International Journal of Academic Research and Development
ISSN: 2455-4197
Impact Factor: RJIF 5.22
www.academicsjournal.com
Volume 2; Issue 6; November 2017; Page No. 429-438

Capital immobility, informal sector and urban unemployment

Titas Kumar Bandopadhyay
P. O. Bagnan, Dist. Howrah, West Bengal, India

Abstract
We consider a three sector model of informal sector which assumes efficiency wage hypothesis and explains the simultaneous existence of informal sector and urban unemployment. We also study the effects of subsidy policies given to different sectors and the effects of change in capital stock on urban unemployment and domestic factor income.

Keywords: capital immobility, informal sector, urban unemployment

1. Introduction
The informal sectors in urban areas play important roles in economic development and in employment generation in less developed countries. Researchers on Development Economics have paid adequate attention on the working of informal sector. There exists a vast empirical literature on it. Also there are a few theoretical models of informal sector of which the models of Fields (1987) [1], Grinols (1991) [19], Khan (1992a, 1992b), Chandra and Khan (1993) [14], Gupta (1993, 1997) [20, 4, 6, 7, 8] and Quibria (1998) need to be mentioned. All these models are extensions of the Corden-Findlay (1975) model with special emphasis on the informal sector. However, none of these models, except Fields (1987) [1] and Gupta (1993) [20], has shown the simultaneous existence of open unemployment and informal sector in the urban area in migration equilibrium.1 The migrants who do not get jobs in the fixed wager when formal sector in those models are automatically employed in the urban informal sector which has a flexible wage-rate.
In reality, we find the simultaneous existence of the informal sector and open unemployment in the urban areas. This paper attempts to explain this simultaneous existence of open unemployment and the urban informal sector in the dual economy using the consumption- efficiency hypothesis of Leibenstein (1957).
The basic idea of the consumption-efficiency hypothesis is that a worker's efficiency is positively related to the wage rate he receives. This is generally valid in the case of low income workers who consume the whole wage income and suffer from malnutrition. The employers use this wage as an instrument of profit maximisation and the optimum wage appears to be unique and independent of other economic variables. This wage rigidity at the equilibrium level explains involuntary unemployment.
In this paper we introduce consumption-efficiency relation in the models of Gupta (1997) [4, 6, 7, 8] and Grinols (1991) [19]. This is assumed to be applicable only to the informal sector workers who receives very low wages. We analyse the existence of unemployment and the effects of different policies on unemployment, informal sector's employment and on domestic factor income some of the policy effects on informal sector's employment and on domestic factor income appear to be different from those obtained in the models of Gupta (1997) [4, 6, 7, 8] and Grinols (1991) [19].
Section 2 describes the model. In this section the basic assumptions, notations and equations of the model are given. The two modified models of Gupta (1997) [4, 6, 7, 8] and Grinols (1991) [19] are described in the sub-sections 2.4 and 2.5 respectively. In these sub-sections, the working of the models and the comparative static effects are also analysed. Concluding remarks are made in section 3.

2. The Model
2.1 Assumptions
We consider a small open economy consisting of three sectors: the urban formal sector, the urban informal sector and the rural sector. All the three sectors produce internationally traded goods. The prices of the three goods, considered here, are the effective prices which are defined as being equal to the given international prices plus the rate of output subsidies given to the producers. These prices are exogenously given.
The production function of all the three sectors exhibit constant returns to scale and have positive and diminishing marginal productivity to each input. Each sector uses only two inputs- Capital and Labour. Capital is measured in physical unit, while labour is measured in efficiency unit.
Workers' efficiency is positively related to the wage rate he receives. Such efficiency- wage relations is more pronounced when the wage rate is low. It is assumed that the workers' efficiency is equal to unity after a certain level of wage and is less than unity below that specified level of wage. The wage rates in the rural sector and the urban formal sector are assumed to be higher than this specified level. While the wage rate of the urban informal sector is assumed to be lower than this level3. Thus, for the urban

formal sector and the rural sector, the labour expressed in lobour time unit is identical to that expressed in efficiency unit. However, for the urban informal sector, efficiency units of labour differ from the labour time units of labour.

