CHAPTER-6

URBAN EMPLOYMENT SUBSIDY, CAPITAL MARKET DISTORTION AND URBAN UNEMPLOYMENT IN THE PRESENCE OF INFORMAL SECTOR: A THEORETICAL ANALYSIS

6.1 INTRODUCTION

6.2 THE MODEL

6.2.1 ASSUMPTIONS OF THE MODEL

6.2.2 NOTATIONS USED IN THE MODEL

6.2.3 THE EQUATIONAL STRUCTURE OF THE MODEL

6.3 THE COMPARATIVE STATIC EFFECTS

6.3.1 THE IMPACT OF INCREASE IN EMPLOYMENT SUBSIDY ON THE UNEMPLOYMENT RATE AND THE LEVEL OF WELFARE OF THE ECONOMY

6.3.2 THE IMPACT OF REDUCTION OF CAPITAL MARKET DISTORTION ON THE UNEMPLOYMENT RATE AND THE LEVEL OF WELFARE OF THE ECONOMY

6.4 CONCLUDING REMARKS

APPENDICES
CHAPTER-6

URBAN EMPLOYMENT SUBSIDY, CAPITAL MARKET DISTORTION AND URBAN UNEMPLOYMENT IN THE PRESENCE OF INFORMAL SECTOR: A THEORETICAL ANALYSIS

6.1 INTRODUCTION

The widespread existence of informal sector in the developing economies have been already discussed in the earlier chapters. The workers of the informal sector usually migrate from the rural sector to the urban area with an expectation of higher wage income. But, when they are unable to find a job in the urban formal sector of the economy, they get themselves involved in the informal sector of the economy. Thus, the informal sector acts as a labour absorbing sector. However, the prevalence of informal sector in the developing economies does not curb the problem of urban unemployment that prevails in these economies. Empirically, it has been observed that in most of the developing economies, there exists widespread unemployment, specially in the urban area despite the presence of informal sector in the urban area of the economy. The dominant view behind the simultaneous existence of informal sector and unemployment in the urban area of the developing economies is that much unemployment is due to search and is voluntary (Harris-Todaro, 1970). It is believed that positive unemployment arises either because of the fact that informal wage is too low or because it is believed that the probability of getting a wage employment is higher if the search is conducted from open unemployment than from informal sector employment. Thus, those who can afford to remain unemployed, remains so in order to search for a wage employment. However, the poor cannot afford to do so. For them the unemployment exists because the entry to informal sector is not free and easy, as thought to be. Many authors believe that

76 Kingdon and Knight (2001) viewed the simultaneous existence of informal sector and urban unemployment in South Africa.
activities in informal sector are highly stratified, requiring skills, experience and contacts which make entry to the sector difficult. In this context, a relevant question that arises is, whether really the informal sector of an economy plays the role of labour absorbing sector so that it can reduce the existence of (urban) unemployment or not. This question is especially important in the context of various policies that are followed in developing economies. In this chapter, we shall try to find the answer to this question. In other words, we shall try to find out the impact of various domestic policies on the level of urban unemployment of the economy, in the presence of informal sector.

The motivation behind the present chapter originates from the fact that in most of the developing economies we find that there is simultaneous existence of urban unemployment and informal sector. In the earlier chapters (chapter-3 to chapter-5) we have considered the presence of informal sector in a full employment neo-classical framework, as a result of which we have not considered the issue of unemployment. In the present chapter, as we want to examine the role of various domestic policies in the presence of informal sector and urban unemployment, we have considered a HT (1970) type of framework. Usually in HT (1970)/Corden Findlay (1975) framework, when we consider the informal sector, it plays the role of labour absorbing sector such that ultimately we have a situation of full employment. The present chapter is different in this context. Here we consider the simultaneous existence of informal sector and urban unemployment in a modified HT (1970)/Corden-Findlay (1975) framework. Another important feature of the developing economies is the presence of capital market distortion. This point has also taken into consideration in this chapter. Thus here we examine the impact of various development policies on the level of welfare and the

---

77 Banerjee (1986) has observed that entry to informal sector is difficult due to presence of cohesive networks, which exercise control over location and zone of operation.
78 India can be considered as one such economy.
79 Usually the HT (1970) framework in explaining the existence of informal sector is being criticized in recent years (as already explained in the earlier chapters). Here we have modified the usual HT (1970) framework as we want to consider the prevalence of unemployment in the economy. In a full employment framework, there is no scope for it.
80 HT (1970) model is actually a specific-factor model whereas Corden Findlay (1975) model is the mobile capital version of traditional HT (1970) model.
81 This kind of framework has already been considered in literature. The works of Beladi and Yabuuchi (2001) and Yabuuchi and Beladi (2000) can be referred for this.
unemployment rate of the economy in the presence of informal sector and capital market distortion of the economy.

In the present chapter we have considered the impact of various developmental policies in the form of increased employment subsidy and reduction of capital market distortion on the level of urban unemployment rate and welfare of the economy. For this purpose we have considered a three sector modified version of HT (1970) framework with an urban informal sector along with urban unemployment. The capital market distortion has also been taken into consideration.

