$

or

$$\text{(Utilitarian)} \quad U = nu(w) + (m - n)u(b) \tag{2.2}$$

where w is the wage rate, b is the alternative wage or unemployment benefit received by unemployed members, n is employment, m is the membership to the trade union

and $U(.)$ is the individual workers utility function. Carruth and Oswald (1987) recall that these functions are mis-specified if one assumes that members (insiders) have priority in employment decisions over outsiders, and that the union is indifferent to increase in employment beyond the level of membership, m. In this case, the correct specification may be written as

$$U = u(w) + [u(b) - u(w)]\max\left[0, \frac{m-n}{m}\right] \tag{2.3}$$

or

$$U = mu(w) + [u(b) - u(w)]\max[0, m-n] \tag{2.4}$$

The literature now seems to be dominated by three models of the trade union, which are the monopoly model (Oswald 1982), the right-to-manage model (Nickell, 1982), and efficient-bargain (see McDonald and Solow, 1981).

2.2.1.1 The Monopoly-Union Model

The monopoly-union model assumes that unions are free to fix the wage at the level that maximizes the union's utility and the firm unilaterally choose the level of employment that maximize its profit. There is no negotiation between the firm and the union over either wages or employment. If the union's and employer's preference over wages and employment are represented by $U(w, L)$ and $V_L(w, L)$.

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A typical monopoly union would be:

$$MaxU(w,L) \text{ subject to } V_L(w,L) = 0 \tag{2.5}$$

2.2.1.2 The Right-to-Manage Model

In this model, wage is determined in a bargain between union and employer. Once the union and firm agreed upon a particular wage rate, the firm will unilaterally determine the number of workers to hire so as to maximize profits (Nickell and Andrews, 1983). Under this class of model, the negotiated wage rate will depend on the bargaining power of both parties and the employment level will always lie on the demand curve for labour (Carruth and Oswald, 1989). If we represent the outcome of this bargaining by an asymmetric Nash Bargaining solution with λ representing the power of the union, the right to manage model is:

$$Max\lambda \log(U - U^{*}) + (1-\lambda)\log(\pi - \pi^{*}) \tag{2.6}$$

where U* and π* are the "fall-back" levels of union utility and profits of firm respectively; i.e. those that accrue to the union or firm during the bargaining process in the event of agreement not being reached immediately. The monopoly model is a special case of the right to manage model when λ=1. Thus, the term monopoly model is used to refer to all models with the form of (1).

2.1.1.3 The Efficient Bargain Model

In this model of trade union behavior, the union can bargain about employment as well as the wage. Bargained levels of wages and employment will be on the contract curve and the outcome will be Pareto efficient that is neither the union nor the firm will be made better off without making other worse off. A typical efficient bargain model would be:

$$\underset{w,L}{Max}\, \lambda \log U(w,L) + (1-\lambda)\log V(w,L) \tag{2.7}$$

Manning (1987) has used the Nash framework to show a more general model of trade unions which encompasses both the monopoly-union, and the efficient-bargain models. He models collective bargaining as a two-stage process where wages are determined in the first stage and employment in the second. The solution to the model is obtained by considering the second stage (first backward induction). The key insight of this recursive bargaining model is that the ability of the union to reach an outcome which is favourable to it, may differ in the two stages.

This second stage (bargaining over employment) can be modeled as,

$$\underset{n}{Max}\, \beta_2 \log U(w,n) + (1-\beta_2)\log \pi(w,n) \tag{2.8}$$

where β_2 is the union's bargaining power over employment decisions. The solution to (8) yields $n = n(w, \beta_2)$, and the first stage can therefore be written as,

$$Max\beta_1 \log U(w, n(w, \beta_2)) + (1 - \beta_1) \log \pi(w, n(w, \beta_2)) \tag{2.9}$$

where β_1 is the unions bargaining power over wages. Manning proves that the monopoly union will be a special case in which the union has all the power in the first stage and the employer in the second (β_1=1 and β_2 = 0). The efficient bargain model, on the other hand, would be a special case in which both the union and the employer have the same power throughout the two stages ($\beta_1 = \beta_2$). Finally, the right-to-manage model is obtained when the unions have less than full power in the first stage and the employer has all the power in the second (β_1 <1 and β_2 = 0).

