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An Application of the Efficiency-Wage Hypothesis to the Modelling of LDC Labour Problems*

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The downward rigidity of wages and its implications for the labour market are some of the central observations that must be explained, and any satisfactory theory of wages and employment must provide explanation for not only this phenomenon but also for the reasons why in some instances falling wages may not eliminate unemployment.

This paper provides a model for the labour market in less developed countries that establishes the observed wage inflexibility and non-market-clearing, by utilizing the efficiency-wage model of employment and wages. The analysis proves to be a very illuminating paradigm to the understanding of the labour problems of underdeveloped countries.

I. Overview

An attempt is made here to utilize neoclassical modelling to explain some of the fundamental basis for the condition of wage and employment behaviour in the less developed economy (LDC). Such a condition is the downward wage rigidity found in most LDCs where it has been observed that wage rates adjust only slowly (if at all), and not fast enough to bring about equilibrium between labour markets, with unemployment as the consequence

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(Fields; Blaug). Also, such conditions include the "segmentation" of the labour market (House; Knight and Sabot; House and Rempel). These conditions could be explained by recourse to neoclassical economic analysis.[1] Such an undertaking is being attempted here by utilizing the Efficiency-Wage Hypothesis and its implications for the labour market.[2]

The wage stickiness that characterize LDC labour markets is studied from the firm's behavioural point of view (in accordance with optimization tendencies), not only in terms of the non-institutional factor of the reduction of hiring and training costs (Stiglitz), but also (and more importantly) in terms of gains to the firm in worker "efficiency" as wages are raised. Such a condition causes an inter-sectoral (i.e. industrial-agricultural and/or urban-rural and/or formal-informal and/or modern-subsistence) wage differential that do not respond to market forces. Stiglitz was the first to analyze this approach (see Basu), basing his work on the earlier studies of the 'wage-efficiency' relationship by Leibenstein; Ezekiel; and Wonnacott. These authors did not exhaust the problem, nor did they apply this important approach towards the study of the employment and wage implications of the "efficiency wage rule" for the overall labour market. This paper is an attempt to carry out this task.

II. The Basic Model

A. Background to the Model: The Efficiency-Wage Theory

Some writers have stressed the view that the literature on wage determination for the underdeveloped economy should stress a new element in the theory of labour markets, namely the notion that output per man-hour will tend to vary according to the wage rate (Leibenstein 1957; Moes and Bottomley; Stiglitz 1976). Two

1 One school of thought attributes these conditions mainly to institutional factors (see Berg; Reynolds; Frank).

2 The efficiency-wage hypothesis can be used to explain many important features of the labour market: involuntary unemployment, wage rigidity, segmentation, existence of wage distribution for workers of identical characteristics, and discrimination (Akerlof 1984; House; Yellen). In this study our main concern primarily is with the first three of the above attributes.

variants of this wage-productivity hypothesis can be specified: the 'nutritional' variant and the 'motivational' variant.

The nutritional variant of the model can be seen as that analyzed by Leibenstein (1957, 1958) and furthered both theoretically and empirically by Rodgers (1975) and Bliss and Stern (1978). It essentially holds that employers can benefit by paying higher wages, for as wages rise, a better diet and an improved and more positive attitude towards the job task will cause workers to increase their productivity. Therefore, both the number of hours offered for hire (labour supply) and the output (number of work units per labour time, such as, number of bricks laid per hour, say) will vary positively with the wage rate. At a high wage, each man-hour will contain more work-units than it does at a low wage (Malcolmson; Basu).

The motivational variant of the wage-productivity relationship can be seen as that emphasized in the works of Akerlof, Yellen, and also utilized by Eswaran and Kotwal in their "shirking model" of employment and wage determination in a "two tier" agrarian labour market. It explains that higher productivity may result from higher wage payments because a worker would be motivated to put in his/her best in the job not only because of an innate motivation of the higher remuneration flowing from the job, but also for fear of losing the job (and the higher "utility" it confers) if fired as a result of "shirking." Let us elaborate further on this "shirking model" aspect of the motivational variant of the hypothesis.

It can be postulated that there is a divergence between the formal authority and work rules of the industry set up and the actual authority and work-rules that does obtain in the work place (Akerlof 1984). Workers tend to set their own informal work rules which are often different from the official ones. The ability of the management or employer to make workers conform to the official rules (which are assumed to be the rules that must be observed in order to enable the firm to maximize labour use and hence necessary for profit maximization) is highly questionable. Not only do such enforcement of the rules require the employment of additional supervisors and therefore raise costs, such enforcements do not guarantee that the worker will actually put in his/her "best" in the work process.