The major results of the chapter are as follows: Increase in employment subsidy to the formal manufacturing sector decreases the urban unemployment rate of the economy and also increases the level of welfare of the economy. Yabuuchi and Beladi (2000) have considered wage subsidy instead of employment subsidy. However, their results are opposite to as obtained in this chapter, as they have shown that, when the informal sector produces internationally traded good, then the manufacturing wage subsidy increases the rate of unemployment and decreases welfare, under some assumptions. Our results on the other hand have important policy implications. The policy of increase in urban employment subsidy for the manufacturing sector may be considered beneficial when curbing the unemployment rate of the economy and improvement in the level of welfare of the economy are considered to be the major objective of the economy. But efforts to reduce the capital market distortion that exists in the economy may not prove to be beneficial if the main objective of the economy is to reduce the urban unemployment rate and to increase the level of welfare of the economy as this policy leads to an increase in unemployment rate and a fall in the level of welfare.

The chapter is organized as follows: The model is described in section 6.2 of the chapter, while section 6.3 examines the comparative static results. Finally, the concluding remarks are made in the section 6.4 of the chapter.
6.2 THE MODEL

6.2.1 ASSUMPTIONS OF THE MODEL

We have considered a small open HT (1970) economy with an urban informal sector. The economy is divided broadly into two major sectors- rural and urban. The urban sector is further subdivided into two sectors- an urban formal manufacturing sector, ‘x’ and a final good producing urban informal sector, ‘z’. The rural sector of the economy is denoted by ‘y’. The formal manufacturing sector is the import-competing sector. The products of sectors ‘x’ and ‘z’ are exported. All the three sectors use labour and capital to produce their products. Capital is perfectly mobile between the two sectors, ‘x’ and ‘y’. However, the informal capital (credit) market\(^3\) faces some degree of isolation\(^4\), which is denoted by \(\beta\) (exogenously given)\(^5\), where \(\beta > 1\). As the informal sector lenders generally borrow funds from the formal credit market for re-lending, the interest rate at which they lend capital in the informal sector is a function of degree of capital market distortion (\(\beta\)) and the rate of interest prevailing in the formal capital market. This is because greater is the degree of imperfection that exists in the informal capital (credit) market, higher will be the power of the informal sector lenders to mark up the interest rate over that prevailing in the formal credit market. In other words, we can say that formal and informal capital is substitutable at a certain degree. Thus, we can say that formal capital is mobile between all the three sectors, though not perfectly.

Due to trade union pressure and other political considerations, wage rate in the formal manufacturing sector is rigid (given exogenously), while the wage rates of the agricultural and the informal sectors are flexible. The labourers from the rural areas migrate to the urban area with the expectation of higher income. So migration continues as long as the expected wage rate of the urban area is equal to the rural wage rate. In this chapter, we have also considered labour allocation between the informal sector and the

\(^3\) Here credit market is treated similar to as capital market.
\(^4\) This idea has been borrowed from literature. One can see Chaudhuri (2003).
\(^5\) It can also be referred as degree of capital market imperfection or degree of distortion faced by the informal capital market.
manufacturing sector in the urban area. This migration also continues as long as the expected wage in the urban informal sector equals to that in the urban manufacturing sector.

The usual assumptions of variable coefficient technology and CRS of production functions with positive and diminishing marginal products hold good in this chapter. The small open economy assumption implies that the prices of the traded goods of the formal manufacturing sectors, the agricultural sector and the informal sector are given internationally. The product of the agricultural sector is considered as the numeraire and its price has been set equal to unity.

6.2.2 NOTATIONS USED IN THE MODEL

In this chapter, we have denoted the formal urban manufacturing, the rural (agricultural) and the final good producing urban informal sectors as ‘x’, ‘y’ and ‘z’ respectively. The other notations used in this chapter are stated as follows, for i=x, y, z.

- $P_i$ - world price for the product of $i^{th}$ sector, i=x, y and z.
- $a_{ij}$ - quantity of $i^{th}$ input required for the production of one unit of output of the $j^{th}$ sector, i=L and K and j=x, y, and z, where L and K implies labour and capital respectively.
- $\bar{W}_x$ - exogenously given wage rate of the workers in sector x.
- $s_x$ - employment subsidy in sector x.
- $W_y$ - wage rate of the workers in sector y.
- $W_z$ - wage rate of the workers in sector z.
- $r$ - rate of return on formal capital.
- $R$ - rate of return on informal capital.
- $L$ - total labour endowment.
- $K$ - total capital endowment.

---

86 This idea has been taken from the work of Yabuuchi and Beladi (2000) and Beladi and Yabuuchi (2001).
U - level of unemployment in the urban sector.
β - degree of capital market distortion
ψ - rate of informalization of labour force, \((a_{l_x}Z / a_{l_x}X)\)
ξ - rate of urban unemployment, \((U / a_{l_x}X)\)

\[ \eta = (1 + \xi + \psi) \] - ratio of total urban labour force (including urban unemployment) with respect to employment in the urban formal manufacturing sector.

6.2.3 The Equational Structure of the Model

The competitive equilibrium conditions of the three sectors of the economy are given by the following equations

\[ P_x = a_{l_x} (\bar{W}_x - s_x) + a_{k_x} r \] (6.1)
\[ 1 = a_{l_y} W_y + a_{k_y} r \] (6.2)
\[ P_z = a_{l_z} W_z + a_{k_z} R \] (6.3)

It is to be noted that \( a_{l_x} = a_x ((\bar{W}_x - s_x) / r) \), \( a_{y} = a_y (W_y / r) \) and \( a_{l_z} = a_z (W_z / R) \) for all \( i = L, K \).

