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Marjit, Sugata and Mandal, Biswajit
Centre for Studies in Social Sciences, Calcutta, India and
The Leverhulme Centre for Research on Globalisation and
Economic Policy University of Nottingham, UK ,
Visva-Bharati University, Santiniketan, India

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Sugata Marjit
Centre for Studies in Social Sciences, Calcutta, India
and
The Leverhulme Centre for Research on Globalisation and Economic Policy
University of Nottingham, UK
AND
Biswajit Mandal
Visva-Bharati University, Santiniketan
India

Corresponding author:
Biswajit Mandal
Department of Economics & Politics, Visva-Bharati University, Santiniketan
India, 731235
Telephone: (+91) 03463262751-56 Extn. 405
E-mail: biswajiteco@gmail.com / biswajit.mandal@visva-bharati.ac.in

Abstract

Informal economy involving unrecorded, unregistered, extra legal activities employs majority of the workforce in the developing world. Such extra legal existence of informal manufacturing and service sectors is facilitated through extortion by agents of political forces in power. Such extortion activities themselves constitute an informal segment. We develop a general equilibrium model to explore the possible consequences of a change in the degree of extortion, change in the quality of administration, tariff reform etc. Economic reform of various kinds has interesting effects on the size of the extortion sector. Various reformatory policies may actually lead to an expansion of the informal sector.

Key words: International Trade, Extortion, General Equilibrium.

JEL classification: F1, D73, D5

1. Introduction

Informal sector is an important ingredient of the contemporary world economy particularly in the developing regions as this segment occupies a formidable chunk of the unskilled labor force. Informal sector is extra-legal if not illegal as it generally does not conform to government regulations. These units do not abide by labor regulations of the government, and do not pay taxes. In fact a large part of it would have vanished if they had to confront government regulations. To suit our purpose we shall define the informal sector as the one which does not have to pay the minimum wage. Several papers have used this interpretation of the informal sector such as Agenor and Montiel (1997), Carruth and Oswald (1981), Marjit (2003), Marjit and Kar (2009, 2009a), Marjit, Kar and Beladi (2007), Kar and Marjit (2001), Beladi and Chao (1993), Beladi and Yabuuchi (2001), Chaudhuri (2003), Chaudhuri and Mukhopadhyay (2010) etc. The survival of the informal segment requires negotiation with administration as this part of the economy is illegal by structure. Sometimes this negotiation is done by politically supported intermediaries, the “extortionists”.

These extortionists take care of legal troubles and other hurdles for the informal producers. They keep the police at bay by paying bribes which in turn are extracted from the informal entrepreneurs, labor, capitalists etc. There is a substantial literature on extortion and mafia related activities such as Skaperdas (1992, 2001), Konard and Skaperdas (1998) etc. Our work is substantially different from that literature.

First, we consider extortion as a facilitating device for organizing production in the informal sector. It is not pure extortion involving all segments of the society.

Second, more significantly, we consider mobility of labor between extortion sector and informal production sector as well. Thus extortionists also have the option to work in the informal sector. Such mobility is then embedded in a general equilibrium structure where capital mobility also plays an important role.

The story of the paper runs as follows. Let us assume that there are three goods out of which two are produced in the formal sector and the rest is produced in the so-called informal sector. All goods are different and only formal goods are traded. Informal good is non-traded. One commodity in the formal set up uses skilled worker as specific factor and the other uses unskilled labor as the same, with capital moving between them. Here formal workers are organized but not the informal workers which mean that the formal sector has to pay minimum wage, but not the

informal sector. Informal unskilled workers have to face a competitive market. Therefore, unskilled wage in the formal and informal segments are not identical. Whoever does not find a job in the formal sector will get one in the informal sector and wage there can have a free fall. No one can afford to remain unemployed because they have to survive. Formal workers are likely to get higher administered wage than their informal counterpart because of the existence of trade unions.

In this context we need to mention that our work is related to the research area dealing with economics of corruption. Marcoullier and Young (1995) has developed a two sector model on graft and corruption demonstrating tacit political support for informal sector. But they do not model extortion in a general equilibrium framework. Similarly Marjit, Ghosh and Biswas (2007) brings in informal sector and corrupt bureaucrats but they do not constitute labor mobility between various informal segments and does not consider a general equilibrium framework.

The model we develop is in the tradition of more recent work in trade theory on extensions of the basic Heckscher-Ohlin-Samuelson (HOS) set up drawing from an early work of Gruen and Corden (1970) and from later contributions of Jones and Marjit (1992, 2008), Marjit and Beladi (1999), Beladi and Marjit (1992), Marjit, Kar and Beladi (2007a) etc.

It should be noted at the very outset that the extortionists in our model will be intermediaries lubricating the activities of the informal sector and have the option of engaging in informal production activities as well. Given this set up various reformatory policies may have counterintuitive outcomes with unintended expansion of the informal segment.

The basic results that we derive in this paper are as follows: higher degree of extortion causes a squeeze in informal productive activity but informal workers may gain; better quality of administration might bring about more informality in the economy; and under reasonable condition a tariff reduction may amplify the informal output whereas under the same condition informal workers would be worse off in money terms but not in real terms.

