DETERMINANTS OF PUBLIC SECTOR WAGES IN NIGERIA

BY

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ABSTRACT

An efficient wage policy entails a clear understanding of the behavioral interactions in the domestic labour market. These may involve understanding the constraints of the labour market including demand and supply determinants and employee preferences for certain wage levels. In Nigeria, the way and manner of determining public sector wages presents no determinable pattern. Existing studies were deficient on data and methodology. This paper discusses the determinants of public sector wages in Nigeria. Using quarterly time series data for 1970-2001, and employing the error correction methodology, the paper identified Trade Disputes, Cost of Living, previous Work Experience and Productivity to be the main determinants. It found the wage level to be inadequate for a decent standard of living, and noted the effects of inappropriate wages on public sector productivity to include personnel attrition, labour freelancing as well as corruption. It similarly identified a strong influence on wages of prices, trade disputes, previous work experience, and public sector deficit spending. The paper recommends amongst other things, the payment of a clean wage to public sector employees (given marginal tax rates) and a review of the failed Public Sector Pension Scheme which was found to be the major cause of corruption in the public sector. To address the issue of constant price increases associated with policy slippages, measures to stem incessant price volatility were suggested.

INTRODUCTION

Wages are a major issue of economic policy, and therefore, an integral part of economic development policies of most countries. At the centre of public wage policy are the rate of wage increases, range and structure of wage differences, degree of desirable or tolerable inequality, adequacy of the wage for the varying differentials of skills and responsibilities, and the extent of variance between wage groups. Also, of importance is the extent to which labour is to be treated as an overhead cost, or alternatively to which labour costs and earnings should vary with output.

Evidently, the composition of wages in public sector employment has not been a crucial factor in the determination of wages nor in formulating wage policies in most developing countries, as this has often been taken for granted (Becker:1964 and Mincer: 1958, 1974). This is due to the absence of an appropriate methodology for classifying attendant paraphernalia of public office and the non-monetization of benefits of public servants. This makes the definition of wages in the public sector a complicated issue. The question of how education and work experience influence wages and the stagnation of wages by public policy to contain inflationary pressures and minimize public sector expenditure, remain unanswered. Other issues are whether the premium between public and private sector wages can reasonably be narrowed by efficient public sector wage policies as Heller and Tait (1983) and Levy and Newman (1989) have alleged.

An efficient wage policy demands a clear understanding of

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the behavioral relationships in the domestic labour market. Thus, issues such as what the constraints of the market are, the relevance of supply in wage determination, the conditions under which employers would prefer a certain wage level to another, need to be clearly understood. In attempting to address these issues, the pertinent question is whether government wage fixing exercises can be justified when theory suggests that in efficient markets, supply creates its own demand and establishes the market equilibrium?

This paper seeks to establish the determinants of public sector wages in Nigeria. To achieve this, the paper is organized in five sections. While Section I presents the introduction, Section II reviews the underlying the oretical and empirical literature. In Section III, a historical review of the determination of wages in Nigeria is undertaken. Section IV presents the empirical findings and analyses, while section five summarises and concludes the paper, and adumbrates some policy recommendations.

SECTION TWO

2.0 Theoretical and Empirical Literature

In a free market economy, wages are considered as a special case of the general theory of value. They are the price for labour, which in the absence of control is determined, like all other prices by the forces of demand and supply. However, labour is not demanded for its own sake, but for its intrinsic value in the production of other goods which consumers pay a monetary value for. Besides, the demand for labour is a derived demand, and the special properties of the derived demand may thus reasonably be assumed as a part of the general theory of wages.

An important consideration is the difference in the efficiency of labour and sometimes the aggregation of wage payment without due consideration for its differentials. In a simplified model of the labour market, wages are in equilibrium when labour demand equals supply, implying that an excess of supply over demand induces unemployment. The unemployed will then ask for lower wages to regain employment. If demand exceeds supply, employers will be unable to obtain all the labour they need and will therefore offer higher wages in order to attract labour.

Economic theory believes wages to be a function of price of labour. The wage determines how much people are willing to do, and how much labour to be employed. This belief is anchored on the behaviour of the profit maximizing firm. A competitive firm will hire workers up to the point where the value of the marginal productivity of labour equals the wage rate. Aggregating for all firms, the economy's profit-maximizing identity will be the same as that of the individual firms; given as:

$w = pX_n$ or

$w/p = X_n$

Where w is the nominal wage rate, p is the price level, w/p is the real wage rate, and X_n is the marginal productivity of labour. The X_n, derived from the production function is assumed to be positive but declines as employment increases in accordance with the assumptions of diminishing marginal productivity.