All the markets are assumed to be perfectly competitive. The assumption of CRS production function and profit maximising behaviour of the firm implies the equality between price and unit cost in each of the three sector and the minimisation of cost of one efficiency unit of labour.

Urban formal sector's wage rate is institutionally fixed and is higher than the rural sector's wage rate which is again higher than the wage rate in the urban informal sector. Workers migrate from the rural sector to the urban region. But some of them are absorbed either in the urban formal sector or in the urban informal sector and a portion of the migrants remains unemployed in the urban region. The migration mechanism is of Harris-Todaro (1970) type. So, in migration equilibrium, the actual rural wage rate is equal to the expected urban wage rate.

2.2 Notations

The following notations are used in this paper.

$j = u, i, r$ J

u = Urban formal sector

i = Urban informal sector

r = Rural sector

X_j = Output produced in the jth sector

L_j = Level of employment in the jth sector

k_j = Capital-Labour ratio in the jth sector

W_j = Wage rate in the ith sector

$\bar{W}_u$ = Institutionally given wage rate in the urban formal sector

h = Workers' efficiency

v_i = Cost of one efficiency unit of labour in the j th sector

L = Total labour endowment

R_i = Rate of interest on the informal capital

R_f = Rate of interest on the formal capital

K_i = Stock of informal capital

K_f = Stock of formal capital

P_j = Effective price of the jth sector's product

F_i = Intensive production function in the jth sector

C_j = Unit cost of production in the jth sector

U = Level of open urban unemployment

Y = Domestic factor income

2.2.1 Equations

The common equation structure used in the two models is as follows:

The intensive production functions in the three sectors are given by the following equations:

$$X_u = L_u f_u(k_u) \tag{1}$$

$$X_i = L_i f_i(k_i) \tag{2}$$

$$X_r = L_r f_r(k_r) \tag{3}$$

The efficiency-wage relation is given by:

$$h = h(W)) \text{ with } h' > 0, h'' < 0, h < 1 \text{ for } W < W* \text{ and}$$
$$h < 1 \text{ for } W < W** \tag{4}$$

The cost of one efficiency unit of labour in the urban informal sector is:

$$v_i = \frac{W_i}{h(W_i)} \tag{5}$$

The condition for minimisation of the cost of one efficiency unit of labour is:

$$h' \frac{W_i}{h(W_i)} = 1 \tag{6}$$

The Harris-Todaro (1970) migration equilibrium condition is given by the following equation

$$W_r = L_u / (L - L_r)) W_u + L_i / (L - L_r)) W_i \quad \ldots \quad \ldots \quad \ldots \tag{7}$$

The labour endowment equation is given by the following:

$$\ldots L_u + L_i + L_r + U = L \quad \ldots \quad \ldots \tag{8}$$

Domestic factor income of the economy is defined as follows:

$$Y = W_u L_u + W_i L_i + W_r L_r + R_f K_f + R_i K_i \quad \ldots \quad \ldots \quad \ldots \tag{9}$$

Using equations (7) and (9), We have

$$Y = W_r L + R_f K_f + R_i K \ldots \quad \ldots \quad \ldots \tag{9.1}$$

It should be noted that the set of equations given by (1) – (9.1) are independent of the nature of capital mobility assumptions to be discussed below.

2.4 Capital Mobility between Rural Sector and Informal Sector

Following Gupta (1997) [4, 6, 7, 8] we assume that the formal capital is specific to the urban formal sector while the informal capital is mobile between the rural sector and the urban informal sector. Thus in equilibrium, we have a common rate of interest in the urban informal sector and the rural sector.

2.4.1 Equations

Along with the equations of section 2.3, we also introduce the following equations in this model. These equations will be different if we drop this capital mobility assumption.