2.3 Empirical Studies

An early empirical study by Slichter (1950) and Lester (1953) supported the theoretical view that wages are not solely determined by the balance of supply and demand. They used statistical methods to show that there is a large pay disparity across similar people and establishments. Slichter found that industry wages are positively correlated with value added per worker and profit margins in the industry, and negatively correlated with the payroll to income ratio. As for Lester, he argued that the existence of substantial differentials within the same labour market appears the common rule rather than the exception.

A later British study, MacKay *et al.* (1971) rejected the validity of the competitive model after examining the personnel records of 75,000 manual workers employed by

sixty-six engineering plants. They found substantial and persistent wage differentials, which could not be explained satisfactorily by non-pecuniary factors. In this paper, they concluded that the labour force will benefit in the form of higher wages if the plant enjoys high profitability, economies of scale, efficient management or methods of production, and monopoly elements in the product market which allow higher earnings to be passed on.

Naheed (1983) in his study analyses the determination of real wages and labour productivity over time in the manufacturing sector of the Punjab for the 1964-1977 period within the framework of two simultaneous equations. The endogenous variables of the model are wages and labour productivity, while there are five exogenous variables in the model.

In the time-series analysis, the two –equation model is specified as follows:

$$w = f(LP, GDP_p, DE, ED)$$

$$LP = f(O, K/L, W, DE) \qquad (2.10)$$

where w is the average earnings of workers deflated by the consumer price index for industrial workers; GDP_p is Gross domestic product at constant factor cost divided by total population; K/L is capital intensity (capital stock deflated by investment price index and divided by the number of persons employed); O is the output in the manufacturing sector at constant prices; DE is the dummy variables for emigration, which assumes that the value of unity for the period 1971 to 1978 and of zero

otherwise; and ED is an interactive variable of employment and dummy variable for emigration.

The estimation results of the wage equation using two stage least square (TSLS) suggest that elasticity of wages with respect to labour productivity is significantly high; a one per cent increase in labour productivity leads to an approximately 0.5 per cent increase in wages. The dummy variable of employment also turns out to be significant, with a positive sign, indicating that emigration of labour force has caused wages to rise. The introduction of gross domestic output per capita improves the overall fitness of model, however, labour productivity becomes insignificant in the presence of the GDP per capita. The elasticity coefficient of per capita gross domestic is significantly low indicates that wage increase did not keep pace with the growth of per capita GDP. Based on this result, he suggested that Pakistan has a low wage trend. This result is consistent with the situation that Pakistan has had a long period of authoritarian and anti-union policies. The labour productivity equation shows that the output variable and capital intensity exerts a positive and significant influence on labour productivity. Wages are significant with an elasticity of 0.63. The negative coefficient of emigration shows the adverse effects of out-migration of skilled labour on industrial production.

In the Downes, Holder and Leon (1990) study, they attempt to examine the interrelationships among wages, prices and labour productivity for a small developing country of Barbados over the period 1955-87. This study extends the earlier work of Downes and McClean (1982) by taking into consideration the explicit role of labour

productivity. In their study, the wage formation in Barbados is a collective bargaining process between trade unions and employers. The wage determination function is given as follows:

$$W = W(\overset{+}{P}, \overset{+}{PX}\ \overset{-}{PM}, \overset{-}{\theta}, \overset{+}{PROD}, \overset{-}{UR}, \overset{-}{\tau}) \tag{2.11}$$

where the signs indicate *a priori* expectation of the explanatory variables impact on the nominal wage rate, W. The trade union pushfulness functions for higher wages are the aggregate price level, P, the price of export, PX and labour productivity, PROD, which all have a positive or direct effect on pushfulness. The employer resistance function is directly related to price of imports, PM, overall insolvency, θ, taxes affecting the cost of production, τ, and the unemployment rate, UR.

The authors simplify the above function using the traded – non-traded sectors framework. The price indices of imports (PM), exports (PX) and the vector of tax rates (τ) are components in the price index of the traded goods sector. Equation above therefore can be re-written as:

$$W = W(\overset{+}{P}, \overset{+}{\overset{-}{PT}}, \overset{-}{\theta}, \overset{+}{PROD}, \overset{-}{UR}) \tag{2.12}$$

They also incorporated the impact of trade union on wages into the wage function. Since data on trade union membership is unavailable, therefore it is represented by time variable, t. The time variable is used to reflect the fact that as trade union membership

increases over time, trade union pushfulness is increased thus putting an upward pressure on wage increases. However, using a time trend as a proxy is inadequate since it includes other factors unrelated to trade union membership.