When money wages rise, the cost of employing an additional worker over and above his marginal productivity would rise, thereby causing a reduction in employment. Similarly, if the price of output (goods) rises, the value of the marginal output of labour would rise. The classicists believed that the supply of labour depends on the real wage level just as does the demand. Thus, workers are not better off when both wages and prices double. If however under the circumstances, better-off, they are said to have a money illusion. The theory suggests that persistent unemployment is ascribed to imperfections in the labour markets which prevent a fall in money wages. They assume that such a fall would lower the real wage and establish equilibrium.

Keynes and the Keynesians argued that money wages tend to be sticky downwards even when involuntary unemployment exists, and that even if money wages fall, the real wage will remain constant and therefore, involuntary unemployment will not be eliminated and thus, equilibrium will not be established. They reasoned that a fall in money wages would temporarily reduce the real wage rate, increase production and consequently,

employment. This argument is based on institutional facts that wages are not generally downwardly flexible even under conditions of heavy unemployment. Keynes maintained that money wages would be inflexible downward even in the absence of unions, minimum wage laws, and similar elements that prevent competition in the labour market.

While workers will not accept a fall in money wages, through wage cuts, they are indifferent if such reductions came about through a rise in the price level. Although this is money illusion, it is important to note how the fall in real wages is brought about. Equilibrium requires that the needed reduction in real wages be brought about by an increase in aggregate demand, which will induce an upward price rise, thereby shifting the labour supply curve inwards to eliminate unemployment. Aggregate demand, therefore, determine the conditions in the labour market in Keynesian economics, whereas in the classical case, the labour market takes care of itself.

Theoretically, wage increases should reflect increased productivity because they are expected to leave labour cost per unit of output unchanged and therefore, not exert upward pressure on prices. To be relevant, wage increases should be economy wide rather than sectoral based to avert lopsided development. It would be inappropriate to regiment wage increases to changes in average productivity, though that may provide a shield against inflation because it indicates the general trend of wages that are tolerable without increase in the unit cost of labour. Where productivity increases are commensurate with wage increases, business mark-up or some combination of these two, would induce inflationary pressures.

There are associated problems of measurement of individual productivity especially in the public sector. Even in the more austere private sector, measurement problems are concealed in the attainment of corporate goals. The public sector however, has no such goals with which to measure its achievements nor the productivity of its employees. Thus, tying wage increases to changes in average productivity would not always be socially expedient. However, the theoretical usefulness of this approach is its safeguard against inflation as it indicates the general trend of wage rates that can be tolerated without an increase in unit labour cost. Discarding this theoretical construct creates structural bottlenecks and infrastructural deficiencies, which have engulfed the public and private sectors in Nigeria (FOS, 1997).

Often, while the public sector maintains high employment, real wages are gradually eroded. Mazumdar (1987) found that when government wages are too high, they tend to exert upward pressure on private sector wages thus compromising employment and labour efficiency. Low wages in the public sector create a discouraged and disenchanted workforce leading to ***moonlighting activities*** (*a situation where persons in full employment engage in parallel activities that are inconsistent with their primary employment for commercial gains)*. This has negative impact on the productivity of the public sector. Moreover, wages in the private sector follow the pattern dictated by the public sector.

Most studies dealing with the adequacy of wage suffer from a suspect methodology, consequently, their findings lack credibility and are adjudged to be misleading. A number of studies dealing with wage determinants make comparisons between the public and private sector on the basis of average wages without making

provision for adjustment for differences in the level of education and work experience between the private and public sector and the reason for their existence. For instance, Mincer (1994) found that educational attainment does respond to wages, and that this response mitigates the trend towards higher wage premiums for college educated workers.

Thus, studies by Abbot and Stanos (1986), Gunderson (1979c), Robinson and Torres (1984) , Shapiro and Stekner (1980, 1986) as well as Ehrenberg and Schwarz (1986) in Canada and the United States, using the ordinary least squares (OLS) regression techniques to control wage determining attributes (such as education, productivity and experience) in assessing the public and private sector wage differentials and adequacy found different results from those obtained in developing countries. Becker (1964) and Mincer (1958, 1974) adopting the human capital model of earnings determination, found that observed wage differences among individuals arise from a mix of school and post school investments in education, training, work experience as well as other socio-economic factors like marital status, geographical location and nationality.

Typically, these studies estimate sector specific wage equations which allow us to test statistically for the equality of overall pay structures in the two sectors as well as to gauge the sectoral differences in the various rates of return of a specific background attribute such as a year of schooling or the acquisition of a university degree. The fact that differences in estimated rewards may not be readily ascribed to productivity-enhancing background attributes, makes a priori evidence that one or another group of workers enjoy a wage premium that may or may not be adequate for its skill level.

However, there is much variation in both the direction and magnitude of the estimated wage advantage. Mazumdar (1981) in Malaysia found that primary school wages in the public sector are lower than those in the private sector. University graduates enjoy higher premium in public sector employment in Cote d'Ivoire over their counterparts in the private sector as Komenan (1987) discovered. In Columbia, Psacharopoulos, Aniagada and Velez (1987) have shown that education rather than work experience and productivity pay in private sector employment. Psacharopoulos (1983) while studying Brazil, Greece, Malaysia, Columbia and Portugal discovered that except for Greece, returns to education, productivity and experience are higher in the private sector than in the public sector.