From the competitive equilibrium condition in the three product markets, we get the following three equations:

$$P_u = C_u(W_u, R_f) \tag{10}$$

$$P_i = C_i(W_i, R_i) \quad \ldots \quad \ldots \quad \ldots \tag{11}$$

$$P_r = C_r(W_r, R_i) \quad \ldots \quad \ldots \quad \ldots \tag{12}$$

The full utilisation of the stock of formal and informal capital leads to the following two

$$K_u L_u = K_f \quad \ldots \quad \ldots \quad \ldots \tag{13}$$

$$k_i L_i + k_r L_r = K_i \quad \ldots \quad \ldots \quad \ldots \tag{14}$$

The optimum capital intensities in the three sectors are functions of factor-price ratios. So we have the following three equations:

$$k_u = k_u\left(W_{u/}R_f\right),\ \mathrm{k}_u' > 0 \ \ldots\ldots \quad \ldots. \tag{15}$$

$$k_i = k_i\left(W_i,\ R_i\right),\ \mathrm{k}_i' > 0 \tag{16}$$

$$k_r = k_r\left(W_r,\ R_i\right),\ \mathrm{k}_r' > 0 \quad \ldots. \quad \ldots. \quad \ldots. \tag{17}$$

2.4.2 Working of the Model

The entire model has three subsystems. The first subsystem consists of equations (1), (10), (13) and (15). Given $P_u, \bar{W}_u$, equation (10) determines the equilibrium value of R_f. Then equation (15) determines the optimum capital labour-ratio, k_u, in the urban formal sector. Next, equation (13) determines L_u, given k_f. We can solve for X_u from equation (1). Thus, the first subsystem determines all the variables related to the urban formal sector.

The second subsystem has seven equations: (4), (5), (6), (11), (12), (16) and (17). Equation (6) determines the equilibrium value of W_i. Thus, we can solve for v_i from equation (5) and for h from equation (4). Equation (11) determines R_i, given P_i Then, we get the equilibrium value of W_r from equation (12), given P_r .Thus, k_i, k_r are obtained from equations (16) and (17).

The third subsystem consists of six equations: (2), (3), (7), (8), (9.1) and (14). Given $L,\ K_i, W_u$ and the equilibrium values of $W_r,\ W_i,\ L_u,\ k_i\ \overline{and}\ k_r,$ we can solve for L_i *and* L_r from equations (7) and (14).

We assume that the rural sector is more capital intensive than the urban informal sector in value terms. This implies that $\left(W_r / R_i k_r\right) < \left(W_i / R_i K_i\right),\ or\ \left(W_r / W_i\right) < \left(k_r / k_i\right)$. This is a sufficient condition for the KK curve to be steeper than the LL curve.

Now, we get the equilibrium value of U from equation (8), given L. The equilibrium values of X_i *and* X_r are obtained from equations (2) and (3). Finally, we can solve for Y from equation (9.1).

2.4.3 Comparative Static Effects

2.4.3.1 Change in P_u

P_u is increased if output subsidy is given to the formal sector. In this case, equation (10) shows that R_f will rise, given W_u. Hence, $\frac{\bar{W}_u}{R_f}$ falls and equation (15) shows that $\overline{k_u}$ also falls. From Equation (13) we find that L_u will rise, given K_f. The increase in L_u will affect the general equilibrium values of L_i, L_r, U.

The LL curve shifts downward because L_u rises. However, the KK curve does not shift because $k_i,\ k_r,\ K_i$ remain unchanged. Thus, in new equilibrium, L_r rises and L_i falls. The result is derived mathematically in the Appendix: (A). Looking at the equation (14) we can say that, given K_i the reduction in L_i exceeds the increase in L_r Lr because $k_r > k_i$. This implies that $(L_i + L_r)$ falls.

From equations (7) and (8), we get

$$\left(W_u - W_r\right) L_u - \left(W_r - W_i\right) L_i = UW_r \ldots\ldots\ldots\ldots\ldots\ldots\ldots \tag{18}$$

Note that $W_u > W_r > W_i$ (assumed). So given W_u, W_r, W_i, an increase in L_u and fall in L_r leads to a rise in U.