They applied Engle and Granger's (1987) two-step method to the above wage function. The results suggest that there is long-run equilibrium between the variables. In the following analysis, they further estimated the short-run dynamic specification using TSLS to allow for simultaneity in the relationships. The empirical results of this study indicate that changes in productivity have a positive impact on the growth of real wages but changes in price (domestic and tradeables) have negative effects on real wage movements. The negative coefficient on the lagged inflation variable suggests that real wages fall more than proportionately with prices, thus showing that nominal wages are a function of expected prices and that some money illusion exits in the short-run. Changes in the unemployment rate do not seem to be significant in explaining short-run changes in real wages. The insolvency variable, as proxied by domestic credit, was statistically insignificant too.

A paper by Carneiro (1998) investigates the industrial wage determination in Brazil using time series data for 22 manufacturing sectors for Jan 1985- Nov 93. He tried to examine whether changes in sectoral productivity are relevant to explain changes in sectoral nominal wages. In his study, wage determination in Brazil fits well within the framework of wage bargaining and the wage equation is the solution to a right-to-manage model.

The wage equation is as follows:

$$w_i = w_i(P^e, N_i, M_i, H, \theta, \mu, X) \tag{2.13}$$

where P^e denote consumer price index captured the appropriate expected price. θ and μ are bargaining power parameters, which usually proxied as union density and/or strike intensity. H is the tax wedge defined as the ratio between real employer labour cost (deflated by the industrial price index) and the post-tax consumption wage, N_i stands for employment level while X represents other variables determining the labour demand condition.

Due to unavailability of data, Carneiro used consumer prices, productivity, unemployment and the tax wedge as explanatory variables. He applied the Augmented Dickey Fuller (ADF) test to all the variables and found that all of them behave as $I(1)$, and are therefore cointegrated of order 1 for the 22 manufacturing sectors. In the following analysis, he estimated 22 long run wage equations for each of the sectors using Engle and Granger's approach. The residuals of these long-run equations then enter into the individual short-run dynamic specifications as sectoral error correction terms (ECM).

The short-run wage dynamic specification is shown as,

$$w_t = \beta_0 + \beta_1 p_t + \beta_2 aw_{t-12} + \beta_3 h_t + \beta_4 u_t + \beta_5 (q-1)_t + \beta_6 v_{t-1} + \sum_{j=1}^{11} c_j D_j + \varepsilon_t \tag{2.14}$$

where ν is the cointegrating vector's residuals (the ECM term), D_j are seasonal dummy variables, β_0 to β_6 and C_j are coefficients and ε is an error term assumed to be white noise. The monthly growth rate in nominal wages, Δw, is determined in the short-run by the monthly rate of change in price inflation, ΔP_t, lagged changes in alternative wage, Δaw_{t-12}, the monthly growth rate of tax wedge, Δh_t, the monthly growth rate in unemployment rate, Δu_t, the monthly growth rate in productivity, $\Delta(q-1)_t$, and feedback via the error correction term, ν_{t-1}, from the deviation between the actual and the long-run equilibrium values of nominal wages in the previous month.

The empirical evidence in Carneiro's article show that there is apparently clear and strong effect of changes in productivity on changes in the nominal wage for most of the sectors. Wage bargainers are able to increase wages in the form of productivity improvements and this provides strong evidence against a competitive labour market structure. Overall, unemployment rate appeared with low negative coefficients. The higher absolute values occurred in the sectors of Chemicals (-0.48), beverages (-0.26) and tobacco (-0.24). According to Carneiro, the small size of the unemployment elasticity may be reflecting the huge size of the informal economy in Brazil. Unemployment rate failed to discipline wage setting because displaced workers in the formal sector tend to enter the informal sector rather than registered unemployment. On the other hand, there is a positive effect of changes in price and changes in the alternative real wage as opposed to a negative impact of tax wedge on nominal wages. A growing tax wedge will restrain nominal wages in the short-run whereas any changes in the alternative wage tend to be internalized by wage bargainers.