Thus, whereas highly educated workers in the public sector do not have a wage advantage, in the private sector, less educated workers do have a wage premium. Steir (1987) confirms that in Venezuela, average public sector wages are higher than private sector wages at all levels except at the post secondary level. Most of these studies consider the adequacy of the wage level to be a relative factor of educational attainment but not a function of the general level of economic development nor price levels.

2.2 Modeling Wages in Nigeria.

Olaloye (1976) modeled wage earnings in Nigeria's manufacturing industries using Time Series data. Employing a two variable formulation - the cost of living and level of productivity gains, the researcher postulated that the present cost of living is affected by past output. The form of equation and the appropriate lag structure were however, said to be indeterminate in the literature. The formulated equation was:

$W = f(X_{t-k}, P_{t-m})$

Where:

W_{et} = Average wage earnings index in the Nigerian Manufacturing Industries;

X = Average Productivity (defined as value added per employee) index in the Nigerian Manufacturing Industries;

P = Cost of Living Index

T = Time subscripts in years, and

k, m = Lags in Years

Estimating the equation in first difference at an appropriate lag structure, and holding productivity constant, the author found a positive relationship between the average wages and the previous year's cost of living index. The same was established for productivity and average wage earnings if the previous year's cost of living index was held constant.

The main deficiency in Olaloye's (1976) estimation was the smallness of his sample size. There were yearly variations in the composition and coverage of establishments affected by the civil war. These introduced noise and structural break in the data set, leading to inconclusive results. No attempt was made to establish wages in the public sector which, invariably, in all cases determine the direction of wage level/flows in the economy. The observed imperfections therefore, have given rise to the present study. This study therefore, improves on Olaloye's approach especially in the veracity and predictive ability of the model by increasing the sample size, and the number of variables. The present study also proposes a robust model with the aid of improved econometric methodology which was used to test the determinants of wages in Nigeria.

SECTION THREE

WAGE DETERMINATION IN NIGERIA

3.0 Wage Administration in Nigeria

Across the board wage bargain institutions in the public sector date to the early 1900s but formal institutionalization in form of wage commission/committees was in the 1930s. The internal machinery for bi-lateral public sector wage negotiation was first set in motion by the 1946 Harragin commission but established by the Cowan Commission of Enquiry of 1948 which introduced two 'Whitley Council', one for clerical and office employees and the other for industrial or manual workers. These councils though ineffective lasted on the statue books till 1964 when they were replaced by Wages Boards upon the recommendation of the Morgan Commission (1963). The wages Board were later displaced by the National Negotiating Councils I, II, and III which were introduced by the 1973 Udoji Commission, inaugurated in 1976. The mandate of these councils was to negotiate salaries, fringe benefits and general conditions of service for the public service, but excluding partial and fully commercialized parastatals, state owned companies and academic and non-academic institutions (universities, research institutes, teaching hospitals, and the like).

Wage fixing exercises in Nigeria have for long remained the prerogative of the federal government which has carried out the exercise through the use of wage commissions (Anyafo, 1996). Thus, between 1941 and 1973, nine such commissions were set up to routinely review public sector wages. These include: Bridges Committee (1941), Tudor Davis Commission (1945), Harragin

Commission (1946), Miller Committee (1947), Gorsuch Committee (1955), Mbanefo and Morgan Commissions (1959), Morgan Commission (1963), Adebo Commission (1970), Udoji Commission (1973).

Though the wage awards of these commissions were intended to apply to the public sector only, workers in the private sector also took their queue from them. A usual feature of a typical wage award in Nigeria is incessant strike by workers, owing to widespread attempts by employees in the private sector (or even in the public sector especially the state and local government authorities who refuse to effect such awards) to raise their pay in tandem with those of government employees. Also, such wage increases were usually effected as a spur of the moment, not having been previously provided for in the budget of the year in which they became effective. In effect, the implementation of such wage increases led to overshooting the boundaries of fiscal discipline, increased inflation, loss of productivity and consequently, national income arising from accompanying labour unrest in agitation for payment of the new wage.

The factors which influenced the growth in remuneration packages in the 1920s through 1950s were the expansion of public utilities such as potable water, electricity, housing and a relatively integrated transportation system (marine, rail, and road), as well as exploration and mining activities. These activities which bred a pool of skilled and semi-skilled artisans, through formal and informal training systems influenced public sector compensation in the country (FOS:1998).