Now, the effect of a rise in P_u on Y can be studied from equation (9.1). When P_u is increased, R_f rises and there is no change in W_r and R_i. This domestic factor income will rise. So, we can state the results in the following proposition:

Proposition 1: A rise in the rate of output subsidy given to urban formal sector raises urban unemployment as well as domestic factor income; and lowers the level of employment in the urban informal sector.

In the absence of efficiency wage relationship, there is no unemployment. The rise in P_u in such a case, has ambiguous effect on L_i. However, it has positive effect on Y provided that L_r rises and L_i falls.

2.4.3.2 Change in P_i

Subsidisation to the informal sector raises P_i. When P_i is increased, equation (11) shows that R_i will rise, given v_i. From equation (12) it is evident that W_r falls, given $\mathrm{P_r}$. Thus ($\frac{W_i}{R_i}$) and ($\frac{W_r}{R_r}$) fall. Equations (16) and (17) show that both k_i, k_r fall.

The KK curve shifts upward and the LL curve shifts downward. Thus, in equilibrium L_r rises and L_i falls. This result is also derived in the Appendix (A).

Looking at the equation (18) obtained in the section 2.4.3.1 we can say that U will rise when L_i, W_r fall.

We now examine the effect of a rise in P_i on Y from equation (9.1). We find that W_r falls and R_i rises when P_i is bid-up. Y will fall if the fall in $W_r L$ exceeds the rise in $R_i K_i$. This is satisfied if $k_r > \frac{K_r}{L}$. However, this condition is always satisfied by the assumption $W_i k_r > W_r k_i$ 5 Thus, we have the following proposition:

Proposition 2: The increase in the rate of output subsidy given to the urban informal sector raises urban unemployment and lowers domestic factor income. It also reduces the level of employment in the urban informal sector.

In the absence of efficiency-wage relationship, urban unemployment does not exist. The increase in P_i lowers L_i and raises Y if $\left(\left(dk_i / dP_i\right)L_i + \left(dk_r / dP_i\right) L_r\right) < 0$.6

2.4.3.3 Change in $\mathrm{P_r}$

With the rise in $\mathrm{P_r}$ caused by subsidisation to the rural sector, equation (12) shows that W_r will rise, given R_i. Thus, ($\frac{W_r}{R_i}$) rises and also k_r. If k_r rises, the KK curve shifts downward; and if W_r rises, the LL curve shifts upward. Thus, in the new equilibrium, L_r falls and L_i rises.

Now, equation (18), which is obtained in section 2.4.3.1, shows that U will fall when W_r, L_i rise, given $L_u, W_i, \bar{W}_u$. From equation (9.1) we find Y will rise as W_r rises. Thus, we have the following proposition:

Proposition 3: A rise in $\mathrm{P_r}$ caused by subsidisation to the rural sector lowers urban unemployment and raises domestic factor income. This also raises employment in urban informal sector.

However, in the absence of efficiency wage relationship and unemployment, an increase in $\mathrm{P_r}$ raises L_i and lowers Y if $\left(dk_i / dp_i\right) L_i + \left(dk_r / dP_r\right) L_r > 0$7

2.4.3.4 Change in K_f

If K_f is increased, equation (13) shows that L_u will rise, given k_u. Thus, the effects of an increase in the stock of formal capital is similar to those obtained in section 2.4.3.1.

Equation (9.1) shows that Y will rise when K_f rises. Thus, we have the following proposition:

Proposition 4: The increase in the stock of capital in the formal sector raises both urban unemployment and domestic factor income and lowers the level of employment in the urban informal sector.

In the absence of efficiency wage relationship and unemployment, the enlargement of the stock of formal capital raises domestic factor income though its effect on the informal sector''5 employment is indeterminate 8

2.4.3.5 Change in K_i

If K_i is enlarged, the KK curve will shift upward. However, the LL curve will not shift at all since K_i does not enter into equation (7). So, in equilibrium, L_r rises and L_i falls. This is a Rybcznsky's result because capital intensive sector expands when capital endowment is increased.