Section 2 discusses the basic model and the equilibrium. Section 3 deals with the impact of a change in the degree of extortion, change in the monitoring or auditing probability and tariff cut on outputs, informal wage, informal good's price and the size of extortion sector. The last section concludes the paper. The relevant mathematical derivations are provided in the Appendix.

2. The Basic Model and Solutions

There are three goods *X, Y* and *Z* produced in the neo-classical framework using four factors such as skilled labor *(S),* unskilled labor (L) and two types of capital (K and T). Capital is perfectly mobile across X and Y but T is specific to Z. S is specific to X and gets Ws as wage. L is mobile between Y and Z. Laborers are unionized in Y. They get $\bar{W}$ as their wage. K gets identical return r across X and Y while T gets R in Z. Who are not fortunate enough to work in Y, have to go out of the formal segment. Because of their livelihood they need to find out alternative workplace. This is provided by the production of Z. However, Z can not be produced by these two factors only. It requires the service of another factor that actually negotiates between producers and administrators since Z is not permitted to be produced legally. But if Z is never produced some labor must remain unemployed and they will not survive. Therefore Z is a necessary for a perfectly competitive full employment framework. Nonetheless, producers of Z need to comply with some institutional and political menace as it is an extra-legal, if not illegal, activity. To combat such menace producers obtain service of intermediaries who actually watch out for these institutional perils. Intermediaries are unproductive in that no additional output is produced by them. Their marginal productivities in terms of the volume of goods are zero though they get positive return for their work. However, without such an arrangement production of Z could not have taken place. We call this sector Z as an informal sector.

Intermediation is done only by labor. People engaged in intermediation activities get pecuniary benefit without producing goods. Let L_N be the people and N be the sector representing intermediations. Important to note that the return to intermediators, W_N must be greater than competitive informal wage, W. The difference between P_Z and sum of the returns to productive factors in Z goes to extortionists as a payment for intermediation activities. N people also need to take care of the police personnel who are supposed to go for evicting these informal production units as these are illegal from government's perspective. Let the probability of being caught in act is q and under this condition intermediators need to pay b fraction of W_N as bribe. After paying out for the police the return to L_N must be equal to W since labor is mobile between Z and N. Here it is worth mentioning that L_N people always receive W_N as return it does not matter whether administration can identify the informal units or not. Thus here both, a part of administration and N people are involved in corrupt practices. N people pay bribe to police not only for the informal production units but also for their own existence. If there are no informal

activities the return to N people goes down to zero. And on the other hand whether Z survives or not that crucially depends on how many people are involved in extortion activities or how much is paid for these extortionists. Say α is the fraction of output that is lost due to these political/institutional complications related intermediations. Thus we can coin this sort of intermediations as directly unproductive profit-seeking activities (Bhagwati, 1982). This is the concept of corruption that we are going to use in our model. In an earlier but a different paper Mandal and Marjit (2010) used the similar notion of corruption to explain the wage distribution between skilled and unskilled.

We have a small open economy with competitive markets for production as well as for extortions related intermediation or corruption. Competitive corruption market implies that the lost output due to intermediation is fully exhausted in paying out extortionists out of which a part (may be fixed or variable) goes to police. Moreover, we have the standard neo-classical assumptions of constant returns to scale and diminishing return to factors. The following set of equations describes the model and the interpretations of symbols are usual and well used in trade models (Jones, 1965, 1971). Let the prices of X and Y be normalized to unity. Y is the importable commodity and subject to a tariff t.

The competitive price conditions are given by:

$$W_S\, a_{SX} + r\, a_{KX} = 1 \quad (1)$$

$$\bar{W} a_{LY} + r\, a_{KY} = (1+t) \quad (2)$$

$$W a_{LZ} + R\, a_{TZ} = P_Z(1-\alpha) \quad (3)$$

Note that, $\alpha \in [0,1]$; a low α will mean lower degree of extortion and conversely.

Note that, the production function for Z is represented by

$$Z = Z(T, L_Z) \quad (4)$$

The expected wage for intermediators satisfies the following equation

$$(1-q)W_N + q(1-b)W_N = W \quad (5)$$

Or, $(1 - b\, q)W_N = W$

Note that, this equality is established because of labor mobility between informal production and extortion segments. This has to hold true. If the LHS (RHS) of equation-5 becomes greater than RHS (LHS) everyone would try to be involved in extortion (production) related activities and would result in non-feasibility of both the informal segments. The reason is the complementarity between extortionists and productive workers in the informal sector. And

equation-5 further makes informal workers, essentially, indifferent between extortion and production.

Therefore, $W_N = \frac{W}{(1-b\ q)}$ Where $0 < b < 1$ and $0 \leq q \leq 1$ (6)

Equation (6) always ensures that $W_N > W$ except the extreme case where $q = 0$. Note that $\bar{W} > W_N > W$.