SECTION FOUR

4.0 Methodology

4.1 DATA JUSTIFICATION

Trade Disputes

The variable measures amongst others, macroeconomic uncertainties associated with wage administration as a barometer for gauging wage insufficiency to attain a decent standard of living, social unrest and discontentment. The data was obtained from the Federal Ministry of Employment, Labour and Productivity under the heading Trade Disputes. It is the number of trade disputes declared by labour in the year.

Productivity

The data on productivity used was gross national productivity as reported by Obadan and Odusola (2000). A theoretical link exist between per capita income and the marginal productivity of labour. Thus, an economy's national productivity is defined as: GNP/Population. This was adopted as proxy for public sector productivity.

Average Wage Earnings

The wage system in Nigeria is a stratified wage. It is broadly classified into two categories, senior and junior. The wage data which was obtained from the National productivity Centre, Federal Ministry of Employment, Labour and Productivity and the Federal Office of Statistics (FOS) was therefore so classified. For purposes of the study, wages at each category was first considered separately. Thus, wages within each bracket were considered

separately and thereafter averaged for that category. Thereafter, the two categories were added and a national average obtained.

Interest Rates

This was used in its strict economic meaning as the cost of capital. The rate used was the Prime Lending Rate. The data was obtained at the Central bank of Nigeria.

Money Supply (M2)

This is defined as currency outside banks plus demand deposits. Data used was as published by the CBN.

Work Experience

This is defined as the man days worked. Data used was obtained from the CBN Statistical Bulletin, Vol. 10 No. 2, December 1999.

4.2 Estimation and Analysis

Olaloye's model was tested using OLS methodology with quarterly data from 1970 to 1998 but it yielded unsatisfactory results. The procedure employed in this study involved an enlarged variable model using an error correction methodology. Our findings revealed that the level of education was not a major determinant of public sector wages in Nigeria. The methodology was used to estimate the model because for a sample size, the OLS methodology though less sensitive to misspecification error than the simultaneous estimation procedures, was inappropriate because it produced no reliable results. Most of the variables met a priori expectations, except for the lagged consumer price index (CPI). When plotted, the relationship produced a long-run relationship amongst the co-integrating variables.

4.3 The Wage Model for Nigeria

The Average Wage which is the average price for labour in the public sector is used as the dependent variable. Using the lagged dependent model we define the dynamic autoregressive model using the Marc Nerlove Partial Adjustment Approach, an improved variant of the Koyck distributed lag model, which portrays the time path of the dependent variable in relation to its past values.

Applying the flexible accelerator approach, which assumes the existence of an equilibrium, optimal, desired or long-run equilibrium wage needed to produce a certain level of output under given fundamentals, and assuming that this desired wage is a linear function of other explanatory variables such as Trade Disputes, Consumer Price Index, Interest Rate, Productivity, Money Supply, and Previous Work Experience, we can then specify the linear form of the equation as follows:

$$\dot{\emptyset}_t = a_0 + a_1(\rho_t) + a_2(II_t) + a_3(\beta_t) + a_4(\gamma_t) + a_5(\Omega_t) + a_6(\Theta_{t-1}) + (\varepsilon_t) \quad \text{.....(1)}$$

Where:

$\dot{\emptyset}_t$ = Average Wage Earnings at Time t

ρ_t = Trade Disputes at time t

II_t = CPI at time t

β_t = Interest Rates at time t

γ_t = Productivity at time t

Ω_t = Money Supply at time t

Θ_{t-1} = Previous Work Experience at time t-1

ε = Error Term

Equation (1) is the long-run or equilibrium wage. Due to the difficulty of observing the desired wage, Nerlove (1963), postulated the Partial Adjustment Hypothesis discussed in Appendix II. The resulting wage model from the partial adjustment hypothesis would be is of the form:

$$\log_t = \log a_0 + a_1 \log(\rho_t) + a_2 \log(II_t) + a_3\delta\log(\beta_t) + a_4\delta\log(\gamma_t) + a_5\delta\log(\Omega_t) + a_6\delta\log(\Theta_{t-1}) + (1-\delta)\log\dot{O}_{t-1} + \delta(\mathcal{E}_t) \quad \ldots\ldots$$

Under this approach, the estimated parameters represent the rate of change in the level or elasticity of the explanatory variables including the level of Trade Disputes (a_1), consumer prices-CPI (a_2), Interest Rates (a_3), Productivity (a_4), Money Supply (a_5) and Previous Work Experience (a_6). A priori, the signs of the parameters are: a_1, a_2, a_3, a_4, a_5, and $a_6 > 0$.

In view of the problems associated with the partial, adjustment hypothesis, the error correction framework, which is an improvement over Nerlove (1963) specification is adopted for this study. The nonlinear least squares estimator of the equilibrium correction model has the following properties as shown by Stock (1987), which are lacking in the partial adjustment framework. It is a super-consistent estimator of the long-run coefficients. Also, it is a consistent and asymptotically normally distributed estimator of the coefficients of the I(0) terms. The econometric package employed in the estimation was views 4.