Instead, the employer may succeed in "enforcing" work rules through the use of higher wage payments that not only appeal to the individual worker's own zeal, but also raises the work-group's morale, and thus elicits the maximum productivity potential that the group has. This is obviously very advantageous to the firm. It can be viewed that given the practical impossibility of negotiating all aspects of the worker's performance in hiring contracts, and of policing the worker all the time, the payment of a wage in excess of the worker's opportunity earnings represents an effective way to give workers the incentive to put in their maximum potential work-effort on the job (Akerlof 1984; Yellen; Eswaran and Kotwal). Moreover, such a high wage make it unattractive for a worker to shirk, since the alternative earning open to him (assuming he is fired if caught shirking) is inferior to the high wage that he would earn on the job by putting in his best.

On the basis of the above postulates, an "effort function"[3] is construed to attach to the production function of the employment relationship. The effort function is of the form

$$e = e(W)\ ;\ e'(W) \geqslant 0, e'' \leqslant 0,$$

where

e: the effort the worker puts in the work process (the number of efficiency units he produces),
W: the money wage rate.

The relevant production function for a typical firm would then be given in the form

$$\text{(i)} \qquad Q = Q\,[L\ e(W),\ K]\ ;\ Q' > 0,\ Q'' < 0,$$

where

Q: output,
L: labour employed (labour time),
K: capital input.

[3] Referring to the function e(W) as the effort-function, I label its first derivative e′(W) as the "effort-response function."

With the above production function in view, and on the basis of the "conventional" neoclassical production function of (labour) economic theory, of the form

$$\text{(ii) } Q = Q(L, K),$$

one readily infers that the implication for any employer operating with the function (ii) is that

$$e(W) = 1, \text{ so that } e'(W) = 0.$$

That is to say that the employer operates on the belief (or implied assumption) that all labour time employed is necessarily utilized in work-activity. In other words, the employer acts as if all work hours employed automatically transfers to productivity-augmenting activity (whether supervised or not). Is this a realistic supposition? The answer is no if an "effort function" does exist for the economy, i.e. if $e(W)$ is not constant in the economy's industrial set up. For if, indeed, $e(W)$ is not constant — if $e'(W) > 0$ for at least some sector(s) of the economy — then a more relevant production function would be the one depicted by (i) above. Therefore the conventional function $Q = Q(L, K)$ which neither recognizes the necessity of taking measures for "extracting" actual work-effort from employed labour, nor incorporates an 'effort function' that is dependent on the wage rate, must be inadequate.

We assume that over a certain range, the increase in productivity is proportionately greater than the increase in the wage itself, to explain the employment and wage-setting behaviour (in the private sector at least) within the Nigerian labour market scene. It is assumed that employers, in their own interests, will hire labour according to a rule not governed by the objective of paying the lowest wage at which a quantitatively sufficient supply will be forthcoming, but by the objective of paying wage which will minimize their labour cost (that is, the cost of the work-unit). Such a wage level is termed an "efficiency-wage."

B. The Model

Consider a situation in which the economy is characterized by firms with fixed capital stock in the short run, each employing labour at wage W. The firm is assumed to seek to minimize average cost per efficiency unit, c,:

(1) $\min_{W} c = W/e(W)$,

where

e: the effort the worker puts in the work process, (the number of efficiency units he produces) $e' > 0$, and $e'' < 0$ given the assumption of diminishing returns.

To achieve (1),

(1a) $[e(W)-We'(W)]/[e(W)]^2 = 0$.

and

$$d^2c/dW^2 = (-We^2e''-2e'e^2 + 2We'^2e)/(e^2)^2.$$

From (1a), $e = We'$; and substituting

$$d^2c/dW^2 = -e^2e''W/(e^2)^2 > 0.$$

The second-order condition for cost minimum is satisfied. Now with

$e(W) = We'(W)$ (from (1a)),

dividing through by e(W),

(2) $\dfrac{We'(W)}{e(W)} = 1$

(2) is by definition the wage-elasticity of effort. The solution to (1a) is the wage rate which minimizes costs, and as we see from (2), is the wage rate for which the wage-elasticity of effort is unity. That is, a proportionate change in the wage rate draws an exact proportionate change in work effort of the worker. This wage rate is the efficiency-wage rate, W*. It minimizes labour costs per efficiency unit, and is rigid downwards. This can be illustrated as follows:

for all $W < W^*$, objective (1) is not achieved. That is

$$[e(W)-We'(W)]/[e(W)]^2 < 0 \quad \text{(as opposed to (1a))}.$$

Then

$$e(W) < We'(W)$$

and it follows that

$$e'(W)\ W/e(W) > 1.$$

This indicates that work effort is wage-elastic over wages less than W^*; and the firm should continue to raise wage in order to minimize cost until W^* is reached. So, the position of the supply curve of labour at W^* would then determine whether the amount of employment, L^*, offered at W^*, is the most desirable for the economy or not. As long as the aggregate demand for labour falls short of aggregate labour supply and W^* exceeds labour's reservation wage, the firm will be unconstrained by labour market conditions in pursuing its optimal policy. Equilibrium will therefore be characterized by involuntary unemployment (Stiglitz 1976; Malcolmson; Yellen).

Now, the (short-run) production function, assumed to be continuous, twice differentiable, increasing and strictly quasi-concave in its arguments, is of the form

$$(3)\ Q = Q[e(W)L];\ Q' > 0,\ Q'' < 0$$

where Q: output,
L: the labour employed (labour time).
The firm's profit function is given by
$\pi = pQ - WL$;
$p = p(Q)$: price of output;
$p' = 0$ under competition,
$p' < 0$ otherwise;
and the firm's objective to maximize π is attained where

$$(3a)\ L:\ pQ'[e(W)\ L]\ e(W) + Qp'Q'e(W) - W = 0;$$

$$(3b)\ W:\ pQ'e'(W) + Qp'Q'e'(W) - 1 = 0.$$

Hence
from (3a), $W^* = p\ e(W)\ Q'[e(W)\ L] + Qp'Q'e(W)$;
i.e.

$$(4)\ W^* = Q'e(W)(p + p'Q)$$

$$\text{or}\quad W^* = pQ'e\,[1 + (p'Q/p)].$$

From (3b),

$$Q'e'(W)(p + Qp') = 1,$$

or

$$pQ'e'\,[1 + (p'Q/p)] = 1.$$

These together yield, upon further simplification

$$(3c)\ W/e(W) = 1/e'(W)$$

and this is the same result given by (2) above.
Equation (4) states that the firm needs to equate wage rate to the marginal revenue product/marginal value product (as the case may be) as a necessary condition for profit maximum.[4] We note that the marginal physical product as shown in (4) is a function of effort per worker. Assuming the employer recognizes this, he has every incentive to keep e high (at least to the minimum level required to sustain π at its appropriate level) by augmenting W which is the most important argument in the functional form of e.[5]

From (4) we can express W as

$$(4a)\ W = pQ'e(W)\left|\frac{1+\eta}{\eta}\right|$$

where
$-\infty < \eta < -1$ is the price-elasticity of demand of output.

4 Note that under competition, the limiting value of W^* as p' approaches zero is $pQ'e$ = marginal value product, and under imperfect competition, the bracketed term in (4) is the marginal revenue, such that $W = eQ'(p + p'Q)$ = marginal revenue product.
5 The functional form of e is $e = e(W)$, contained in (3).

For simplicity let

$$\psi = \frac{(1+\eta)}{\eta} > 0, \text{ (i.e., assume } \eta \text{ constant}$$

Then (4) becomes

(4b) $W = \psi Q'e(W)p$.

We would consider, each in turn, the two cases of

(a) competition ($p' = 0$)
(b) imperfect competition ($p' < 0$).

1. The Competitive Setting

The equilibrium wage in this case is

(5) $W^* = pQ'e(W)$

(Note that if $p' = 0$, then $\psi = 1$).

Taking a total differential of this

$$dW = p[eQ''(L\, e'dW + edL) + Q'e'dW];$$

and rearranging, we have

$$dW[1 - pe'(eQ''L + Q')] = pQ''e^2dL;$$

from which we obtain

$$\frac{dW}{dL} = \frac{pQ''e^2}{1 - pe'(eQ''L + Q')}$$

It can be shown that (6) is not unequivocally negative given the signs of e', Q' and Q'', as expected in conventional economic theory. This implies that the only thing that can induce the firm to reduce the wage it offers to expand employment should be a change in the functional form of $e(W)$, such as $e'(W) = 0$.