2.4 Local Empirical Studies

There is a lack of local empirical studies concerning wages in Malaysian industries. Nijhar (1976), Paul Chan (1991) have done studies on wage structure but very little attention was paid on explaining the mechanism of wage formation at sectoral levels in Malaysian economies. Nijhar (1996) has conducted a survey on the wage structure in the rubber estate in West Malaysia. While Paul Chan (1998) provide a benchmark report on the wage structure and analysis the wage trends at it disaggregated level. A later study by Soon (1991) attempted to assess the influence of non-competitive forces on wage in the Malaysian manufacturing context. The study also look at the effects of salary scale wage setting to real wage rigidity and employment during the 1985-86 recession.

Soon (1991) used the following wage equation to estimate the non-competitive forces on wages in the manufacturing sector.

$$\log w_i = a + bCONC_i + cUNION_i + dCONC_i * UNION_i + ePLANT_i + f(\frac{k}{l})_i$$
$$+ gOWNER_i + hSKILL_i + jSEX_i + kGROWTH_i \qquad (2.15)$$

where w is the average annual earnings of production workers in industry i. CONC, the concentration of the industry is measured by four-establishment concentration ratio (the value of the output of the four largest establishments divided by the total output of the industry). UNION is measured by the fraction of the industry's workforce registered as

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members of trade unions. Plant size (PLANT) is measured by the proportion of industry's labour force in establishments employing 50 workers or above. K/L which is the capital intensity, is measured by the ratio of the book value of fixed assets to workforce in the industry. Foreign ownership (OWNER) is the ratio of employment in foreign firms to total employment. SKILL which measures the ratio of skilled workers to production workers and SEX, which is the proportion of female production workers in the industry. The variable GROWTH measures the rate of growth of employment in the 5-digit industry over the preceding three years to proxy the effects of shifts in labour demand.

The equation was estimated using Ordinary Least Square (OLS). Estimation was carried out for two years, 1979 and 1985, years with different labour market conditions. The results show that there are considerable changes in the coefficients and their significance across the year. Concentration has the hypothesized positive effect on earnings but is not significant in 1985, suggesting concentration-wage effects vary over the cycle. The result is consistent with the arguments that in a recession, concentrated firm pressured by lower profits, hence do not pay wages significantly different from competitive firms. For the same reason the concentration-union term is insignificant in 1985 but is significant in 1979. The Union term in 1985 is insignificant given the reason that union bargaining power tends to be weaker during economic downturn. The degree of foreign ownership on wage is significant in 1985 while skill composition is significant in 1979. The demographic composition of the workforce affects wage levels

in the expected manner but neither the capital-labour ratio nor growth of employment is significant.

Thus, the authors concluded that there are institutional rigidities in the wage setting behaviour in the formal sectors of the Malaysian economy consistent with the view that wages are not set competitively in the formal sectors.

Shirley (1999) has done a study on the impact of trade unions on wages and labour productivity in the food manufacturing industry. The study employed cross-sectional regression for the years 1990 through 1996 using a simplified version of the equation used by Soon (1991). The wage equation is a function of union, productivity, capital intensity and sex. The study has found that the four explanatory variables mentioned above explained 99.9% of the variation in wage of the food industry. She admitted that the estimated coefficient of UNION might have been overestimated compared with Soon's study. Soon's regression estimates of interindustry wages for 1979 and 1985 indicates a union effect of 0.985 and 0.320 respectively, which is very much lower than the author's estimate of 8.102. The major reasons behind were the study did not control for variables such as skill and size of the establishment. Since the impact of productivity being a mere of 0.0005 as compared to the union effect of 8.10, it is rather relevant to suggest that the firm pay high wage with improved productivity.

2.5 Conclusion

The first part of the chapter reviews the main theoretical development of union behaviour. It has been shown that pay is dependent on the form of the bargain and the power of unions to set wages. In the context of unionism, different models of union-firm behaviour have been proposed: (a) the monopoly union model (b) the right-to-manage model and (c) the efficient bargain model.

The empirical results of previous studies showed that changes in sectoral performance (e.g. profits and relative productivity) have a positive impact on the growth of real wages. This seems to enhance the ability of organized groups to share in market quasi-rents. Wages increase in the form of productivity improvements is against to competitive labour market coefficients.