4.4 Results and Major Findings

The results of the static regression are presented in Table 1 based on a unit root test, conducted on the log values of the explanatory variables, as shown in Table 2. All the variables were integrated of order 2.

Results of the static model are presented in Table 1.

Table 1

RESULTS FROM STATIC REGRESSION

Variable	Coefficient	Standard Error	t-statistic	Probability
CONSTANT	-0.060048	0.207151	-0.289874	0.7725
$L\rho_t$	0.083690	0.019292	4.338022	0.0000
LII_t	0.486584	0.064162	7.583636	0.0000
LII_{t-1}	-0.420379	0.064817	-6.485587	0.0000
$L\dot{\emptyset}_{t-1}$	0.062550	0.017468	3.580858	0.0005
$L\Theta_{t-1}$	0.888633	0.030844	28.81045	0.0000

R^2 = 0.995983, AdjR^2= 0.995799, DW = 1.685981, Log Likelihood = 168.4828, Akaike Inf. Crit. = -2.825788, F. Stat.= 5405.417, Prob(F-Stat) = 0.000000

This gives us our long-run equation as:

$$\dot{\emptyset}_t \; 0.060 + 0.084(\rho_t) + 0.487(II_t) - 0.420(II_{t-1}) + 0.063(\dot{\emptyset}_{t-1}) + 0.889(\Theta_{t-1}) \ldots . \quad (3)$$

Although the stationarity of the variables may dispense with the problem of spurious regression, however, the coefficients of the regression don't converge in probability with increasing sample size, as the constant diverges. Consequently, both the regression coefficients and the R^2 have non-degenerate distributions. Thus, the test diverges so that there are no asymptotically correct critical values for these conventional significance tests, and the DW test

Table 2

UNIT ROOT TEST OF THE VARIABLES

Variable**	Critical Values for ADF Test	ADF Test Statistic	Order of Integration
$\dot{\emptyset}_t$	-2.8879	-6.933878	1
ρ_t	-2.8879	-7.802847	1
Π_{tt}	-2.8879	-6.496882	1
$D\beta_t$	-2.8879	-6.625881	1
γ_t	-2.8879	-6.861061	1
Ω_t	-2.8879	-7.599730	1
Θ_t	-2.8879	-8.420121	1

The ADF Test Statistic is at 5% level of significance. The ADF Test was without trend, but included an intercept. All variables are in their log form and are I(1), at the 2nd lag length

converges to zero (Granger-Newbold:1974). Following Granger and Newbold (1974), the ADF unit Root Test on the residual shows that there is co integrating relationship amongst the variables as such, they are correctly associated in the long run. The residual term for our test defined as Φ is of the form:

$$\Delta\Phi = a_0 + a_1\Phi(-1) + a_2\Delta(\Phi(-1) \quad \text{.....(4)}$$

And the Residual test yielded the results presented in Table 3 below.

Table 3

RESULTS OF RESIDUAL TEST

Variable	Coefficient	Standard Error	t-statistic	Probability
CONSTANT	0.001106	0.005992	0.184498	0.8540
$\Phi(-1)$	-2.889241	0.403692	-7.157051	0.0000
$\Delta\Phi(-1)$	1.217138	0.352902	3.448944	0.0008

R^2 = 0.764562, AdjR^2 = 0.753133, DW = 2.032655, Log Likelihood = 150.6015, Akaike Inf. Crit. = -2.653239, F. Stat. = 66.89637, Prob(F-Stat) = 0.000000

Our Error Correction Model is of the form:

$$\Delta^2\dot{\Phi}_t = a_0 + a_1\Delta^2\rho_t + a_2\Delta^2 n_t + a_3\Delta^2\beta_t + a_4\Delta^2 Y_t + a_5\Delta^2\Omega_t + a_6\Delta^2\Theta_{t-1} + a_6\Phi_{t-1} \quad \text{.....(5)}$$

Where Φt_{-1} = rest-1 = Residual,

Table 4

RESULTS OF THE ERROR CORRECTION REGRESSION

Variable	Coefficient	Standard Error	t-statistic	Probability
CONSTANT	0.000938	0.006880	0.136332	0.8918
$L\rho_t$	0.127117	0.025271	5.030164	0.0000
$L\Pi_t$	0.484025	0.061501	7.870145	0.0000
$L\Pi_{t-1}$	-3.316966	0.133310	-2.377666	0.0192
L_{t-1}	0.639214	0.245988	2.598557	0.0107
$L\Theta_{t-1}$	0.038722	0.025271	5.030164	0.0000
Φ_{T1}	-0.605133	0.265989	-2.275027	0.0249

R^2 = 0.458270, AdjR^2 = 0.427893, DW = 1.972275, Log Likelihood = 170.4636, Akaike Inf. Crit. = -2.867783, Schwarz Inf. Cri -2.70, F. Stat. = 15.08590, Prob(F-Stat) = 0.000000