The value of output lost in Z must be identical to the payment made for extortionists. Thus,

$\alpha . P_Z . Z = W_N L_N$ (7)

Plugging (6) into (7) one gets,

$\frac{\alpha . P_Z . Z(T, L_Z)}{L_N} = \frac{W}{(1-b\ q)}$ (8)

Full employment of all the factors guarantee the following equations,

$a_{SX} . X = S$ (9)

$a_{KX} . X + a_{KY} . Y = K$ (10)

$a_{TZ} . Z = T$ (11)

$a_{LY} . Y + a_{LZ} . Z = L - L_N$ (12)

Let us further assume that the demand for Z follows standard Cobb-Douglas preference where β fraction of consumers' income is spent on the informal good. Therefore demand supply equilibrium in the informal sector implies,

$\beta\{X + (1 + t)\ Y\} = (1 - \beta) P_Z . Z$ (13)

This completes the structure of the model. Now let us solve for the unknown variables. Note that $t, \alpha, \bar{W}, K, T, L$ and S are exogenously given and we need to solve for $W_S, W, r, R, P_Z, X, Y, Z$ and L_N to solve for from equation (1) - (3) and (8) – (13). We have nine equations and nine unknown variables. Thus the system is solvable. Given the tariff rate, t we solve for r from (2) as $\bar{W}$ is exogenously determined by workers' union. Equation (1) would determine Ws for already determined r. Thus $a_{SX}, a_{KX,} a_{LY}$ and a_{KY} are determined through CRS assumption. Hence (9) give us the value of X and given this value of X we can solve for Y from (10) as endowment of S and K are constants. However, $W, R, P_Z,\ Z$ and L_N are still to be determined.

Substituting from (9) equation (12) can be rewritten as

$$L_Z + L_N = L - \frac{a_{LY}}{a_{KY}}\left(K - \frac{a_{KX}}{a_{SX}}S\right) \qquad (14)$$

Given the commodity prices we already know the values of $a_{LY}, a_{KY}, a_{KX}, a_{SX}$ and L, K and S are given. Thus RHS of (14) is constant for these given values. This implies a negative relationship between L_Z and L_N for equation (14) to be satisfied.

Again equation (8) can also be represented as follows,

$$\frac{\alpha.Z(T,L_Z)}{L_N} = \frac{W}{P_Z}.\frac{1}{(1-b\,q)} \qquad (15)$$

Here $\frac{W}{P_Z}$ is the real wage of informal workers; bq and α are given. Following an increase in L_Z the RHS of (15) would fall as the marginal productivity of Lz falls. And simultaneously the numerator of the LHS must go up as the supply of variable factor increases. Thus to bring back the equality in (15) L_N has to increase. Therefore, L_N and L_Z are positively related following equation (15).

Hence we can represent equation (14) and (15) in L_N and L_Z plane to determine the equilibrium values of L_N and L_Z in our set up. Let us portray it in figure-1.

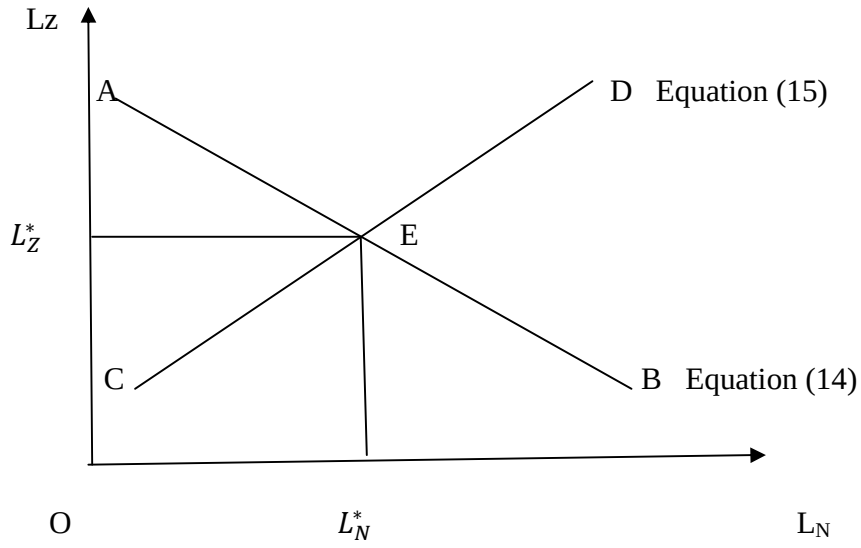

Figure –1
Determination of equilibrium L_N and L_Z.

Now given the equilibrium values of L_Z^* and L_N^* we can easily calculate the value of Z from (15) as all the remaining variables are given. In fact, the equilibrium value of L_N can also be calculated for any given value of Lz .

Once Z is determined, Pz is easily solved for from the Cobb-Douglas preference function symbolized in (13). From equation (13) it is apparent that given the values of X and Y, the demand for Z that comes from the formal sector remains constant. Hence if Pz goes up Z has to fall in the RHS of (13), signifying the standard negative relationship for demand. On the other hand an increase in Pz must be followed by a rise in the return to informal workers and specific factor. The return to specific factor would increase more compared to informal labor (for a detailed mathematical derivation see Appendix A). Therefore, producer will try to economize on usage of dearer factor, a_{TZ} falls implying a rise in Z. This explains the positive supply side relationship between Pz and Z. This is precisely how, from the intersection of demand and supply, the equilibrium Pz is determined in this model. Therefore, given the equilibrium value of Pz, W is determined from (8). And eventually using Pz and W we can calculate the value of R. Thus the entire system is solved. However, it is worth mentioning that once W is determined we can easily get the wage rate for extortionist, W_N, from equation (6).