If $e' = 0$, then

$$(6a)\ dW/dL = pQ''e^2 < 0,$$

as in conventional theory.[6]

But according to the prime case of our model that e' is actually positive, we proceed to determine the behaviour of the firm with respect to the efficiency-wage in equilibrium, as well as what the relevant wage level the efficiency-wage would be.

Define

$$(7)\ N = Le(W)$$

as the effective labour force engaged by the firm.

Then

$$dN = Le'dW + e(W)dL$$

so that

$$\partial N/\partial W = Le' > 0; \text{ and } \partial L/\partial W = -Le'/e(W) < 0.$$

These results show that whereas the firm's labour demand curve is downward sloping, its effective manpower utilization (i.e., actual work time utilized as opposed to available labour time in the firm) will increase at higher wages.

Now substituting (5) into (7) and differentiating totally:

$$dN = Le'p(Q'e'dW + e^2Q''dL + e'eQ''LdW) + edL;$$

and collecting terms we obtain

$$dN = dW(Le'^2pQ' + L^2\ e'^2peQ'') + (Le'e^2pQ'' + e)dL;$$

6 Note that the assumption that $e'(W) = 0$ implies that the effort-function, $e(W)$, having a zero first derivative, is therefore a positive constant. This would indicate that the firm reckons that the employee has a positive work effort, but does not link it to any factor (or may link it to a factor other than wage). Such an assumption appears to be implicit in conventional analysis, but the question then arises as to how realistic it is. This is assumed to be the case for secondary labour market firms (see Yellen). We also assume that this holds for some public sector firms in the LDCs (Ikpeze; House), for reasons to be explained later.

and rearranging we have

$$dL = [dN - dW(Le'^2pQ' + L^2e'^2peQ'')]/(Le'e^2pQ'' + e)$$

from which it follows that

$$\frac{\partial L}{\partial W^*} = \frac{-(Le'^2pQ' + L^2e'^2peQ'')}{(Le'e^2pQ'' + e)}$$

and eliminating e'e

$$(8)\quad \frac{\partial L}{\partial W^*} = \frac{-[L(e'/e)pQ' + L^2e'pQ'']}{[LQ''ep + (1/e')]}$$

Now we want to constrain (8) to be negative; i.e. for the wage level W*, the "efficiency-wage," it is expected that an upward variation in it leads to a reduction in the employment of labour. Hence

$$(8a)\quad \frac{\partial L}{\partial W^*} = \frac{-[L(e'/e)pQ' + L^2e'pQ'']}{[LQ''ep + (1/e')]} < 0;$$

so that

$$-[L(e'/e)pQ' + L^2e'pQ''] < 0.$$

Now substituting $W = e/e'$ from (2) or (3c) into this:

$$-(L/W)Q' - L^2e'pQ'' < 0,$$

and solving for W from this

$$(9)\quad W^* < -\frac{Q'}{Le'PQ''} = W' > 0.$$

That the wage solution (9) yields a positive value is consistent with reality. But the efficiency-wage is also supposed to be greater than the market-clearing wage W_0 (assuming that we are dealing with an economy where significant involuntary unemployment exists);

i.e., $W_0 < W^* < W'$.
So it is deduced that the wage rate must be at least as high as a certain minimum level determined by the firm according to its optimizing behavioural conditions under the efficiency-wage rule. This analyzes the specific case of competition in the product market. We now consider the more generalized model.

2. Imperfect Competition

In this case the equilibrium wage offer is

$$W^* = \psi\, Q'pe(W).$$

Differentiating totally:

$$dW = \psi\ [peQ''(L\, e'dW + edL) + pQ'e'dW + eQ'p'Q'\\ (Le'dW + edL)]$$

and rearranging

$$dW\,[1 - \psi\, e'p(eQ''L + Q') - \psi\, eQ'^2p'Le'] \\ = \psi\, (pe^2Q''dL + Q'^2p'e^2)dL$$

from which

$$(10)\ \frac{dW}{dL} = \frac{\psi\,(pQ''e^2 + p'e^2Q'^2)}{[1 - \psi\, e'p(eQ''L + Q')] - e'p'LeQ'^2\,\psi}$$