Equation (7) may be written as $\underline{L} - \bar{W}_u L_u = W_r L_r + W_i L_i$

Here, the fall in L_i outweighs the rise in L_r, since $W_r > W_i$ and Lu is given. Thus,($L_i + L_r$) falls. From equation (8), we find that U will rise, given Lu.

Again, equation (9.1) shows that Y will rise when K_i is increased, Thus, we have the following proposition :

Proposition 5: A rise in K_i raises both urban unemployment and domestic factor income, but lowers employment in the urban informal sector.

In the model of Gupta (1997) [4, 6, 7, 8], when K_i expands, L_i falls and Y rises if $k_r > k_i$.

2.5 Capital Mobility between Urban Formal Sector and Rural Sector

In this section, we follow Grinols (1991) [19]; and assume that the formal capital is mobile between the urban formal sector and the rural sector. Thus, in equilibrium, we have a common rate of return on formal capital in these two sectors. However, the urban informal sector uses the informal capital which is sector-specific. So there exists a different interest rate in the informal capital market.

2.5.1 Equations

Besides the equations of section 2.3, the following additional equations are to be considered in this section:

As the unit cost is equal to the effective price in competitive equilibrium in each of the three sectors, we have the following three equations :

$$P_u = C_u\left(\bar{W}_u, R_f\right) \quad \ldots \quad \ldots \quad \ldots \quad (10a)$$

$$P_i = C_i\left(V_i, R_i\right) \quad \ldots \quad \ldots \quad \ldots \quad (11a)$$

$$P_r = C_r\left(W_r, R_f\right) \quad \ldots \quad \ldots \quad \ldots \quad (12a)$$

The full utilisation of the stock of formal capital and the informal capital leads to the following two equations:

$$k_i L_i = K_i \quad \ldots \quad \ldots \quad \ldots \quad (13a)$$

$$K_u L_u + k_r L_r = K_f \quad \ldots \quad \ldots \quad \ldots \quad (14a)$$

2.5.2 Working of the Model

Equation (6) determines the equilibrium value of W_i. Then, we get h from equation (4), and v_i from equation (5). R_i is obtained from equation (11a), given P_i . Thus, ($\frac{W_i}{R_i}$) is determined and hence, we get optimum k_i. L_i is obtained from equation (13), given K_i. Equation (2) gives X_i.

Equations (10a) and (12a) determine R_f, W_r Then equations (15) and (17) determine k_u, k_r . Now, we can solve for L_i, L_r from equation (7) and equation (14a). We assume that the urban region is more capital intensive than the rural region in value terms. The urban capital intensity is defined as the ratio of the mobile capital to the labour force allotted to the urban region. So, ($RK_u / \left(W_u L_u + W_i L_i\right)\right) > \left(RK_r / W_r L_r\right)$.

The equilibrium value of U is obtained from equation (8). Finally we solve for Y from equation (9.1).

2.5.3 Comparative Static Effects

2.5.3.1 Change in P_u

Change in P_u does not affect L_i because P_u does not enter into the system of determination of W_i, R_i, k_i *and* L_i If P_u is increased, equation (10a) shows that R_f will rise. When R_f rises, W_f has to fall to keep the equation (12a) satisfied. Hence, ($\frac{\bar{W}_u}{R_f}$ and ($\frac{W_r}{R_f}$) fall and so also k_u, k_r .

When W_r falls, the LLcurve shifts downwards. The MM curve shifts upward because k_u, k_r fall. In the new equilibrium, L_u rises and L_r falls. This result is derived mathematically in the Appendix (B)

Looking at the equation (18) obtained in the section 2.4.3.1, we can say that U will rise if W_r falls and L_u rises.