The rate of interest prevailing in the informal capital market is a function of the degree of capital market distortion or imperfection\(^7\) (β) and the rate of interest of the formal capital (r). In other words, the relation between the formal and informal interest rate is expressed as follows

\[ R = \beta r \] (6.4)

It is assumed that the amount of capital supplied to the informal sector of the economy, \( K_1 \), is a positive function of the interest rate differential between the two capital markets. It is believed that informal capital market exists only if there exists some interest rate differential between the two capital markets. In other words, it can be said

\(^7\) It can be referred to as a measure of isolation of informal capital market.
that if there exists some capital market distortion, i.e. $\beta > 1$, which implies that if there is some interest rate differential between the two capital markets, then the informal capital market will exist$^{88}$. Thus, it is believed that higher the capital market distortion, greater will be the amount of capital supplied to the informal sector of the economy$^{89}$. The capital which goes to the informal part of the economy is used by the informal sector of the economy. So the complete utilization of informal capital (credit) implies

$$a_{Kz}Z = K_{1}(R-r); \text{where } K_{1} > (=)0 \text{ when } (R-r) > (=)0; K'_{1}(.) > 0$$

The formal capital (credit) market equilibrium condition is given by

$$a_{Kx}X + a_{ Ky}Y = K - K_{1}(R-r)$$

We can combine formal and informal credit market equilibrium conditions and can write the capital market equilibrium condition of the economy as follows, $^{90}$

$$a_{Kx}X + a_{Ky}Y + a_{Kz}Z = K \quad (6.5)$$

The HT (1970) migration equilibrium condition, which shows that the rural wage rate equals the expected wage in the urban area, is given by the equation

$$(\overline{W_{x}}a_{lx}X + W_{x}a_{lz}Z)/(a_{lx}X + a_{lz}Z + U) = W_{y} \quad (6.6)$$

In equation (6.6), $(a_{lx}X/(a_{lx}X + a_{lz}Z + U))$ is the probability of getting a job in the urban formal manufacturing sector, $(a_{lz}Z/(a_{lx}X + a_{lz}Z + U))$ is the probability of getting a job in the urban informal sector and $(U/(a_{lx}X + a_{lz}Z + U))$ is the probability of remaining unemployed in the urban area. Treating the probabilities as relative frequencies and multiplying each of these probabilities by their respective values (for example, $\overline{W_{x}}$ with the probability of getting a job in the urban formal manufacturing

$^{88}$ $\beta>1$ implies $R>r$.

$^{89}$ This assumption is consistent with Bottomley's (1975) hypothesis of lender's risk. According to the hypothesis, the informal sector's lender is always subjected to risk of default of loans advanced by him. Thus, under this situation it is reasonable to assume that the lender of informal sector will advance loan if and only if there exists a capital market distortion in the economy, i.e. interest differential exists.

$^{90}$ It is to be noted that $K_{1}$ in the capital market equilibrium condition can always be replaced by $a_{Kz}Z$. 
sector, $W_z$ with the probability of getting a job in the urban informal sector and zero with the probability of remaining unemployed\(^9\)) we get the LHS of equation (6.6), which is the expected wage rate in the urban area. Labourers from the rural area migrate to the urban area with an expectation of higher wage. Thus, migration continues as long as the expected wage rate of urban area is greater than the wage rate of the rural sector. Once the expected urban wage rate equals to the rural wage rate, equilibrium is achieved, which is expressed in the above equation.

The labour allocation mechanism between the manufacturing and informal sectors within the urban area is expressed by the following equations

\[
(W_z a_{1z} X)/(a_{1x} X + a_{1z} Z + U) = (W_z a_{1z} Z)/(a_{1x} X + a_{1z} Z + U)
\]  

(6.7)

Here we have also considered the migration of labourers between the manufacturing sector and the informal sector within the urban area. The labourers migrate from the informal sector to the manufacturing sector within the urban area, with an expectation of higher income. Thus, this migration continues as long as the expected wage rate of the manufacturing sector is equal to the expected wage rate of the informal sector. Therefore, we can say that equilibrium is achieved, when expected wage rate of the manufacturing sector is equal to the expected wage rate of the informal sector, which is expressed by the above equation.

Allocation of the labour force among the three sectors of the economy along with urban unemployment can be expressed as follows

\[
a_{1x} X + a_{1y} Y + a_{1z} Z + U = \bar{L}
\]  

(6.8)

Thus, in this model we have eight equations with eight endogenous variables- $r$, $R$, $W_z$, $W_z$, $X$, $Y$, $Z$ and $U$.

\(^9\) The rate of return for the (urban) unemployed is zero.
The working of the model is simple. As $P_x, \bar{W}_x$ and $s_x$ are fixed (given exogenously), we can determine $r$ from equation (6.1). Once the value of $r$ is known, we get the value of $W_y$ from equation (6.2). Again the value of $R$ can be determined from equation (6.4), once the value of $r$ is known, as $\beta$ is given exogenously. From equation (6.3) the value of $W_z$ is determined, once the value of $R$ is known. Thus, the system is decomposable in nature. The other four unknowns $X$, $Y$, $Z$ and $U$ can be determined from the remaining four equations, (6.5), (6.6), (6.7) and (6.8), when solved simultaneously.