Again the sign of (10) is indeterminate. However, putting $e'(W) = 0$, we have

$$(10a)\ dW/dL = \psi\, e^2(pQ'' + p'Q'^2) < 0.$$

This again reduces to the conventional case of the usual downward sloping demand curve for labour. But with $e'(W) > 0$, to resolve the problem:
substituting $e'(W)\ W = e(W)$ [from either (2) or (3c)] and

$Q'e(W) = W/\ \psi p$ [from (4b)], into (10)

we have

$$\frac{dW}{dL} = \frac{\psi pe^2Q'' + (\psi P'eQ'W/\psi p)}{[1-(W/e)e' - \psi e'^2WpQ''L - \psi (W/\psi P)P'Q'Le']}$$

and simplifying,

$$(11) \quad \frac{dL}{dW} = \frac{-\psi pe'Q'' + W^2p'Q'e/p}{\psi pe^2Q''(L/W) + (W/p)p'Q'Le'} < 0$$

From this relation, now, the efficiency-wage level can be solved for:

$$-\psi Q''ee'p-(W^2p'Q'Le'/p) < 0,$$
$$\text{i.e., } W^2p'Q'Le'/p > \psi Q''ee'p;$$

from which

$$(12) \quad W^{*2} < \frac{\psi P^2e'Q''}{p'Q'e}$$

(12) gives the efficiency-wage as that wage level which minimizes cost per efficiency-unit (maximizes profits), but for which the employer's response to increases in it would be to reduce the number of labour employed. It is rigid downwards because any reduction in it would yield less productivity, higher costs, less net revenue, and hence prove suboptimal for the firm even though there may be excess labour supply at W*.

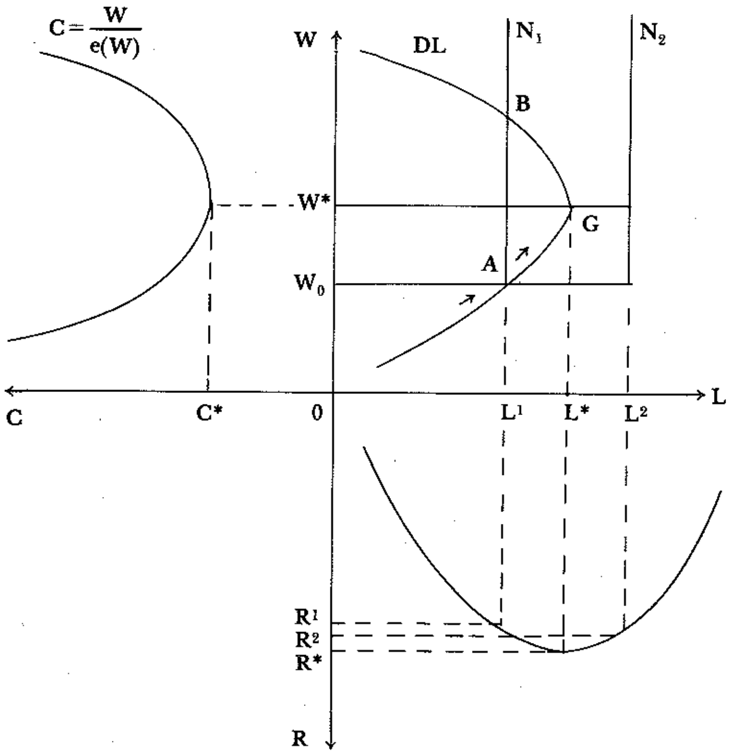
This simple model seems to indicate an explanation for the industrial sector wage rigidity and unemployment observed in developing countries (see Bairoch; Stewart and Weeks; Bruton). And it is no wonder that, even barring the activities of labour unions, wages have not been observed to exhibit downward flexibility as a way of encouraging more employment of labour. We now proceed to apply this model in addressing the employment question.

III. Application of the Model

Employment demand at the firm level in the private sector,

Figure 1

EMPLOYMENT AND WAGE DETERMINATION



characterized with $e'(W) > 0$ for wage-employment in the large-scale formal (organized) sector, and $e'(W) = 0$ for others, is first analyzed. We then extend the model to cover the cases of the public sector and the "unorganized" (informal) sector within a framework of the aggregate (market) economy. In this latter case we attempt to explain how wages and employment in the various sub-sectors are determined simultaneously within the (complex) system.