3. Comparative Static Results

3.1 An increase in α

Let us assume that owing to some reasons the degree of extortion goes up in the informal sector. It is easily understandable that keeping all other things remaining same an increase in α is in fact tantamount to a fall in *Pz*.Given Pz differentiating equation (3) we get,

$$\widehat{W}\ \theta_{LZ} + \hat{R}\ \theta_{TZ}\ = (-)\alpha.\hat{\alpha} \qquad (16)$$

(where θs bear the usual meaning)

Note that, X and Y would remain unchanged as $\widehat{\bar{W}} = \widehat{W_S} = \hat{r} = \hat{t} = 0$.

The elasticity of substitution (represented by σ) for Z gives,

$$\hat{Z} = (-)\sigma_Z.\theta_{LZ}\left(\widehat{W} - \hat{R}\right) \qquad (17)$$

The full employment condition of unskilled labor provides (assuming no change in L and Y)

$$\hat{Z} = (-)\widehat{L_N}\ \ \frac{\lambda_{LN}}{\lambda_{LZ}} \qquad (18)$$

Substituting $\widehat{L_N}$ from (8) and setting no change in Pz and (1-bq)

$$\hat{Z} = (-)\ \frac{\lambda_{LN}}{\lambda_{LZ}}\left(\hat{\alpha} + \hat{Z} - \widehat{W}\right) \tag{19}$$

Comparing (17) and (19)

$$\left(\widehat{W} - \hat{R}\right) = \frac{\lambda_{LN}}{\lambda_{LZ}+\lambda_{LN}} \frac{1}{\sigma_Z.\theta_{LZ}}\left(\hat{\alpha} - \widehat{W}\right) \tag{20}$$

Multiplying both sides of (20) by θ_{TZ} and adding it with (16) yields,

$$\widehat{W}\left(1 + \frac{\Delta}{\sigma_Z}.\frac{\theta_{TZ}}{\theta_{LZ}}\right) = \hat{\alpha}\left\{\frac{\Delta}{\sigma_Z}.\frac{\theta_{TZ}}{\theta_{LZ}} - \alpha\right\} \tag{21}$$

Here, $\Delta = \frac{\lambda_{LN}}{\lambda_{LZ}+\lambda_{LN}} < 1$ and $0 < \alpha < 1$.

$$\widehat{W} = \hat{\alpha}\frac{\left(\Delta.\,\theta_{TZ} - \alpha.\ \sigma_Z.\theta_{LZ}\right)}{\left(\Delta.\,\theta_{TZ} + \ \sigma_Z.\theta_{LZ}\right)} \tag{22}$$

Hence $\widehat{W}$ is ambiguous.

$\widehat{W} > 0$

if $\Delta.\ \theta_{TZ} > \alpha.\ \sigma_Z.\theta_{LZ}$

or, $\frac{\Delta}{\alpha.\ \sigma_Z} > \frac{\theta_{LZ}}{\theta_{TZ}}$. (23)

It is apparent from equation (16) that $\hat{R}$ has to be negative when $\widehat{W} > 0$. Therefore under condition (23) $\left(\widehat{W} - \hat{R}\right) > 0$ and the output of Z must fall following equation (17).

Manipulating (20) and using (16) one can easily derive the value of $\hat{R}$.

$$\hat{R} = (-)\alpha.\hat{\alpha} - \frac{\Delta}{\sigma_Z}.\hat{\alpha} + \frac{\Delta}{\sigma_Z}.\hat{\alpha}\ \frac{\left(\Delta.\,\theta_{TZ} - \alpha.\ \sigma_Z.\theta_{LZ}\right)}{\left(\Delta.\,\theta_{TZ} + \ \sigma_Z.\theta_{LZ}\right)} \tag{24}$$

We have already mentioned that $\hat{R}$ must be negative. This can only happen if the following condition holds good. And it has to hold true from (16).

$$\left|\alpha + \frac{\Delta}{\sigma_Z}\right| > \left|\frac{\Delta}{\sigma_Z}.\frac{\left(\Delta.\,\theta_{TZ} - \alpha.\ \sigma_Z.\theta_{LZ}\right)}{\left(\Delta.\,\theta_{TZ} + \ \sigma_Z.\theta_{LZ}\right)}\right| \tag{25}$$

However, if the reverse of condition (23) is satisfied there would be a reduction in the informal wage due to an increase in the degree of extortion. Thus,

$\widehat{W} < 0$

if $\Delta.\ \theta_{TZ} < \alpha.\ \sigma_Z.\theta_{LZ}$

or, $\frac{\Delta}{\alpha.\ \sigma_Z} < \frac{\theta_{LZ}}{\theta_{TZ}}$. (26)

Interestingly, under condition (26) $\hat{R}$ becomes unambiguously negative. At the same time a closer investigation of (22) reveals that $|\widehat{W}| < |\hat{\alpha}|$. This implies $|\hat{R}| > |\widehat{W}|$. Note that both are negative. This argument ensures $(\widehat{W} - \hat{R}) > 0$. This makes $\hat{Z} < 0$. Therefore, it does not matter what happens to $\widehat{W}$ *and* $\hat{R}$, Z must contract. Contraction of Z is made possible through a reduction in Lz and a simultaneous increase in L_N. This can be shown diagrammatically as follows.