We assume that the subsidy is financed by lump sum taxes\(^{92}\) so that NI measured at world prices, $\Omega$, is expressed as follows,

$$\Omega = \bar{W}_x a_{lx} X + W_y a_{ly} Y + W_z a_{lz} Z + r(K - K_l) + RK_l$$

(6.9)

This NI can be treated as a measure of welfare. Using equation (6.8) it can be shown from equation (6.6) that

$$(\bar{W}_x a_{lx} X + W_z a_{lz} Z) = W_y (a_{lx} X + a_{lz} Z + U) = W_y (L - a_{ly} Y)$$

Therefore, using the above relation, equation (6.9) can be rewritten as

$$\Omega = W_y a_{ly} Y + W_y L - W_y a_{ly} Y + rK + (R - r)K_l$$

Since, $R = \beta r$, thus we get

$$\Omega = LW_y + rK + r(\beta - 1)K_l$$

(6.9.1)

6.3 THE COMPARATIVE STATIC EFFECTS

In this section of the chapter, we want to analyze the impact of various development policies on the rate of unemployment prevailing in the economy and on the level of welfare of the economy. The development policies that are implemented in the developing economies are in the form of increase in employment subsidy or reduction in capital market distortion that prevails in the developing economy. Here, in this chapter we have considered employment subsidy to the formal manufacturing sector. The urban

---

\(^{92}\) This assumption is crucial for our model. In fact in the specification for NI we add the (lump sum) tax revenue and deduct the subsidies. Due to balanced budget it gets cancelled out.
informal sector, as the name suggests, is not under any type of government regulations. So there exists no chance of imposing employment subsidy on this sector. In the first section of the chapter, the impact of increase in employment subsidy to the formal manufacturing sector and in the latter section the impact of reduction of capital market distortion on the unemployment rate and the level of welfare of the economy have been considered. Here, we have considered the impact of various development policies on the rate of unemployment prevailing in the economy instead of the level of unemployment, as that gives us definite and unambiguous results.

Here in this context, we assume that the rate of urban unemployment is denoted by $\xi$ and informal-formal labour ratio is denoted by $\psi$. In other words, $\xi$ expresses the ratio of urban unemployment of the economy to the employment of the urban manufacturing sector of the economy\footnote{This idea has been borrowed from literature. See the work of Yabuuchi and Beladi (2000).} i.e. $(U/a_{lx}X)$, whereas $\psi$ can be narrowly said as the rate of informalization of labour force i.e. $(a_{lz}Z/a_{lx}X)$. Using these relations equations (6.6) and (6.7) can be expressed as (see appendix 6.1 for detail derivations)

$$W_x + \psi W_z = W_y (1 + \xi + \psi) = W_y \eta$$  \hspace{1cm} (6.6.1)

and

$$W_z = \psi W_z$$ \hspace{1cm} (6.7.1)

where,

$$\eta = 1 + \psi + \xi$$ \hspace{1cm} (6.6.1')

Thus, $\eta = (a_{lx}X + a_{lz}Z + U)/(a_{lx}X)$ is the ratio of total urban labour force (including urban unemployment) with respect to employment in formal manufacturing sector\footnote{One can say $(1/\eta)$ is the degree of formalization of the economy in broad sense.}. 

Again, using equation (6.7.1), equation (6.6.1) can be rewritten as

$$2W_z = W_y \eta$$ \hspace{1cm} (6.6.2)
6.3.1. **THE IMPACT OF INCREASE IN EMPLOYMENT SUBSIDY ON THE URBAN UNEMPLOYMENT RATE AND LEVEL OF WELFARE OF THE ECONOMY**

The impact of rise in employment subsidy to the formal manufacturing sector on the rate of unemployment of the economy can be explained as follows (detailed derivations are shown in appendix 6, subsection 6.2)

Differentiating and using envelope condition in equation (6.1) we get (for detailed see appendix 6.2, subsection 6.2.1)

\[
\frac{dr}{ds_J} = \left( \frac{a_{Lx}}{a_{Kx}} \right)
\]

Again, differentiating and using envelope condition \(^{95}\) in equation (6.2) and then incorporating the value of \(\frac{dr}{ds_J}\), we get

\[
\frac{dW_y}{ds_J} = -\left( \frac{a_{Ky}}{a_{Iy}} \right) \left( \frac{a_{Lx}}{a_{Kx}} \right)
\]

Similarly, the value of \(\frac{dR}{ds_J}\) can be obtained by differentiating equation (6.4). Now incorporating the value of \(\frac{dR}{ds_J}\) in equation (6.3) after differentiating and using the envelope condition, we get

\[
\frac{dW_z}{ds_J} = -\beta \left( \frac{a_{Kz}}{a_{lz}} \right) \left( \frac{a_{lx}}{a_{Kx}} \right)
\]

The values of \(\frac{d\eta}{ds_J}\) and \(\frac{d\psi}{ds_J}\) can be obtained by differentiating equations (6.6.2) and (6.7.1) and then by incorporating respectively the values of \(\frac{dW_y}{ds_J}\) and \(\frac{dW_z}{ds_J}\) (as obtained above) we thus get

\[
\frac{d\eta}{ds_J} = \left( \frac{a_{Ky}}{a_{Iy}} \right) \left( \frac{a_{Lx}}{a_{Kx}} \right) (\eta / W_y)
\]

and

\[
\frac{d\psi}{ds_J} = \{\psi \beta / W_z\} \left( \frac{a_{Kz}}{a_{lz}} \right) \left( \frac{a_{lx}}{a_{Kx}} \right)
\]