A. Employment in the Private Non-Agricultural Sector

Consider the three-quadrant diagram in Figure 1. The first quadrant shows the efficiency wage, W^*, as the wage that minimizes cost per efficiency unit. The firm's demand for labour is shown in the second quadrant as the curve DL: it is positively sloped over the range of the wage rate less than W*, and negatively sloped for all $W > W^*$. DL is to be interpreted in the following manner: the firm is aware of a wage W* which maximizes profits. Therefore it offers that wage and employs the optimal number of labour L*. The firm will not offer any wage less than W*, and apparently does not have any clear-cut employment decision at such wages. However, if for some reason it must offer some employment at such wages, it will just employ some amount of labour less than L*, and will employ successively fewer workers as wage falls, because lower wages yield lower productivity.

For wages greater than W*, cost per efficiency unit is rising because each worker's productivity increase is less than proportionate to the wage increase that brings it about. Accordingly, the firm believes that each worker employed at such wages would not be as "efficient" as those employed at W*, so it employs fewer workers than L*.[7]

At W* the firm's optimal labour demand is determined as L*. It is assumed that at W*, the firm faces a certain number of job-seekers at its gates wishing to be employed (see Lewis). In accordance with its optimal employment needs, the firm will settle for the point G, employing the amount of labour L*.

The third quadrant shows the net-revenue curve R.[8] It is maximized when L* is employed.

Now if the amount of labour seeking employment in this representative firm is N_1, then, an excess demand situation arises, and all workers seeking jobs will be employed, with vacancies remaining to be filled in the firm.[9]
We note that at the market-clearing wage W_0, an equilibrium employment demand situation obtains at the point A. But this equilibrium is unstable, in that, for any $W > W_0$ equilibrium does

7 Viewed from the firm's standpoint, it is unnecessary to pay such a high wage when a lower wage (W*) is all that is required to obtain optimum efficiency.

8 Net revenue is given by the difference between total revenue and total wage bill, i.e. the area under the DL curve minus WL.

9 Under such a condition, competition by firms for the scarce labour will drive up the wage, and firms would be operating sub-optimally. Such a situation is, by definition, of a labour surplus economy, ruled out for most LDCs (see Weeks).

not gravitate back to A (as wages are inflexible downwards). The point B is also unstable since all wages greater than W* will not be offered.

If, however, the amount of job-seekers facing the firm is N_2, then there is open involuntary unemployment. The number employed, L*, are "protected" in employment by the "efficiency-wage" phenomenon, which also acts as a permanent barrier to entry into employment by the unemployed. The firm will offer on-the-job training to its employed, and the lack of this training will act as an additional barrier facing the unemployed.

This indicates a "segmentation" situation. The "segmentation" here, though, does not relate to the characteristics of the workers; it is a result of the firm's optimizing behaviour.

The unemployed (secondary workers) are faced with a few options: they could continue searching for jobs in these firms; they could enter into self-employment in informal activity (either in the urban area or in the rural area's subsistence agriculture and/or other rural activities), or they could continue to move in and out of other low-paying casual jobs within the industrial sector.

Hence this analysis provides a basis for demarcating the labour market into a primary (protected) sector with high wages, good working conditions, low turnover rates, etc. (Mazumdar 1977; House and Rempel 1978); and a secondary sector (constituting the "bad jobs" industry, and informal employment including subsistence activities), with relatively lower wages and higher turnover rates.[10]

B. The Public Sector

Employment in the public sector is characterized by

$$e'(W) \geqslant 0.$$

10 House and Rempel (1978) note that this results from firms in an industry characterized with differentiated products, and among industries, so that a dual labour market is apt to emerge: "In the 'protected' part of the labour market a limited number of employees will receive a wage above that available to those who fail to gain access to the protected portion of the market. Protection is defined in terms of the production techniques used by certain firms."

That is, an "effort-response function" may or may not exist. The public sector may be distinguished from the private sector by the nature of the former's operation environment which is largely marked by the absence of strict market forces (see Gunderson). In the public sector the profit constraint of the private sector needs not be a consideration because public firms are mainly natural monopolies and invariably face inelastic demand curves. So it can be assumed that firms can not only easily raise output prices with little or no consequence for output and employment (Gunderson; House), but also do not operate according to the "effort-function" of our models' production function. Firms can offer relatively high wages and better conditions of service according to the tastes of the government without profit and efficiency considerations (Ikpeze). We consider the two cases of "high wages" and "market wages" respectively.

Case 1: $e'(W) > 0$.