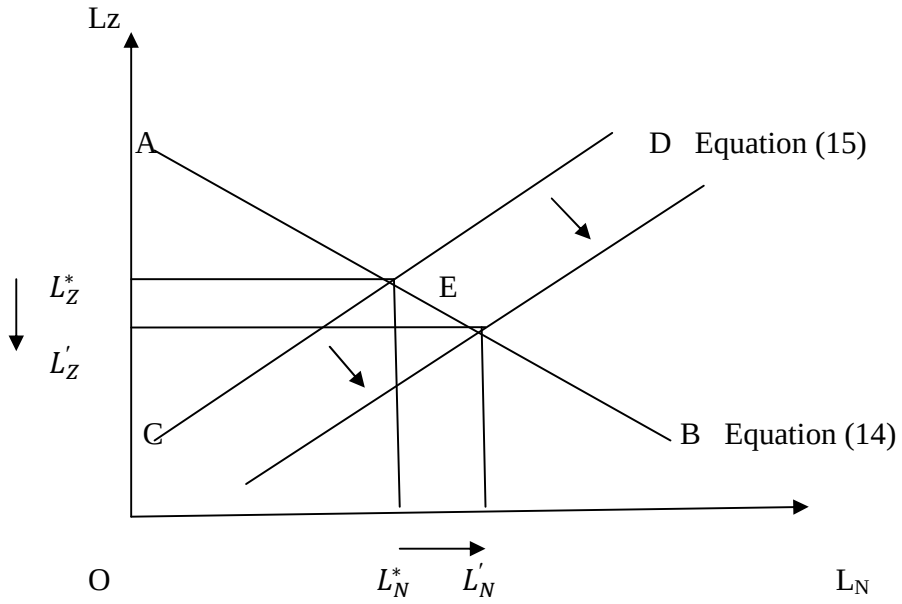

Figure – 2
Determination of equilibrium L_N and L_Z due to an increase in α

However, we need to know the effect on Pz to get the upshot on real wage. We already know that output of Z contracts consequent upon an increase in the degree of extortion. From the LHS of (13) it remains unchanged as there is no expansion or contraction in X and/or Y. But in the RHS we have negative effect through a fall in Z. Hence Pz must rise at equilibrium. Nevertheless it is not less interesting to see what happens to the real wage. As T is fixed and Lz has gone down, marginal productivity of labor should increase in Z. Consequently the real wage should also increase. This is possible iff W rises since Pz has already increased. Hence we can rule out the leeway of a negative $\widehat{W}$ (and precisely the condition (26)). The only possibility is an increase

in W along with a fall R and Z in tandem. Therefore W_N goes up. This indicates an expansion of extortion sector which is denoted by $W_N.L_N$ ($=\alpha. P_Z. Z$).

Thus the following proposition would summarize the outcome.

Proposition I: *An increase in the degree of extortion would be immediately followed by a decrease in the size of the informal production sector. However, the size of the extortion sector must expand.*

Corollary I.1: *If the degree of extortion increases, both the informal workers and extortionist get relatively higher return. The exact condition for this to happen is* $\frac{\Delta}{\alpha.\ \sigma_Z} > \frac{\theta_{LZ}}{\theta_{TZ}}$. *However, the return to T falls, unambiguously*

3.2 An increase in bq

An improvement in the quality of administration in a kleptocratic set up is straightway reflected by an increase in monitoring /auditing probability of identifying the people who defy laws. Here the law breakers are informal units. Therefore a better administration would be followed by an increase in bq.

Differentiating the price equation of Z,

$$\widehat{W}\ \theta_{LZ} + \hat{R}\ \theta_{TZ}\ = 0 \qquad (27)$$

Just like the previous section output of X and Y would not change as $\widehat{\bar{W}} = \widehat{W_S} = \hat{r} = \hat{t} = 0$.

From the full employment condition of labor and using (8)

$$\hat{Z} = (-)\ \frac{\lambda_{LN}}{\lambda_{LZ}}\left(\widehat{(1-bq)} + \hat{Z}\ - \widehat{W}\right) \qquad (28)$$

Comparing (17) and (28) we have,

$$\widehat{W} = \frac{\Delta.\widehat{(1-bq)}}{(\Delta.\ \theta_{TZ} + \ \sigma_Z.\theta_{LZ})} \qquad (29)$$

Therefore, $\widehat{W}$ is unambiguously negative as $\widehat{(1-bq)} < 0$. If that is the case $\hat{R} > 0$. This is obvious from equation (27). This judgment guarantees $\left(\widehat{W} - \hat{R}\right) < 0$ which in turn make sure that $\hat{Z} > 0$ (from (17)). Basically this takes place through relocating adjustments of Lz and L_N. Here Lz increases and L_N falls.

Nonetheless, the clear-cut expression for $\hat{R}$ is

$$\hat{R} = (-)\widehat{(1-bq)}\,\frac{\Delta}{\sigma_Z}\left\{1 - \frac{\Delta}{(\Delta.\ \theta_{TZ} + \ \sigma_Z.\theta_{LZ})}\right\} \qquad (30)$$

We have already argued that $\hat{R} > 0$. This implies an automatic and obvious satisfaction of the inequality, $\frac{\Delta}{(\Delta.\theta_{TZ} + \sigma_Z.\theta_{LZ})} < 1$. The effect on Pz is straight and simple. It must decrease as supply goes up without changing the demand implying an ambiguity in the real wage of informal productive workers. However, an increase in Lz, given T ensures the fall in real wage of informal laborers. But what happens to the money or real wage of extortionists that is not yet clear. From equation-(6) we get,

$$\widehat{W_N} = \widehat{W} - \widehat{(1-bq)} \qquad (31)$$

In the RHS, W has already fallen and $\widehat{(1-bq)}$ is also negative. Thus W_N would decrease if W falls at a rate faster than (1-bq). Accordingly, extortionists are relatively less worse-off than informal workers, if they lose at all. Symbolically,

$$\widehat{W_N} \lesseqgtr 0 \text{ iff } \left|\widehat{W}\right| \gtreqless \left|\widehat{(1-bq)}\right| \qquad (32)$$

Therefore, the eventual consequence on the size of extortion sector is also ambiguous.