\(^{95}\) Envelope conditions have already been discussed in footnote no. 31.
The relationship between the change in $\psi, \eta$ and $\xi$ can be obtained by differentiating the equation $\eta = 1 + \xi + \psi$ and it is as follows

\[
\frac{d\xi}{ds_x} = \frac{d\eta}{ds_x} - \frac{d\psi}{ds_x}
\]  

(6.10)

Incorporating the values of $\frac{d\eta}{ds_x}$ (given by equation (6.6.3)) and $\frac{d\psi}{ds_x}$ (given by equation (6.7.2)) in the equation (6.10) (for details see appendix 6.2, subsection 6.2.2) we get

\[
\frac{d\xi}{ds_x} = \left(\frac{a_{K_y}a_{L_x}}{a_{K_y}a_{L_x}}\right)\left(\frac{\eta}{W_y}\right) - \left\{\frac{\mu\beta}{W_z}\right\}\left\{\left(\frac{a_{K_y}}{a_{L_y}}\right)\left(\frac{a_{L_x}}{a_{K_x}}\right)\right\}
\]

\[
= \left(\frac{a_{L_x}}{a_{K_x}}\right)\left(\frac{a_{K_y}a_{L_y}}{a_{K_y}a_{L_y}}\right)\left(\frac{\eta}{W_y}\right) - \left(\frac{a_{K_y}}{a_{L_y}}\right)\left(\frac{\psi\beta}{W_z}\right)
\]

This expression after some simplification (see appendix 6.2, subsection 6.2.2) gives us

\[
\frac{d\xi}{ds_x} = \left(\frac{a_{L_x}}{a_{K_x}}\right)\left(\frac{2\left(a_{K_y}a_{L_y}\right)}{\left(W_x/W_y\right)^2} - \frac{\left(W_y/W_z\right)\beta}{2} - \left(\frac{\psi a_{K_y}a_{L_x}}{W_ya_{L_y}}\right)\left(\frac{a_{K_y}}{a_{L_y}}\right)\right)
\]

We know that in a HT (1970) framework $W_y > W_z$. We also assume here that the urban informal sector is more capital intensive as compared to that of the rural sector of the economy\(^{96}\). Thus,

\[
\frac{d\xi}{ds_x} < 0 \text{ if } \beta > 2\left(\frac{W_y^2}{W_z^2}\right)
\]

or, if $\beta > \left(\frac{\eta^2}{2\psi^2}\right)$ where $(\eta/\psi) = (2W_z/W_y)$ (see appendix 6.2, subsection 6.2.2 for detailed derivations)

Increase in employment subsidy of the urban formal manufacturing sector causes a reduction in the effective wage, $(W_x - s_x)$ of that sector. Thus, given the world prices, from equation (6.1) we find that the rate of return of the formal capital increases in order

\(^{96}\) Earlier in chapter 3 and 4 we have considered that informal sector is less capital intensive as compared to that of the rural sector. Here, in this chapter, the assumption is just the opposite because here we have considered urban informal manufacturing sector instead of informal sector. Empirically, it has been observed that any manufacturing sector in the urban area employ more capital-intensive methods than the rural (agricultural) sector.
to maintain zero profit condition. The increase in the rate of formal capital causes from equation (6.4), the rate of return of the informal capital also to increase, as $\beta$ is fixed and given exogenously. It is to be noted that higher the degree of imperfection of informal capital market, higher will be the rate of increase in informal interest rate. Given $P_r$, the increase in rate of return of the informal capital causes from equation (6.3) the wage rate of the urban informal sector to fall, in order to maintain zero profit condition.

With the decrease in wage rate of the urban informal (manufacturing) sector, the rate of informalization of the economy, $\psi$, increases (from equation 6.7.1), as $\overline{W}_x$ is fixed. Similarly, from equation (6.6.2) $\eta$ also increases with the fall in $W_y$, as $\overline{W}_x$ is fixed. But in the presence of high rate of capital market distortion in the economy (which is given by $\beta > (\eta^2 / 2\psi^2)$), the increase in the rate of interest of the informal capital market, $R$, will be high. Infact higher is $\beta$, higher will be the increase in $R$. Greater the increase in $R$, more will be the fall in $W_z$ inorder to maintain zero profit condition. Again, it is to be noted that the greater the decrease in $W_z$, the more will be the increase in $\psi$ (from equation (6.7.1)) as $\overline{W}_x$ is fixed. In other words, as a result of increase in employment subsidy to the formal manufacturing sector the rate of informalization, $\psi$, increases. Higher is the degree of imperfection in the informal capital market, greater will be the rate of informalization of the economy, $\psi$. Thus as both $\eta$ and $\psi$ increases, it imply that the effect on urban unemployment rate, $\xi$, is ambiguous. However, for high degree of imperfection in the informal capital market (say $\beta > (\eta^2 / 2\psi^2)$) we find that increase in $\psi$ dominates over the increase in $\eta$, so that the urban unemployment rate, $\xi$, falls.

