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Fair Wages, Urban Unemployment and Welfare in a Developing Economy

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***Abstract*:** This paper studies the impact of pay fairness on factor income and social welfare in a developing economy with both modern urban and traditional rural sectors. When urban workers become aware of income fairness, they use the expected urban wage and weighted average returns to capitalists as their reference pay. This perception of fairness raises the urban wage and enlarges the wage gap between the urban and rural sectors. The ensuing above market-clearing wage rate causes urban unemployment. Greater wage fairness worsens urban unemployment and lowers social welfare in the economy.

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1. Introduction

The perception of income fairness has a profound influence on human behavior. Fairness not only affects the individual incentive to work, but also can avoid social problems between workers and capitalists. In the literature, income fairness is related to efficiency wages.

Solow (1979) and Akerlof (1982) suggested that a worker's effort is a function of the perceived fairness of the actual wage in relation to a reference wage. According to the basic fair wage-effort hypothesis, the number of units of effective labor input is in proportion to the ratio of the actual wage to the fair wage (Akerlof and Yellen, 1990). Akerlof and Yellen extend this theory to show how the fair wage of a given group is a weighted average of the wage received by an intra-firm reference group and the market-clearing wage (p.271). They also show that, if the two types of labor do not work together, inefficient equilibria can occur. Equilibrium conditions illustrate how changes in labor supply and/or productivity can affect wages and unemployment (p. 275-76). Except for the case of perfect labor substitution, fairness will affect resource allocation and production efficiency (p. 281). According to Seidel (2010), fair wage is directly related to profits. As profits rise, workers increase the wage considered to be fair (p.215). However, the models in the literature investigate the situation for developed economics and neglect developing economies, in which uneven development between sectors prevails.

The purpose of this paper is thus to consider wage fairness in developing economies with a dual structure consisting of urban manufacturing and rural agricultural sectors. We adopt the Harris-Todaro model (1970) to depict the uneven development of developing economies by assuming that the urban wage is higher than the rural wage. Rather than fixing the urban wage rate as in the Harris-Todaro model, we consider an urban fair wage rate that is the weighted average of the actual wage and the rate of return on capital. To achieve production efficiency, urban manufacturing firms offer a fair wage to workers. The ensuing above market-clearing fair wage rate leads to migration from rural to urban areas, resulting in urban unemployment. In addition, the higher wage raises the cost of production and lowers

the output of manufacturing firms. Capital is then released to the rural sector, thereby pushing up the rural wage rate. However, the gap between urban and rural wages still widens, because the beneficial effect on the rural wage of capital reallocation to the rural sector is relatively small.

The remainder of this paper is organized as follows. Section 2, "The Model" presents a dual production model of a developing economy, in which a fair wage rate prevails in the urban manufacturing sector. Using this production structure, we examine the effects of a fair wage on income distribution and social welfare in the economy. Section 3, "Analysis" formally investigates the effect of a rise in pay fairness for urban workers on the relative wages of urban and rural labor. Section 4, "Conclusions" offers some concluding remarks.

2. The Model

Consider a developing economy in which a distinctive feature is the dual structure of uneven development between the modern urban and traditional rural sectors. Firms in the urban sector produce manufactured good X, and the rural sector produces agricultural good Y. Labor (L_i) and capital (K_i) are employed to produce both goods. Nonetheless, imperfect monitoring in the manufacturing sector may mean that workers do not make an effective effort to produce good X. The production function of good X can be thus expressed as $X = X(eL_X, K_X)$, where $e \in (0, 1]$ is the level of working effort.[1] In the agricultural sector, in contrast, there is no shirking and the production function of good Y is $Y = Y(L_Y, K_Y)$. Both forms of production exhibit constant returns to scale with positive and diminishing marginal products, that is, $X_L > 0$ and $X_{LL} < 0$, etc. Choosing good Y as the numeraire, the relative price of good X is denoted by p.