Thus we propose that,

Proposition II: S*tringent administration or an increase in monitoring probability would end up with an expansion of so-called illegal informal productive counterpart of the economy.*

Corollary II.1: *Even if the informal production activities increase, the informal workers lose unambiguously consequent upon the qualitative improvement of administration.*

3.3 A reduction in t

To start with assume that the government has initiated the liberalization strategy and accordingly opted for a tariff cut in the importable sector. Setting $\hat{\bar{W}} = 0$, we derive

$$\hat{r} = \hat{t}.\frac{t}{\theta_{KY}} < 0 \quad ; \text{ (as } \hat{t} < 0) \qquad (33)$$

$$\widehat{W_S} = -\frac{\theta_{KX}}{\theta_{SX}}.\frac{t}{\theta_{KY}}.\hat{t} > 0 \quad ; \text{ (as } \hat{t} < 0) \qquad (34)$$

And setting $\hat{\alpha} = \widehat{P_Z} = 0$ equation (16) would be modified as follows

$$\widehat{W}\,\theta_{LZ} + \hat{R}\,\theta_{TZ} = 0 \qquad (35)$$

Applying the elasticity of substitution in X and Y sector we obtain,

$$\hat{X} = (-)\sigma_X.\frac{\theta_{KX}}{\theta_{SX}}.\frac{t}{\theta_{KY}}.\hat{t} \; > 0 \text{ ; as } \hat{t} < 0. \qquad (36)$$

$$\hat{Y} = \sigma_X.\frac{\theta_{KX}}{\theta_{SX}}.\frac{\lambda_{KX}}{\lambda_{KY}}.\frac{t}{\theta_{KY}}.\hat{t} \; < 0 \text{ ; as } \hat{t} < 0. \qquad (37)$$

These results are quite obvious as both *X* and *Y* share same mobile capital, *K*. As *Y* shrinks some unskilled labor would be released. They would immediately rush to the informal fragment. Therefore, informal activity must expand. Note that informal activity consists of both production and extortion activities. This implies an increase in (L_N+L_Z). Thus whether output of *Z* would spread out that depends on as to where these relinquished labors get employed: in production (Lz) or in extortion related intermediation (L_N) or in both. Thus the interesting question is what happens to L_N and *Lz* separately.

From equation (14) the RHS must increase as labor employed in *Y* dwindles and simultaneously the LHS has to go up. This is portrayed in figure-3. It is evident from the diagram that *Lz* will increase coupled with an increase in L_N as well. Hence output of *Z* should rise as *T* remains fixed at an exogenously given level.

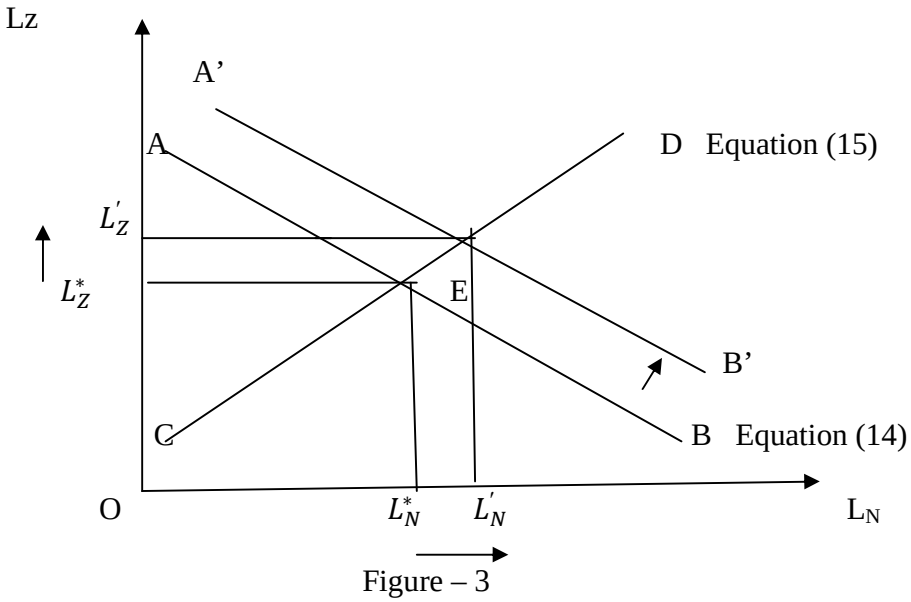

Figure – 3
Determination of equilibrium L_N and L_Z due to a fall in t

Nevertheless there are some other real possibilities regarding L_N and L_Z. Keep *Lz* fixed by assumption. This will ensure an increase in L_N. In figure-3 CD has to shift right along with an upward shift of AB. Thus the point is, as a consequence of such assumption how much likely that *Lz* will remain unchanged. *Lz* would remain unchanged if "in equilibrium" *Z* remains unaltered as *T* is exogenously fixed. From the Cobb-Douglas preference it is apparent that (a) as *Y* falls demand for *Z* should fall; (b) as *X* increases demand for *Z* should rise and (c) demand for