The above obtained results can be summarized in the form of following propositions

**Proposition 6.1**: Increase in employment subsidy to the urban formal manufacturing sector decreases the urban unemployment rate of the economy, if $\beta > (\eta^2 / 2\psi^2)$, and given that, the urban informal sector of the economy is more capital intensive than the rural sector of the economy.
Now, we would like to examine the impact of increased urban formal manufacturing sector employment subsidy on the level of NI of the economy. It is given by

$$\Omega = LW_y + rK + r(\beta - 1)K$$  \hspace{1cm} (6.9.1)

Differentiating the equation (6.9.1) with respect to $s_x$, we get

$$\left(\frac{d\Omega}{ds_x}\right) = L\left(\frac{dW_y}{ds_x}\right) + K\left(\frac{dr}{ds_x}\right) + (\beta - 1)K_1\left(\frac{dr}{ds_x}\right) + r(\beta - 1)K'\left(\frac{dr}{ds_x}\right)$$

$$= L\left[\left(\frac{dW_y}{dr}\right)\left(\frac{dr}{ds_x}\right)\right] + K\left(\frac{dr}{ds_x}\right) + (\beta - 1)\left(\frac{dr}{ds_x}\right)[K_1 + r(\beta - 1)]$$  \hspace{1cm} (6.9.2)

Using the Shephard –Samuelson relations we find from competitive equilibrium condition of the sector ‘y’

$$\frac{dW_y}{dr} = -(a_{KY} / a_{LY})$$

Incorporating the value of $\frac{dW_y}{dr}$ in equation (6.9.2), we get

$$\left(\frac{d\Omega}{ds_x}\right) = L\left[-a_{KY} / a_{LY}\right]\left(\frac{dr}{ds_x}\right) + K\left(\frac{dr}{ds_x}\right) + (\beta - 1)\left(\frac{dr}{ds_x}\right)[K_1 + r(\beta - 1)]$$

$$= L\left(\frac{dr}{ds_x}\right)\left\{\left(\frac{K}{L}\right) - \left(\frac{a_{KY}}{a_{LY}}\right)\right\} + (\beta - 1)\left(\frac{dr}{ds_x}\right)[K_1 + r(\beta - 1)]$$  \hspace{1cm} (6.9.3)

If we assume that the capital labour endowment ratio of the economy is greater than the capital labour ratio of the rural sector, then $\left\{\left(\frac{K}{L}\right) - \left(\frac{a_{KY}}{a_{LY}}\right)\right\} > 0$. Again, as $\left(\frac{dr}{ds_x}\right) > 0$ (already proved), we find that

$$\left(\frac{d\Omega}{ds_x}\right) > 0$$

The above results can be summarized in terms of the following proposition.

**Proposition 6.2:** The increase in employment subsidy to the formal manufacturing sector of the economy increases the level of NI of the economy under the assumption that the capital labour endowment ratio of the economy is greater than the capital labour ratio of the rural sector of the economy.

---

97 It has been explained in footnote no. 33
6.3.2. THE IMPACT OF REDUCTION IN CAPITAL MARKET DISTORTION ON THE URBAN UNEMPLOYMENT RATE AND THE LEVEL OF WELFARE OF THE ECONOMY

A reduction in capital market distortion, \( \beta \), implies a reduction in rate of interest of the informal sector, \( R \), but the rate of interest of the formal capital and the wage rate of the urban manufacturing sector and that of the rural sector remain unaffected. Again, given \( P_z \), a decrease in the rate of interest of the informal capital causes the wage rate of the urban informal sector of the economy to rise in order to maintain zero profit condition (from equation 6.3). This in turn decreases \( \psi \) (from equation (6.7.1)). However, as a result of reduction in capital market distortion, the wage rate of the rural sector, \( W_r \), is not affected, we can thus say that \( \eta \) remains unaltered. Thus, to maintain equilibrium, equation (6.6.1') implies \( \xi \) increases as \( \psi \) decreases so that \( \eta \) remains unchanged with the fall in \( \beta \). This implies

\[
(d\xi / d\beta) < 0.
\]

In other words, the urban unemployment rate increases as the degree of imperfection in the informal capital market decreases. This result appears to be contradictory to the conventional wisdom. However, it is interesting as it implies that a reduction in \( \beta \) implies not only a imperfection in informal capital market but it also implies lesser informalization of the economy, through fall in \( \psi \). The informal sector plays the role of labour absorbing sector. So lesser informalization implies higher possibility of open (urban) unemployment and hence higher (urban) unemployment rate in the economy.

The results are summarized in the form of the following proposition

**Proposition 6.3:** A reduction in the capital market distortion of the economy, which is expressed in terms of degree of isolation of the informal capital market, causes the urban unemployment rate of the economy to rise.
Now, we would like to examine the impact of reduction of capital market distortion on the level of NI of the economy. It is expressed in terms of the following equation

\[ \Omega = LW_y + rK + (\beta - 1)rK_i \]  \hspace{1cm} (6.9.1)

Differentiating the equation (6.9.1) with respect to \( \beta \), gives us

\[ \frac{d\Omega}{d\beta} = L\frac{dW_y}{d\beta} + K(d\beta / d\beta) + K_i(\beta - 1)(d\beta / d\beta) + (\beta - 1)r(dK_i / d\beta) + rK_i \]  \hspace{1cm} (6.9.4)