This is the case of positive effort-response function. Within the high-wage public firms (whether or not profit maximization is pursued) employees tend to increase their work-effort and hence productivity as a result of the high wages. In such circumstances, the employment rule is similar to that of the private sector efficiency-wage firms just analyzed: high wages, high profits, and fewer employment.

However, this result has not been observed to characterize the public sector firms in LDCs: in Nigeria (Fajana; Ikpeze); in Kenya (Rempel); in Colombia (Berry); and in LDCs in general (House). In Nigeria, for instance, the public sector employs more wage-labour than the private sector (Damachi; Rimmer), but public sector wages are not as high as private sector wages, and public firms are not associated with making positive profits (Weeks 1972; Vielrose; Phillips). This implies that optimizing labour market policies may not be followed by public firms; as, within the framework of our model, it implies that public firms may offer non-efficiency-wages, viz:

$$W_0 < W^*.$$

This means that cost per efficiency unit is not minimized by the firm, i.e., $$\frac{[e(W)-W\,e'(W)]}{(e(W))^2}<0$$

for the firm's chosen point of operation.
That is

$$e(W)<We'(W),$$

so that

$$\frac{e'(W)W}{e(W)}>1.$$

This indicates that the firm operates at the range of wages over which work-effort is elastic with respect to wage changes, yielding a suboptimal employment policy: net revenue will be smaller, employment will be small or large depending on the labour policy of such a public company (and/or the government that directs it). The firm might as well (and usually does) decide to offer the higher "efficiency-wage" to some of its employees on the basis of such factors as seniority/experience, credentialism (see House), and other bureaucratic evaluative considerations (as well as for political reasons).

Case 2: $e'(W)=0$.

As indicated earlier, this implies the case of a constant effort "function," indicating that the effort-response function does not exist. Workers supply positive work-effort which does not have a direct link with the wage paid.

In certain segments of the public sector, particularly in the civil service,[11] the majority of the employees are middle-level, semi-skilled and unskilled workers having generally academic qualifications equivalent to high school certificate. These belong to a labour market where the conventional wage-employment relationship governs: labour demand is inversely related to wage

[11] Employees in the civil service are known to be characterized by "nonchalant" attitudes to work (Rimmer). High wages do not necessarily lead to more work-effort from workers, given that the civil service is perceived as a "no man's land" where inefficiency "does not matter."

rate. No particular skill acquisition is necessary for employment, and the firm needs not raise wages to encourage higher productivity, for such a policy, besides not being necessary (since workers would generally not react to it in the desired fashion given their inherent attitudes to government work (see below), has no theoretical basis for being applied in this sector of the labour market.

To ascertain worker attitudes to work among this category of the labour force, we carried out a survey in the Lagos area among civil service employees of the Federal and Lagos State governments. Of the 161 respondents, almost 88 percent replied that vast increases in their salaries would not make them to "work harder" (i.e. to be more punctual to work, to stay at their posts for all of the 8-hour working day for which they are paid, and to be more honest in carrying out their (public) duties); nor would higher wages make any much difference in their general attitudes to government work (which is that of general apathy to duty).

Consider equation (10) of the model:

$$(10)\ \frac{dw}{dL} = \frac{(pQ''e^2 + p'e^2Q'^2)}{[(1 - \phi\, e'p(eQ''L + Q')] - e'p'LeQ'^2\psi}$$

Putting $e'(W) = 0$, we have

$$dw/dL = \phi\,(pQ''e^2 + p'Q'^2e^2) < 0.$$

This indicates an inverse relationship between employment demand and wage rate of the "usual" type postulated by neoclassical theory.

Under this setting therefore, the labour market would clear under normal circumstances. Even if the public firm wishes to "maximize profits," it can adopt a wage policy (W_0) which enables it to do so. But since profit maximization is not a usual consideration, the firm can employ as much labour as it wishes at the wage[12] W_0 (the "secondary labour market" wage).

The actual amount of employment offered is illustrated below.

12 Note that senior civil servants are supposed to belong to the category analyzed under Case 1.

C. The Aggregate Labour Market

The foregoing analysis relates exclusively more or less to wage employment in the formal sector. We attempt now to apply the model to the overall labour market, encompassing both the formal (organized) and informal (unorganized) sectors.