Z also rises because of an increase in L_N (note that to start with *Lz* is kept frozen). "In equilibrium" if (a) is offset by the (b) and (c), informal production does not change and hence an unchanged *Lz*. This insures an unconditional expansion of L_N or extortion activity as informal labor has already risen. This would be obvious from equation (44) with an equality sign. However, if (a) is strong enough *Lz* must fall and $\frac{L_N}{L_Z}$ must rise. On the other hand if positive demand effect is sufficiently strong both L_N and L_Z are likely to expand. This is the situation that have been shown in figure-3. Therefore it is more likely that L_N or extortion activity may increase due to a tariff cut.

Now let us go back to the analysis where we have focused on a simultaneous increase in *Lz* and L_N. Manipulating the unskilled labor constraint and plugging (37) into it and setting $\hat{L} = 0$ one obtains

$$\hat{Z} = (-)\left\{\widehat{L_N}.\frac{\lambda_{LN}}{\lambda_{LZ}} + \delta_Y.\hat{t}\right\} \tag{38}$$

$$\text{Where,}\delta_Y = \frac{\lambda_{LY}}{\lambda_{LZ}}.\sigma_X.\frac{\theta_{KX}}{\theta_{SX}}.\frac{\lambda_{KX}}{\lambda_{KY}}.\frac{t}{\theta_{KY}}.\hat{t}$$

It has already been discussed that both $\widehat{L_N}$ and $\hat{Z}$ would be positive due to a tariff slash.[1] Therefore to make $\hat{Z} > 0$ the following condition needs to be satisfied,

$$\left\{\widehat{L_N}.\frac{\lambda_{LN}}{\lambda_{LZ}} + \delta_Y.\hat{t}\right\} < 0$$

$$|\delta_Y.\hat{t}| > \left|\widehat{L_N}.\frac{\lambda_{LN}}{\lambda_{LZ}}\right| \tag{39}$$

Comparing (38) and (17)

$$\sigma_Z.\theta_{LZ}\left(\widehat{W} - \hat{R}\right) = \left\{\widehat{L_N}.\frac{\lambda_{LN}}{\lambda_{LZ}} + \delta_Y.\hat{t}\right\}$$

$$\text{Or, } \left(\widehat{W} - \hat{R}\right) = \left\{\widehat{L_N}.\frac{\lambda_{LN}}{\lambda_{LZ}} + \delta_Y.\hat{t}\right\}\frac{1}{\sigma_Z.\theta_{LZ}} \tag{40}$$

Multiplying both sides of (40) by θ_{TZ} and adding it with (35) yields,

$$\widehat{W} = \left\{\widehat{L_N}.\frac{\lambda_{LN}}{\lambda_{LZ}} + \delta_Y.\hat{t}\right\}\frac{\theta_{TZ}}{\sigma_Z.\theta_{LZ}} \tag{41}$$

Hence informal wage, W, would fall after liberalization if and only if Z expands, i.e. when $\left\{\widehat{L_N}.\frac{\lambda_{LN}}{\lambda_{LZ}} + \delta_Y.\hat{t}\right\} < 0$. And subsequently the wage to extortionists will also decrease. The

absolute number of extortionist, L_N, must increase. However, what happens to the size of the extortion sector (=$W_N L_N$) that is unclear as though L_N rises unambiguously the effect on W_N is not unconditional.

Economic argument behind this outcome is very easy to follow. Due to liberalization as the output of Y shrinks the supply of unskilled labor increases in the informal sector. This is likely to depress W as the supply of complementary factor, T is fixed. However, Z must go up.

Still, what happens to the informal price consequent upon a tariff cut that is not very undemanding as liberalization conventionally raises the formal income[2]. This increased income induces higher demand for informal good whose supply has already been raised. In what follows the eventual impact on Pz relies on the relative strength of these two effects.

Differentiating and manipulating equation (13) we get,

$$\widehat{P_Z} = (-)S_X\sigma_X\frac{\theta_{KX}}{\theta_{SX}}\frac{t}{\theta_{KY}}\hat{t} + S_Y\sigma_X\frac{\theta_{KX}}{\theta_{SX}}\frac{\lambda_{KX}}{\lambda_{KY}}\frac{t}{\theta_{KY}}(1+t)\hat{t} + \left\{\widehat{L_N}\frac{\lambda_{LN}}{\lambda_{LZ}} + \delta_Y\hat{t}\right\} + t\hat{t} \qquad (42)$$

Where, $S_X = \frac{\beta.X}{(1-\beta).P_Z.Z}$ and $S_Y = \frac{\beta.Y}{(1-\beta).P_Z.Z}$

Equation (42) confirms that $\widehat{P_Z} < 0$ iff $\left\{\frac{S_Y}{S_X}\frac{\lambda_{KX}}{\lambda_{KY}}(1+t)\right\} > 1.$ (43)

Therefore if the share of expenditure on Z coming from Y is not sufficiently less the above inequality is likely to hold true. And hence informal price would fall due to a tariff cut.