Since the change in \( \beta \) do not effect \( W_y \) and \( r \), therefore we get

\[ \frac{dW_y}{d\beta} = 0 \] and \[ \frac{dr}{d\beta} = 0 \]

Thus, we get

\[ \frac{d\Omega}{d\beta} = (\beta - 1)r(dK_i / d\beta) + rK_i \]

\[ = (\beta - 1)r^2 K_i' + rK_i \]  \hspace{1cm} (6.9.5)

With the decrease in capital market distortion, \( \beta \), the rate of interest of the formal capital, \( r \) remains unchanged as from equation (6.1) we can determine \( r \), as \( \bar{W}_y \) and \( s_x \) are given and also given \( P_x \). It also implies from equation (6.2), for given \( P_y = 1 \), that the wage rate of the rural (agricultural) sector remains unchanged. As wage rate of the rural (agricultural) sector can be interpreted as the average wage rate of the economy\(^98\), we find that the total wage bill of the economy remains unaffected due to fall in \( \beta \). We know that \( K_i \) depends on the degree of distortion of the capital market, which in turn depends on the interest rate differential between the two capital markets. As the interest rate differential between the two capital markets decreases due to fall in \( \beta \), the degree of distortion of the informal capital market decreases which in turn reduces the amount of \( K_i \). Thus we get

\(^98\)From equation (6.6) we find that

\[ (W_x a_{lx} X + W_y a_{ly} Z) = W_y (a_{lx} X + a_{ly} Z + U) = W_y (L - a_{lx} Y) \]  \hspace{1cm} (using equation 6.8)). Thus, we can write

\[ W_x a_{lx} X + W_y a_{ly} Z + W_y a_{ly} Y = W_y L \] or \[ W_y = (1 / L)(W_x a_{lx} X + W_y a_{lx} Z + W_y a_{ly} Y). \]

In other words \( W_y \) is the average wage rate of the economy and \( W_y L \) is the total wage bill of the economy.
\((dK, / d\beta) > 0\)

Therefore, from equation (6.9.5)
\((d\omega / d\beta) > 0\) as \(rK\), is also a positive term.

We thus summarize our result in the form of the following proposition

**Proposition 6.4:** *A reduction in capital market distortion of the economy, expressed in terms of degree of isolation of the informal capital market, leads to a reduction in the level of NI of the economy.*

### 6.4 CONCLUDING REMARKS

In the conventional Harris-Todaro (1970) framework, the informal sector is considered as a labour absorbing sector, so the presence of informal sector in the urban area of the economy, rules out the possibility of existence of unemployment in the urban area. But, empirical evidences show the simultaneous existence of urban unemployment and informal sector in the urban area of the economy. Thus, here in this chapter we have considered the simultaneous existence of the two, which is quite different from the conventional Harris-Todaro (1970) framework.

In this framework, we have shown the impact of increase in employment subsidy to the urban formal manufacturing sector on the urban unemployment rate and the level of NI of the economy. Here, we find that an increase in employment subsidy decreases the urban unemployment rate though it increases the level of welfare of the economy. Hence, this policy prescription seems beneficial when the objective of the economy is to improve its welfare and also to curb down the unemployment rate of the economy.

We have also obtained some contradictory results while examining the impact of reduction of capital market distortion prevailing in the economy, on the rate of urban unemployment and also the level of NI of the economy. Reduction in capital market distortion increases the urban unemployment rate and also reduces the level of welfare of
the economy. These results are quite contradictory to the conventional wisdom as it is believed that reduction in any distortion leads to an improvement of the economy and that is why financial liberalization has been advised to the developing economies in their development strategies.
APPENDICES

APPENDIX 6

6.1 Derivation of equations (6.6.2) and (6.7.1)

Dividing equation (6.6) by $a_{Lz}X$, we get

$$[\bar{W}_x + W_z(a_{Lz}Z / a_{Lz}X)] / [1 + \{a_{Lz}Z / a_{Lz}X\} + \{U / a_{Lz}X\}] = W_y$$

Using the relation $\psi = \{a_{Lz}Z / a_{Lz}X\}$ and $\xi = \{U / a_{Lz}X\}$ we can rewrite the above equation as

$$\bar{W}_x + \psi W_z = W_y (1 + \xi + \psi) = W_y \eta \tag{6.6.1}$$

where $\eta = 1 + \xi + \psi$

Similarly, equation (6.7) can be rewritten by using the relation $\mu$ and $\lambda$ as

$$\bar{W}_x = \psi W_z \tag{6.7.1}$$

Using equation (6.7.1), we can rewrite equation (6.6.1) as

$$2\bar{W}_z = W_y \eta \tag{6.6.2}$$

6.2 The comparative static effects of urban employment subsidy

6.2.1 Impact of increase in employment subsidy to the urban formal manufacturing sector on the factor prices

Differentiating and using envelope condition in equation (6.1) we get

$$0 = -a_{Lz}ds_x + a_{Kx}dr \quad \text{(given } P_x \text{ and also given } \bar{W}_x)$$

dr \quad \text{therefore,}

$$\frac{dr}{ds_x} = \frac{a_{Lz}}{a_{Kx}}$$

Again, differentiating and using envelope condition, equation (6.2) can be written as

$$0 = a_{Lz}dW_y + a_{Ky}dr$$

or,

$$0 = a_{Lz} (dW_y / ds_x) + a_{Ky} (dr / ds_x)$$

Putting the value of $(dr / ds_x)$ in the above equation we get

$$(dW_y / ds_x) = -(a_{Ky} / a_{Lz})(a_{Lz} / a_{Kx}) \tag{6.2.1}$$
Similarly differentiating equation (6.4) we get 
\[(dR / ds_x) = \beta(dr / ds_z) = \beta(a_{ls} / a_{Kx})\]