Following Harris and Todaro (1970), the uneven development of the dual economy is represented by a higher urban wage rate w_X than the rural wage w_Y. This leads to the migration of rural workers to the urban sector, which results in voluntary urban unemployment L_u. The expected urban wage rate is thus the probability of employment times the actual urban wage rate, $(1 - u)w_X$, where $u = L_u/(L_X + L_u)$ is the unemployment rate in the

urban sector. In equilibrium the rural-urban migration stops when the expected urban wage rate equals the rural wage:[2]

$$(1 - u)w_X = w_Y. \quad (1)$$

Note that the rural wage rate is determined by the value marginal product of labor in the agricultural sector Y, that is, $w_Y = Y_L(L_Y, K_Y)$. However, distinct from the institutionally set urban wage rate considered in the Harris-Todaro model, urban workers in this developing economy have become aware of income fairness and use returns to capitalists, denoted by r, as their reference income. By balancing the pay of capitalists and workers, a fair urban wage, w_X^*, can be set as the weighted average of the return on capital and the expected urban wage: $w_X^* = \alpha r + (1 - \alpha)(1 - u)w_X$, where the parameter $\alpha \in (0, 1)$ represents the fair wage coefficient.[3] It is assumed that the return on capital exceeds the urban wage ($r > w_X$). Thus, the effort level of urban workers can be described by $e = \min [w_X / w_X^*, 1]$. To achieve better production efficiency, urban manufacturing firms offer the fair wage rate (i.e., $w_X = w_X^*$) to workers. This yields the following relation between the urban wage and the return on capital:

$$w_X = \{\alpha/[\alpha + u(1 - \alpha)]\}r. \quad (2)$$

As $0 < \alpha < 1$, we assure that $w_X < r$. Essentially, the greater fairness achieved by a larger α increases the urban wage rate. It is close to the return on capital ($w_X = r$) when α approaches 1.

We next consider the goods market. In a perfectly competitive market, unit prices equal unit costs to assure zero profits in equilibrium. Letting $c^i(\ .\ )$ denote the unit cost function of good i, the zero-profit conditions of the goods markets require that

$$c^X(w_X, r) = p, \quad (3)$$

$$c^Y(w_Y, r) = 1. \quad (4)$$

Note that the partial derivative of the unit cost function with respect to an input price gives the corresponding unit input demand. For instance, c_w^X expresses the unit labor requirement to produce good X. The employment conditions for labor and capital therefore must thus satisfy

$$c_w^X(w_X, r)X/(1-u) + c_w^Y(w_Y, r)Y = L, \tag{5}$$

$$c_r^X(w_X, r)X + c_r^Y(w_Y, r)Y = K, \tag{6}$$

where L and K are, respectively, the endowment of labor and capital in the economy.[4]

Turning to the demand side of the economy, the expenditure function is defined as: $E(p, v) = \min\{pD_X + D_Y: v(D_X, D_Y) = v\}$, where D_i denotes the demand for good i and v is the level of utility. By the envelop property, we have $E_p = D_X$, which is the compensated demand for good X. In addition, $E_v > 0$, which denotes the inverse of the marginal utility of income. The budget constraint of the economy requires the equality of expenditure on goods and revenue from production

$$E(p, v) = pX + Y. \tag{7}$$

The economy described in (1) – (7) contains seven unknowns, u, w_X, r, w_Y, X, Y and v, and the parameter α for a fair wage. We use this model to examine the effects of pay fairness on income distribution and social welfare in the economy.

3. Analysis

The production side of the economy represented by (1) – (6) is block recursive. Hence, the four unknowns, u, w_X, r and w_Y, can be solved from (1) – (4) as functions of the fairness parameter α. Differentiating these equations and letting θ_{ji} denote the cost share of factor j in producing good i,[5] we can obtain the effects of a rise in pay fairness α on factor returns and the urban unemployment rate, as follows

$$\hat{w}_X / \hat{\alpha} = u^2\theta_{KX}\theta_{LY}/(1-u)[\alpha + u(1-\alpha)]J > 0, \tag{8}$$

$$\hat{r} / \hat{\alpha} = -u^2\theta_{LX}\theta_{LY}/(1-u)[\alpha + u(1-\alpha)]J < 0, \tag{9}$$

$$\hat{w}_Y / \hat{\alpha} = u^2\theta_{LX}\theta_{KY}/(1-u)[\alpha + u(1-\alpha)]J > 0, \tag{10}$$

$$\hat{u} / \hat{\alpha} = u|\theta|/[\alpha + u(1-\alpha)]J > 0, \tag{11}$$

where $J = u\theta_{LY}/(1 - u) + u(1 - \alpha)|\theta|/[\alpha + u(1 - \alpha)] > 0$ under the stability condition that the urban manufacturing sector is more capital intensive than the rural agricultural sector, that is, $|\theta| = \theta_{KX}\theta_{LY} > \theta_{LX}\theta_{KY}$.[6]