When P_u is increased, W_r falls and R_f rises. Thus, from equation (9.1), we find that Y rises if the fall in $W_r L$ is less than the rise in $R_f K_f$. This is satisfied if $\left(dW_r / dR_f\right) > -\left(K_f / L\right)$ 10. Thus, we may summarise the results in the following proposition:

Proposition 6: An increase in P_u resulting from subsidisation to the urban formal sector raises both urban unemployment and domestic factor income. However, it has no effect on the employment in the urban informal sector.

In the original model of Grinols (1991) [19], with the rise in P_u , domestic factor income may move in any direction and the level of employment in the urban informal sector does not change. However, we do not get the unemployment effect in that model because efficiency-wage relationship and unemployment do not exist there.

2.5.3.2 Change in P_i

If P_i is increased (resulting from subsidisation to the informal sector) equation (11a) shows that R_i will rise. So, ($\frac{W_i}{R_i}$) falls and so also k_i i. Equation (13a) implies that L_i rises, given K_i .

When L_i rises the LLcurve shifts downward. However, the MM curve does not shift because L_i does not enter into equation (14a). Thus, in new equilibrium, L_u rises and L_r falls. This is shown in the Appendix (B). Equation (14a) shows that the rate of decline in L_r is more than the rate of increase in L_u because $k_u > k_r$. Thus, ($L_u + L_r$) falls.

From equation (18) obtained in the section 2.4.3.1. We find that U will fall if the fall in ($L_u + L_r$) exceeds the rise in (L_i). This is satisfied if $k_u > \left(\left(\bar{W}_u - W_i\right) / \left(W_r - W_i\right)\right) k_r$. Its proof is given in the Appendix (B).

From equation (9.1), it is clear that Y will rise because R_i rises and other factor prices remain unchanged. Thus, we have the following proposition:

Proposition 7: A rise in P_i lowers urban unemployment; and raises domestic factor income as well as informal sector's employment.

In the model of Grinols (1991) [19], where there is no urban unemployment, a rise in P_i raises L_i , and its effect on Y is indeterminate.

2.5.3.3 Changes in $\mathrm{P_r}$

Change in $\mathrm{P_r}$ does not affect L_r because $\mathrm{P_r}$ does not enter into the determination of W_i, R_i, k_i *and* L_i . When $\mathrm{P_r}$ is raised, equation (12a) shows that W_r will rise. So, ($\frac{W_r}{R_f}$) rises and so also k_r .

The LLcurve shifts upward and the MM curve shifts downwards. In the new equilibrium, L_u falls and L_r rises. This is also derived in the Appendix (B).

Equation (18) shows that U should fall when W_r rises and L_u falls. Equation (9.1) shows that Y will rise when W_r rises. Thus, we have the following proposition:

Proposition 8: A rise in P_r resulting from subsidisation to rural sector, lowers unemployment, raises domestic factor income and keeps informal sector's employment unchanged.

In the original model of Grinols (1991) [19], a rise in P_r lowers L_i and leads to ambiguous effect on Y. Here, we do not get the effect on U since urban unemployment does not exist in the Grinol's (1991) model.

2.5.3.4 Change in K_f

The increase in K_f does not affect the factor prices. However, this leads to a rise in L_u and a fall in L_r, since the MM curve shifts upward and the LLcurve does not shift. Equation (18) shows that U will rise and equation (9.1) shows that Y will rise in this case. However, this does not affect L_i because K_f does not enter into the set of equations determining W_i, R_i, k_i *and* L_i. Thus, we have the following proposition:

Proposition 9: A rise in K_f raises unemployment and domestic factor income. However, this keeps informal sector's employment unchanged.

In the original model of Grinols (1991) [19], with zero unemployment, an increase in K_f also raises Y keeping L_i unchanged.

Change in K_i

The increase in K_i does not affect the factor prices and factor-intensities. If K_i is expanded, equation (13a) shows that L_i also rises, given k_i. Thus, the effect of a rise in K_i on U is similar to that obtained in the section 2.5.4.2. Equation (9.1) shows that Y will rise when K_i is increased. Thus, we have the following proposition:

Proposition 10: An increase in K_i raises domestic factor income and informal sector's employment and lowers unemployment.