Again, differentiating and using envelope condition, equation (6.3) can be written as

\[0 = a_{ls}dW_z + a_{Kz}dR\]

or, \[0 = a_{ls}(dW_z / ds_x) + a_{Kz}(dR / ds_x)\]

Putting the value of \((dR / ds_x)\) in the above equation we get

\[(dW_z / ds_x) = -\beta(a_{Kz} / a_{ls})(a_{ls} / a_{Kx})\]  \hspace{1cm} (6.3.1)

6.2.2 Impact of increase in urban formal manufacturing employment subsidy on the urban unemployment rate, \(\xi\)

Differentiating equation (6.6.2) with respect to \(s_x\) we get

\[0 = \eta(dW_y / ds_z) + W_y(\eta / ds_x)\]

Incorporating the value of \((dW_y / ds_x)\) (as obtained in equation (6.2.1)) in the above equation, we get

\[(d\eta / ds_x) = (a_{Kx}a_{ls} / a_{ls}a_{Kx})(\eta / W_y)\]  \hspace{1cm} (6.6.3)

Again, differentiating equation (6.7.1) with respect to \(s_x\) we get

\[0 = \psi(dW_z / ds_x) + W_z(d\psi / ds_x)\]

Incorporating the value of \((dW_z / ds_x)\) (as obtained in equation (6.3.1)) in the above equation, we get

\[(d\psi / ds_x) = \{\psi\beta / W_z\}\{(a_{Kz} / a_{ls})(a_{ls} / a_{Kx})\}\]  \hspace{1cm} (6.7.2)

We know that
\[\eta = 1 + \psi + \xi\]

Differentiating the above equation with respect to \(s_x\), we get

\[(d\eta / ds_x) = (d\xi / ds_x) + (d\psi / ds_x)\]

\[\Rightarrow (d\xi / ds_x) = (d\eta / ds_x) - (d\psi / ds_x)\]  \hspace{1cm} (6.10)

Incorporating the values of \((d\eta / ds_x)\) (given by equation (6.6.3)) and \((d\psi / ds_x)\) (given by equation (6.7.2)) in the equation (6.10) we get

\[(d\xi / ds_x) = (a_{Kx}a_{ls} / a_{ls}a_{Kx})(\eta / W_y) - \{\psi\beta / W_z\}\{(a_{Kz} / a_{ls})(a_{ls} / a_{Kx})\}\]
Putting the value of $17(17 = 2W_x W_y)$ and $\psi(\psi = W_x / W_z)$ in the above equation we get

$$(a_{K_y} / a_{L_y})[(\eta / W_y) - (a_{K_z} / a_{L_z})(\psi \beta / W_z)]$$

$$(a_{K_y} / a_{L_y})[(\eta / W_y) - (a_{K_z} / a_{L_z})(\psi \beta / W_z)] - (\psi a_{K_y} / W_z a_{L_y})((a_{K_z} / a_{L_z}) - (a_{K_y} / a_{L_y}))$$

Thus, dividing equation (6.7.1) by equation (6.6.2), we get

$$(2a_{K_y} / a_{L_y})[[2W_x / W_y^2] - (W_x / W_z^2) \beta] - (\psi a_{K_y} / W_z a_{L_y})((a_{K_z} / a_{L_z}) - (a_{K_y} / a_{L_y}))$$

In this chapter we assume that

$$(a_{K_z} / a_{L_z}) > (a_{K_y} / a_{L_y})$$

Thus,

$$(a_{K_y} / a_{L_y})[(\eta / W_y) - (a_{K_z} / a_{L_z})(\psi \beta / W_z)] < 0 \text{ if } \beta > 2(W_z^2 / W_y^2)$$

Dividing equation (6.7.1) by equation (6.6.2), we get

$$(W_z / 2W_z) = (\psi W_z / \eta W_y)$$

Thus, dividing the above equation we get

$$(\eta^2 / \psi^2) = (4W_z^2 / W_y^2)$$

or, $$(\eta^2 / 2\psi^2) = (2W_z^2 / W_y^2)$$

Thus, $$(d\xi / ds_x) < 0 \text{ if } \beta > (\eta^2 / 2\psi^2)$$
6.3 Impact of decrease in capital market distortion on the urban unemployment rate

With the decrease in $\beta$, $W_y$ remains unchanged. So from equation (6.6.2) it can be concluded that $\eta$ does not change with the reduction in $\beta$ i.e. $(d\eta / d\beta) = 0$, but from equation (6.7.1) it can be concluded that $\psi$ decreases with the fall in $\beta$, as $W_z$ increases and $\bar{W}$ is constant.

Thus, in order to maintain equilibrium, $\xi$ increases as $\psi$ decreases with the fall in $\beta$, so that $\eta$ remains unchanged with the fall in $\beta$. This implies

$(d\xi / d\beta) < 0$