The results of the model is presented as:

$$\dot{\emptyset}_t = 0.009 + 0.13\rho_t + 0.48\Pi_t - 3.32\beta_{t-1} + 0.64Y_{t-1} + 0.04\Omega_{t-1} - 0.61\Theta_{t-1}.$$

Analysis of the Results

Trade Disputes was highly statistically significant, met a priori expectations. The variable addresses amongst other issues, macroeconomic uncertainties associated with wage administration in Nigeria, insufficiency of wages to live a decent standard of living, political considerations, social pressure and discontentment with policies amongst others. At 5 per cent level of significance, the null hypothesis of a Zero coefficient of trade disputes is rejected. This is an indication that trade dispute induce significant positive wage changes and wage policies in Nigeria. Thus, a unit change in trade disputes induces a 0.13 per cent wage change. Its inelasticity

shows how inadequate is the level of wages change. Its inelasticity shows how inadequate is the level of wages to meet basic needs. Therefore, the more often and persistent is trade dispute, leading to work stoppages, the better for employees because they will have more time for freelancing and moonlighting.

The CPI with a t-statistic of 7.87 is also significant at the 5 per cent level. It met a priori expectations showed signs of moderate elasticity. A unit change in prices induces a 0.48 percent increase in wages. Thus, the null hypothesis of a zero coefficient that changes in price levels have no effect on wage levels is rejected. Infact, growth in the price level with wages held constant would induce demand for higher wages.

The one period lagged CPI was very elastic and statistically significant at 5 per cent level of significance, but it had a wrong sign. With an elasticity of greater than unity, a unit change in last quarter's prices induce a more than proportionate change in current wages. It gives us reason to reject the null hypothesis of a zero coefficient of the lagged inflation rate and to accept the alternate that the one period lagged inflation is instrumental at the 5% level of significance in affecting current wages. The wrong sign could be explained in terms of the leaning against the wind response of government to demands for higher wages when there is perceived rise in the price level.

Previous Work Experience proved to be statistically significant at 5 per cent level, and met a priori expectations. This is an indication that public sector wage policies recognize recent work experience acquired as is the case with the more austere private sector which uses wage increases to compensate highly skilled labour, and for purposes of personnel motivation. Thus, changes in

previous work experience are complemented by 0.04 per cent increased wages. This inelasticity may explain the causes of personnel attrition to the more austere private sector.

The lagged dependent variable performed creditably, being statistically significant and meeting a priori expectations. Thus, current wages are highly sensitive to previous wage levels. Consequently, a unit change in previous wages raise current wages by as much as 0.64 per cent.

The main gaps in the paper include the discrete nature of public sector wages, the non-inclusion of non-monetary benefits enjoyed by certain office holders in the public sector, the influence of extraneous factors such as the personal disposition of an incumbent leader to wage matters. These issues present challenges for further research.

SECTION V

Concluding Remarks and Policy Recommendations

5.1 Concluding Remarks

The major findings of the study are that the main determinants of wages in Nigeria are: Trade Disputes, Price Levels, Previous Work Experience, and the Level of Previous Wages. The low elasticities of trade disputes confirms the inadequacy of wages which induced moonlighting activities, freelancing, bribery and corruption, in order to generate additional income to meet the cost of living. The very high elasticity of prices on the other hand indicate a more than proportionate reaction of wages to changes in prices. The low elasticity of previous work experience indicate that compensation policies, though take cognizance of previous work experience, are not based on recently acquired experience which gives rise to personnel attrition and moonlighting activities. Also, both lagged inflation and lagged dependent variable are instrumental to wage changes in Nigeria. Exchange rate, productivity, interest rate and money supply, however, do not directly influence wage changes.

5.2 Policy Recommendations

As rising price levels heighten the demand for higher wages, which if not met leads to trade disputes and fall in output, it is recommended that policies that moderate price levels be conscientiously pursued to stem spiral price movement. This will ensure a more pragmatic and equitable compensation system which recognizes productivity and adequacy of the wage to meet basic standard of living. This will encourage hard work and reduce the incidence of absentee employees who freelance in search of alternative income to compensate for inadequate wages. We also

recommend a restructuring of the public sector wage system such that the employee is paid a clean wage (monetizing accrued benefits), given marginal tax rates. The pension scheme which has become unrealistic should also be reviewed with a view to building into the model, cost of living adjustment and aging consideraions. This may take care of personnel attrition and freelancing labour, which impacts on labour efficiency and output.

APPENDIX I

TEST FOR COINTEGRATION

The cointegration test was carried out based on the rules specified by Engle and Granger (1991) that the components of the vector x, are said to be cointegrated of order d, b, denoted $X_t \sim CI(d,b)$, if:

(I) all components of X_t are I(d)

(ii) there exists a vector a(0) so that $Z_t = a'x_t^2$ I(d-b). Then, the vector a is called the cointegrating vector.