From (12), employment in an efficiency-wage firm i is found, so that total employment by all non-competitive efficiency-wage firms (say, f of them) is

$$\sum_{i=1}^{f} \frac{\phi Q_i'' e_i}{W_i^* p_i' Q_i'}$$

Similarly, employment in each competitive efficiency-wage firm j can be found from (8), so that total employment by all competitive efficiency-wage firms together (say, h of them) is

$$\sum_{j=1}^{h} \frac{-W_j^*}{e_j^2 p Q_j''}$$

Therefore, aggregate employment, E^{**}, for all the $(f+h)$ efficiency-wage firms in the labour market is

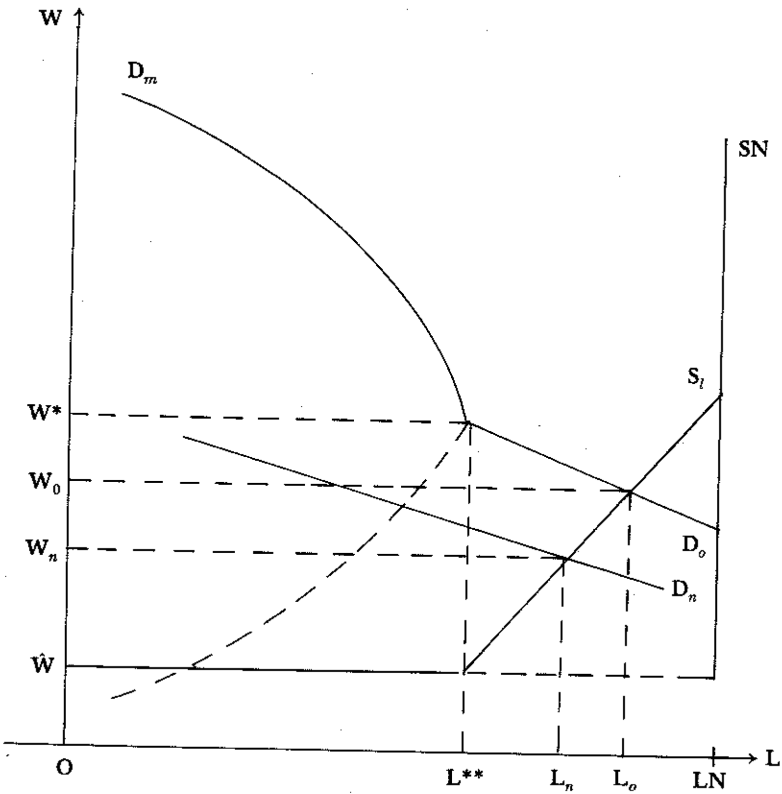
$$E^{**} = \sum_{i=1}^{f} \frac{\psi Q_i'' e_i}{W_i^* p_i' Q_i'} + \sum_{j=1}^{h} \frac{-W_j^*}{e_j^2 p Q_j''}$$

Now let us assume homogeneity for each category of labour. The demand for labour for all efficiency-wage firms taken together, E^{**}, can be obtained by horizontal summation of the curve DL (of Figure 1); but adding the negatively-sloped demand curve of all other firms taken together to this, we obtain the aggregate labour market demand curve — the kinked curve $D_m D_0$ — shown in Figure 2.

The amount $L^{**} = E^{**}$ are the "protected" employees employed by the efficiency-wage firms in the organized sector. The wage $\hat{W}$ is the average level of the earnings in rural agriculture and other activities, and for all $W > \hat{W}$ the economy's supply curve of lavour is the positively-sloped curve SL. The total

Figure 2

AGGREGATE LABOUR DEMAND IN THE ECONOMY



labour supply to the market (less those already employed in the efficiency-wage firms, L**) is SN. The curve D_n is the labour demand curve of the unorganized sector.

The amount of labour $L^{**}L_0$ is the total employed in both the private and public sectors by all non-efficiency-wage firms: the amount $L^{**}L_n$ employed in the unorganized sector, receiving W_n; and the amount L_nL_0 in the public sector, receiving W_0.

It follows that the critical determinant of the wage rate in the unorganized sector (W_n), as well as the extent of unemployment in it, is the rate of flow of labour from the agricultural sector to the non-agricultural sector; and the factors influencing this flow include the level of W_0 (the average wage level in the public sector, which are influenced by institutional forces of government policy such as minimum wage legislation); $\hat{W}$, the corresponding earnings in agriculture; and π, the weighted average of perceived probabilities of obtaining high-wage employment by potential urban-bound migrants for any given W_0 (Harris and Todaro; Todaro).

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