However, in the original model of Grinols (1991) [19], with zero urban unemployment, a rise in K_i leads to a rise in L_i and a fall in Y.

3. Conclusion

In this paper, we have introduced urban unemployment in the otherwise models of Gupta (1997) [4, 6, 7, 8] and Grinols (1991) [19]; and this simultaneous existence of unemployment and urban informal sector has been explained in terms of efficiency-wage relationship in the informal sector.

So far as the general equilibrium effects of various trade and fiscal policies are concerned, it appears that the subsidisation to the rural producers lowers urban unemployment and raises domestic factor income in both the versions of the model. However, in the original models of Gupta (1997) [4, 6, 7, 8] and Grinols (1991) [19] such a policy may have a negative effect on domestic factor income. Similarly subsidisation to the urban formal sector raises domestic factor income and unemployment in both the versions of the present model. However, in the original models of Gupta (1997) [4, 6, 7, 8], such a policy raise domestic factor income; and produces ambiguous effect in the model of Grinols (1991) [19].

Moreover, a subsidy policy adopted in the informal sector leads to different effects in the two cases. In the case of capital mobility between informal sector and rural sector, this raises unemployment and lowers domestic factor income. In the case of capital mobility between formal sector and rural sector subsidisation to the urban informal sector lowers unemployment and raises domestic factor income. However, such policy raises domestic factor income in the original model of Gupta (1997) [4, 6, 7, 8]; and leads to ambiguous effect in the model of Grinols (1991) [19].

The increase in the stock of capital in the informal capital market raises domestic factor income in both the cases. However, this raises urban unemployment in the presence of capital mobility between the rural sector and the informal sector; and lowers unemployment when the informal sector uses sector specific capital. On the other hand, the increase in informal capital lowers domestic factor income; in the model of Grinols (1991) [19] and raises that in the model of Gupta (1997) [4, 6, 7, 8].

Footnotes

1. Fields explains urban unemployment in a frame work where unemployed are more efficient in job search than those employed in the Urban Informal Sector. On the other hand, Gupta (1991) [4, 6, 7, 8] explains this in a frame work where price is fixed and quantity adjusts to clear the market for rural sector's product, 1987.