Hannan (1970) has shown that if each component of X_t, is I(1) so that the change in each component is a zero mean purely non-deterministic stationary stochastic process, then it follows that there will always exist a multivariate wold representation of the form $(I-B)x_t = C(B)e_t$, indicating both sides of the equation will have the same special matrix. Also, C(B) will be specially defined given the conditions that the relationship C(Z), $Z = e^{ir}$, have all zeros on or outside the unit circle, and that $C(0) = I_N$, NxN matrix.

From the above representations, the e_t are zero mean white noise vectors with

$$E(e_t\ e_s) = 0, \quad t = s$$
$$= G, \quad t = s$$

Thus, only contemporaneous correlations can occur. The moving average polynomial C(B) can be shown as:
$C(B) = C(1) + (1-B)C^*(B)$. Consequently, if c(B) is finite, then C*(B) will be finite by rearranging the terms. If $C^*(1) = 0$, then, we can similarly refine $(1-b)^2$.

APPENDIX II

NERLOVE'S PARTIAL ADJUSTMENT FRAMEWORK

The marc Nerlove Partial Adjustment framework is a preceding alternative procedure over the error correction methodology, and an improvement over the Koyck distributed lag model, which potrays the time path of the dependent variable in relation to its past value. Thus, using the lagged dependent model we define the dynamic autoregressive model as:

$$\dot{\emptyset}_t = a_0 + a_1(\rho_t) + a_2(\Pi)_t + a_3(\beta_t) + a_4(Y_t) + a_5(\Omega_t) + a_6(\Theta_{t-1}) + (\varepsilon_t) \quad \ldots\ldots(1)$$

$$\dot{\emptyset}_t - \dot{\emptyset}_{t-1} = \delta(\dot{\emptyset}_t - \dot{\emptyset}_{t-1}) \quad \ldots\ldots(2)$$

The model may also be specified as:

$$\dot{\emptyset}_t - \dot{\emptyset}_{t-1} = \delta(\dot{\emptyset}_t - \dot{\emptyset}_{t-1}) \quad \ldots\ldots(2)$$

Where:
δ, is coefficient of adjustment0<

Thus, equation (1) implies that actual change in wages in any time "t" is some fraction "δ" of the desired change for that period. If $\delta = 1$, it means the actual level of wages is equal to the desired level i.e actual level adjusting instantaneously with the desired level in the same time period. However, if $\delta = 0$, it means no change has occurred since the actual level at time t is the same with that observed in the previous time period. **t-1**. is expected to lie between these two extreme since adjustment to the desired wage is likely to be incomplete because of rigidity, inertia, contractual obligations, and other extraneous considerations. We can therefore define the adjustment mechanism as:

$$\dot{\emptyset}_t = \delta \dot{\emptyset}^*_{t+} \delta (1-\delta_-) \dot{\emptyset}_{t-1} \quad \ldots\ldots(4)$$

Indicating that the observed wage at time t is a weighted average of the desired wage at the time and the wage existing in the previous time period, δ **and (1-δ)** being the weights.

Substituting equation (1) in equation (4) produces equation (5) which is of the form:

Yt = δ (æo + æ1xt + $\acute{\varepsilon}$t + (1-δ) yt-1

= δæo + δ æ1xt + $\acute{\varepsilon}$t + (1-δ) yt-1 + δ $\acute{\varepsilon}$t.....(5)

Equation (5) is the short-run wage function; hence, the short-run wage may not necessarily be equal to the long-run wage. Estimating the short-run wage function produces the adjustment coefficient δ (from the coefficient of **yt-1),** we then derive the long-run function by dividing δ**æo** and δ**æ1** by ä and omitting the lagged Y term which produces equation (1) above.

BIBLIOGRAPHY

Abbot, M. G., and T. Stanos (1986) Alternative Estimates of Union-Non-Union and Public-Private Wage Differentials in Ontario, 1981. Discussion Paper 670, Queens' University Institute for Economic Research, Kingston, Ont.

Anyafo, A. M.O. (1996) Public Finance in a developing Economy: The Nigerian Case, b & F Publications, UNEC .

Ashenfelter, Orley, and David Card (1987) "Why have Unemployment Rates in Canada and the U.S. Diverged." In C. R. Bean, P. R. G. Layard, and S. J. Nickell, *The Rise in Unemployment*. New York: Blackwell.

Becker, Gray (1964) Human Capital. New York, Columbia University Press.

Bennell, P. S. (1983) "Earnings Differentials between Public and Private Sectors in Africa: The Cases of Ghana, Kenya, and Nigeria." Labour and Society 6, No. 4:223-241.

CBN (1999) Nigeria's Development Prospects: Poverty Assessment and Alleviation Study, CBN.