The income distribution effect, given in (8) – (10), of an increase in fairness α can be explained and illustrated by Figure 1, in which the diagram on the right-hand side expresses the positive relationship between w_X and r for pay fairness in (2) and the negative sloped unit-cost loci of r and w_X for producing good X in (3). The diagram on the left-hand side depicts the unit cost combinations of r and w_Y for producing good Y in (4). A rise in α causes a direct increase in w_X by rotating the fairness equation (2) rightward to (2)'. However, a higher w_X provides an incentive for rural workers to migrate to the urban sector, leading to higher urban unemployment. This mitigates the pressure on the rise in the urban wage, thereby pulling the fairness schedule (2)' leftward to (2)" in Figure 1. Consequently, a higher urban wage reduces the production of good X. If good X is capital intensive, then more capital will be released to sector Y. This causes the rate of return on capital r to fall and the rural wage rate w_Y to rise in accordance with (4).

Using (8) and (10), we can infer that the rise in pay fairness in the urban sector widens the gap between urban and rural wages, as follows

$$\hat{w}_X / \hat{\alpha} - \hat{w}_Y / \hat{\alpha} = u^2|\theta|/(1 - u)[\alpha + u(1 - \alpha)]J > 0. \quad (12)$$

This is because pay fairness raises the rural wage indirectly due to the inflow of capital to the rural sector. Nonetheless, the indirect rise in the rural wage is smaller than the direct rise in the urban wage that results from fairness.[7]

We next turn to the welfare effect of fairness. As indicated in (2), a fair wage causes the urban wage to exceed its market-clearing rate. Fairness also enlarges the wage gap between the urban and rural sectors. This attracts more workers to the urban sector, resulting in urban unemployment. Thus, in accordance with (7), the unemployment distortion affects social welfare in the following way

$$E_v(dv/d\alpha) = - [w_Y L_X/(1 - u)^2](du/d\alpha). \quad (13)$$

As $du/d\alpha > 0$ by (11), we have $dv/d\alpha < 0$. Hence, an increase in pay fairness in the urban sector reduces social welfare in the economy.

These results can be summarized in the following proposition

Proposition: *For a developing economy with uneven development between the rural and urban sectors, a rise in pay fairness for urban workers widens the gap between urban and rural wages. Greater fairness also worsens the problem of urban unemployment and hence lowers social welfare in the economy.*

4. Conclusions

Like the Harris and Todaro (1970) paper, this study offers an explanation for urban unemployment in the context of urban-rural wage differences. However, unlike Harris and Todaro, who focus on differences in expected earnings from an institutionally set urban wage, this paper develops an explanation of the urban-rural wage difference in the context of the fair wage literature as exemplified by Akerlof and Yellen (1990. When urban workers become aware of income fairness, they use the expected urban wage and weighted average returns to capitalists as their fair urban wage. This perception of fairness raises the urban wage, thereby widening the wage gap between the urban and rural sectors. An above market-clearing wage rate attracts urban labor and causes unemployment in the urban sector. Greater pay fairness worsens the urban unemployment situation. This unfavorable unemployment effect in turn lowers social welfare in the economy.

It is worth noting that in our model the real wage rate in the urban area is rigid in lieu of political or institutional considerations whereas wage rate in the rural area is flexible. By using a different framework one could empirically test whether wages in rural areas with high unemployment are higher than market clearing wages.

Footnotes

1. See Akerlof and Yellen (1990) and Seidel (2010) for the specifications for a worker's effort in production.
2. Studies on the Harris-Todaro (1970) model can be found, for example, in Parai and Beladi (1997) and Hatzipanayotou and Michael (2001).
3. Seidel (2010) formulates the fair wage as the weighted average of the wages and profits of a firm.
4. Capital is perfectly mobile between sectors. See Chakrabarti (2009) , Oladi (2004) and Gilbert and Oladi (2009) for related studies on capital mobility in general equilibrium analyses.
5. We follow Jones (1965) with this notation.
6. As shown in the Appendix, the stability of the economy requires this factor intensity condition.
7. See Neary (2002), Marjit, et al. (2003), Kar and Beladi (2004) and Anwar (2009) for recent studies on wage inequality.