2. Domestic factor income is different from national income because subsidies given to different sectors are financed by taxing on factor income. The effects on national income in many cases involve ambiguity.
3. Wage-rates in the rural and informal sector are endogenous variables; and the restrictions are to be imposed on the equilibrium values of these variables.
4. Related exercise have been made by Gupta (1997).
5. This assumption implies that $k_r > k_i$; *or* $k_r > \frac{K_r}{L_i + Lr} > K_i / L$ *since* $L > (L_i + L_r)$
6. See Gupta (1997).
7. See Gupta (1997).
8. See Gupta (1997).
9. 1. *If* $\left(Rk_u / \left(\bar{W}_u L_u + W_i L_i\right)\right) > \left(RK_r / W_r L_r\right)$, *then* $\left(L_u k_u / \left(W_u L_u + W_i L_i\right)\right) > k_r / W_r$; *Or* $W_r k_u Lu > \left(WukrLu + WikrLi\right)$; *or* $\left(Wrku - Wukr\right) > \left(WiLikr / Lu\right)$; □ *Wrku* > *Wukr*.
10. 10. However, this condition is automatically satisfied in this model since $(K_u / (L - L_r) > (K_r / L_r)$ *or* $\left(K_f > Lk_r\right)$
11. $(Rk_u / \left(\bar{W}_u L_u + W_i L_i\right)) > \left(RK_r / W_r L_r\right)$, which in turn implies that
12. Bandyopadhyay M, Gupta MR. "Development policies in the presence of an informal sector: A note", Journal of economics. 1995a; 61:301-315.
13. Bandyopadhyay M, Gupta MR. "Capital mobility, informal sector and development policies : A dynamic analysis of a three-sector small open economy", Working paper, Jadavpur University, 1995b.
14. Chandra V, Khan MA. "Foreign investment in the presence of informal sector". Economica. 1993; 60:79-103.
15. Chowdhury S. "Rural-Urban Migration, Informal Sector, Urban Unemployment and development policies.- A Theoritical Analysis", Review of Development Economics. 2000; 4(3):353-364.
16. Corden WM, Findlay R. "Urban unemployment, intersectoral capitalmobility and development policy", Economica. 1975; 42:59-78.
17. Datta Chaudhuri T. "A theoretical analysis of the informal sector", World Development. 1989; 187:351-355.
18. Fields G. "Rural-urban migration, urban unemployment and underemployment and job search activity in LDCs", Journal of Development Economics. 1975; 2(2):165-187.
19. Grinols EL. "Unemployment and foreign capital: the relative opportunity cost of domestic labour and welfare", Economics. 1991; 57:107-121.
20. Gupta MR. "Rural-Urban migration, informal sector and development policies: a theoretical analysis", Journal of Development Economics. 1993; 41:137-151.
21. "Informal sector and informal capital market in a small open less-developed economy", Journalof Development Economics. 1997; 52:409-428.
22. Harris JR, Todaro MP. "Migration, Unemployment and Development: a Two-sector Analysis", american Economic Revies. 1970; 60:126-142.
23. Papola TS. "Informal Sector: Concept and Policy", Economic and Political Weekly. 1980; 15:817-824.
24. Romatet Emmanual. "Calcutta's Informal Sector: Theory and Reality", EPW 18, December. 1983; 10:2115-2128.
25. Sethuraman SV. (ed), "The Urban Informal Sector in Developing Countries : Employment, Poverty and Environment, ILO, Geneva Despite its economic developments, the cement industries have created many challenges in the form of environmental hazardous issues and problems. The cement industry is a highly energetic intensive process and contributed vital role in the climatic alterations, 1981.

References

1. Bandyopadhyay M, Gupta MR. Development policies in the presence of an informal sector: A note. Journal of economics. 1995a; 61:301-315.
2. Bandyopadhyay M, Gupta MR. Capital mobility, informal sector and development policies: A dynamic analysis of a three-sector small open economy. Working paper, Jadavpur University, 1995b.
3. Chandra V, Khan MA. Foreign investment in the presence of informal sector. Economica, 1993; 60:79-103.
4. Chowdhury S. Rural-Urban Migration, Informal Sector, Urban Unemployment and development policies.- A Theoritical Analysis. Review of Development Economics. 2000; 4(3):353-364.
5. Corden WM, Findlay R. Urban unemployment, intersectoral capitalmobility and development policy. Economica, 1975; 42:59-78.
6. Datta Chaudhuri T. A theoretical analysis of the informal sector. World Development, 1989; 187:351-355.
7. Fields G. Rural-urban migration, urban unemployment and underemployment and job search activity in LDCs. Journal of Development Economics. 1975; 2(2):165-187.
8. Grinols EL. Unemployment and foreign capital: the relative opportunity cost of domestic labour and welfare. Economics, 1991; 57:107-121.

9. Gupta MR. Rural-Urban migration, informal sector and development policies: a theoretical analysis. Journal of Development Economics. 1993; 41:137-151.
10. _____. Informal sector and informal capital market in a small open less-developed economy. Journal of Development Economics. 1997; 52:409-428.
11. Harris JR, Todaro MP. Migration, Unemployment and Development: A Two-sector Analysis. American Economic Revies. 1970; 60:126-142.
12. Papola TS. Informal Sector: Concept and Policy. Economic and Political Weekly, 1980; 15:817-824.
13. Romatet Emmanual. Calcutta's Informal Sector: Theory and Reality. EPW 18, 1983; 10:2115-2128.
14. Sethuraman SV (ed). The Urban Informal Sector in Developing Countries: Employment, Poverty and Environment, ILO, Geneva, 1981.