Ehrenberg, Ronald, and J. I. Schwarz (1986) "Public-Sector Labour Markets." In O. Ashenfelter and R. Layard, eds., *Handbook of Labour Economics, Vol. II.* Amsterdam: North Holland.

Engle, R. F. and C. W. J. Granger (1991) "Cointegration and Error Correction: Representation, Estimation, and Testing". In Long-run Economic Relationships, Readings in Cointegration, Oxford University Press.

FOS (1997) National Accounts of Nigeria 1981-1996. FOS, Abuja.

FOS (1998) Review of the Nigerian Economy 1997. FGN.

Gaag, Jaques van der, Stelcner, Morton and Vijverberg, Wim (1989) Wage Differentials and Moonlighting by Civil Servants: Evidence from Cote d'Ivoire and Peru. World Bank Economic Review. Vol. 3, No. 1.

Granger, C.W.J. and Paul Newbold (1974) "Spurious Regressions in Econometrics" Journal of Economics, 2, 111 20.

Gunderson, Morley (1979c) "Wage Determination in the Public Sector: Canada and the United States." *Labour Society* 4, No. 1: 49-70.

Hannan, E. J. (1970) Multiple Time Series, New York, Wiley

Heller, P. S., and A. A. Tait (1984) Government employment and Pay: Some International Comparisons. IMF Occasional Paper 24, Washington, D.C.

Ihlanfeldt, Keith R. (1992) "Job Accessibility and School Enrolment of Teenagers." Kalamazoo, MI: W.E. Upjohn Institute of Employment Research.

Komenan, A. G. (1987) "Education, experience, and salaries in Cote d'Ivoire: An Analysis Based on the labour Force Survey of 1984." World Bank Education and Training Department Discussion Paper 99. Washington, D.C.

Lindauer, David, *Public Sector Wages and Employment in Africa:* Facts and Concepts, World Bank Studies in Employment and Rural Development, No. 68 (Washington, 1981).

Mazumdar, Dipak (1981) The Urban Labour Market and Income Distribution: A Study of Malaysia, New York: Oxford University Press and the World Bank.

Mincer, Jacob (1974) Schooling, Experience and Earnings, New York: National Bureau of Economic Research and Columbia University Press.

Mincer, Jacob (1994) "Investment in US Education and Training" National Bureau of Economic Research Working paper. No. 4844, August.

Mitchell, Daniel J. B., (1985) 'Wage Flexibility in the United States: Lessons from the Past." American Economic Review 75, No. 2 (May): 36-40.

Numberg, Barbara (1987) "Public Sector Pay and Employment **Issues in Bank Lending:** An Interim Review of Experience." World Bank Country Economics Department. Washington, D.C.

Obadan, I and Ayodele F. Odusola (2000) "Productivity and Unemployment in Nigeria" in Proceeding of the 9th Annual Conference of the Zonal Research Units, CBN, Abuja.

O'Brien, Anthony (1985) "The Cyclical Sensitivity of Wages." American Economic Review 75, No. 4 (December):1124-1142.

Olaloye, A. O (1976) Wage Earnings in Nigeria's Manufacturing Industries. The Nigeria's Journal of Economic and Social Studies Vol. 18, No. 3, November. pp. 407-420.

Onwuoduokit, E. A. (1999) Fiscal Deficits and Inflation Dynamics in Nigeria: An Empirical Investigation of Causal Relationships, CBN EFR, Vol. 37, No. 2, June 1999.

Phillips, P. C. B. (1985b) Understanding spurious Regression in Econometrics, Cowles Foundation Discussion paper, 757.

Psacharopoulos, George (1983) "Education and Private Versus Public sector Pay." Labour Society 8, No. 2: 123-134.

Rosen, Sherwin. (1985) "Implicit Contracts: A Survey." Journal of Economic Literature 23, No. 3 (September0:1144-1175.

Shapiro, D. M., and Morton Stelcner (1986) Public-Private Sector Earnings Differentials in canada, 1970-1980. Concordia University Department of Economics Working Paper 1986-03. Montreal.

Solow, R. M.. (1987) "Unemployment: Getting the question Right." In C. R. Bean, P. R. G. layard, and S. J. Nickell, *The Rise in Unemployment*. New York: Blackwell.

Steir, Francis (1987) 'Schooling, Experience, and Earnings: Issues in Venezuelan Development, 1975 - 84" Ph.D Diss., Columbia University.

Stock, J. H. (1987) Assymptotic properties of Least Squares Estimators of Co-integrating Vectors, Econometrica, Vol. 55, pp 1035-1056World Bank (1990) World Development Report, Oxford University Press.

World Bank (1993) Nigeria's Structural Adjustment Program, Policies, Implementation and Impact, West African Department Country Operations Division, report. No. 12366.

Yule, G. U. (1926) Why do we sometimes get nonsense-correlations between time-series?, Journal of the Royal statistical Society B, 89, 1-64.