Appendix

This appendix provides a stability analysis of the model. Letting a dot over the variables denote the time derivative, the adjustments of the system in (3) – (6) can be expressed as

$$\begin{bmatrix} \dot{X} \\ \dot{Y} \\ \dot{w}_Y \\ \dot{r} \end{bmatrix} = \begin{bmatrix} 0 & 0 & -\theta_{LX}(1-\alpha)(1-u) & -\theta_{KX} - \theta_{LX}[\alpha + u(1-\alpha)] \\ 0 & 0 & -\theta_{LY} & -\theta_{KY} \\ \lambda_{LX}/(1-u) & \lambda_{LY} & A & B \\ \lambda_{KX} & \lambda_{KY} & C & D \end{bmatrix} \begin{bmatrix} \hat{X} \\ \hat{Y} \\ \hat{w}_Y \\ \hat{r} \end{bmatrix}$$

where λ_{ji} denotes the employment share of factor j in producing good i. The principle minors of the coefficient matrix are

$\Delta_1 = \Delta_2 = \Delta_3 = 0$,

$\Delta_4 = |\lambda||\theta| + \theta_{LX}[\alpha + u(1 - \alpha)]|\lambda|$,

where $A = -B = -(1 - \alpha)(1 - u)(s_{LX} - \lambda_{LX})/(1 - u) - [s_{LY} + \lambda_{LX}/(1 - u)]$ and $C = -D = (1 - \alpha)(1 - u)s_{KX} + s_{KY}$. Note that $s_{KX} = \sigma_x\theta_{LX}\lambda_{KX}$ and $\sigma_X = c\,c_{rw}^X / c_w^X\, c_r^X$. In addition, we denote $|\lambda| = \lambda_{KX}\lambda_{LY} - \lambda_{LX}\lambda_{KY}/(1 - u)$ and $|\theta| = \theta_{KX}\theta_{LY} - \theta_{LX}\theta_{KY}$.

The stability condition for the foregoing system requires that the odd principles are non-positive and the even principle minors are non-negative. This then requires that $|\lambda| > 0$ and $|\theta| > 0$, that is, the urban manufacturing sector X is more capital intensive than the rural agricultural sector Y.

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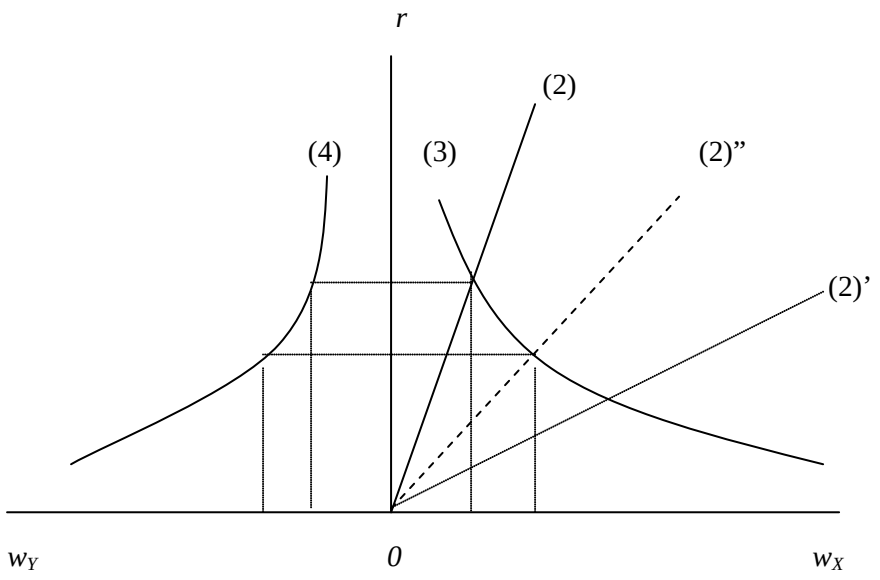

Figure 1. Effect of pay fairness on factor returns