In fact Pz may even fall under the following condition,

$$\left|S_Y\sigma_X\frac{\theta_{KX}}{\theta_{SX}}\frac{\lambda_{KX}}{\lambda_{KY}}\frac{t}{\theta_{KY}}(1+t) + \left\{\widehat{L_N}\frac{\lambda_{LN}}{\lambda_{LZ}} + \delta_Y\right\} + t\right| > \left|S_X\sigma_X\frac{\theta_{KX}}{\theta_{SX}}\frac{t}{\theta_{KY}}\right| \qquad (44)$$

Plugging (41) into (42) we have,

$$\widehat{P_Z} = (-)S_X\sigma_X\frac{\theta_{KX}}{\theta_{SX}}\frac{t}{\theta_{KY}}\hat{t} + S_Y\sigma_X\frac{\theta_{KX}}{\theta_{SX}}\frac{\lambda_{KX}}{\lambda_{KY}}\frac{t}{\theta_{KY}}(1+t)\hat{t} + \widehat{W}\frac{\sigma_Z.\theta_{LZ}}{\theta_{TZ}} + t\hat{t} \qquad (45)$$

Thus if Z expands and equation (43) is satisfied Pz is likely to fall more than that of W entailing an increase in real wage. If the reverse of (44) is true Pz will increase. But that is unlikely since the skilled sector is not expected to spend a sufficiently large share on the informal good (high S_Y relative to Sx).

Therefore the following proposition is immediate.

Proposition III: *Liberalization may not necessarily increase informal production. Under some reasonable condition informal production will get the boost.*

Proof: For detailed mathematical calculations refer to appendix B.

Corollary III.1: *The informal workers would be worse off in money wage under the same condition for which informal output increases. But the real wage may well go up.*

4. Conclusion

In this paper our endeavor is to propose an apt extension of HOS framework where both formal and informal sectors work in tandem. Formal goods are produced in the fair segment of the economy while informal sector is affected by extortion. But informal good is never unwarranted. Under these circumstances an increase in the degree of extortion definitely contracts the informal productive segment while the size of the extortion sector must expand. On the other hand if the administrative people ask for larger pie of the unsolicited cake, the informal activity increases. Nevertheless the effect of liberalization is ambiguous. However, informal workers would be better off in terms of real wage under liberalization if informal sector inflates.

Footnote

1. One can easily follow the steps for $\widehat{L_N}$ as in previous sections. This is provided in Appendix C. We retained $\widehat{L_N}$ in order to avoid nagging cumbersome calculations since the intuition behind $\widehat{L_N}$ is crystal clear.
2. One special case under this situation could be the unchanged income from X and Y. It is very much possible as X goes up and Y falls.

APPENDIX A

Given all other variables except Pz, differentiating equation (3) and using the standard notations for general equilibrium trade model we get,

$$\widehat{W}\ \theta_{LZ} + \hat{R}\ \theta_{TZ}\ = \widehat{P_Z}(1-\alpha) \tag{A.1}$$

Note that, nothing would happen to X and Y as $\widehat{\bar{W}} = \widehat{W_S} = \hat{r} = \hat{t} = 0$.

Mathematically, using the elasticity of substitution for Z one gets,

$$\hat{Z} = (-)\sigma_Z.\theta_{LZ}\left(\widehat{W} - \hat{R}\right) \tag{A.2}$$

Again from the full employment condition of unskilled labor and assuming no change in L and Y

$$\hat{Z} = (-)\widehat{L_N}\ \ \frac{\lambda_{LN}}{\lambda_{LZ}} \tag{A.3}$$

Substituting $\widehat{L_N}$ from (8)

$$\hat{Z} = (-)\ \frac{\lambda_{LN}}{\lambda_{LZ}}\left(\widehat{P_Z} + \hat{Z} - \widehat{W}\right) \tag{A.4}$$

Comparing (A.2) and (A.4)

$$\left(\widehat{W} - \hat{R}\right) = \frac{\lambda_{LN}}{\lambda_{LZ}+\lambda_{LN}}\frac{1}{\sigma_Z.\theta_{LZ}}\left(\widehat{P_Z} - \widehat{W}\right) \tag{A.5}$$

Multiplying both sides of (A.5) by θ_{TZ} and adding it with (A.1) yields,

$$\widehat{W}\left(1 + \frac{\Delta}{\sigma_Z}.\frac{\theta_{TZ}}{\theta_{LZ}}\right) = \widehat{P_Z}\left\{(1-\alpha) + \frac{\Delta}{\sigma_Z}.\frac{\theta_{TZ}}{\theta_{LZ}}\right\} \tag{A.6}$$

Here, $\Delta = \frac{\lambda_{LN}}{\lambda_{LZ}+\lambda_{LN}}$ and $0 < \alpha < 1$.

Hence $\widehat{W}$ is unambiguously positive if $\widehat{P_Z} > 0$.

Manipulating (A.6)

$$\widehat{W} = \widehat{P_Z}\left\{1 - \frac{\alpha.\sigma_Z.\theta_{LZ}}{\sigma_Z.\theta_{LZ}+\Delta.\theta_{TZ}}\right\} \tag{A.7}$$

The RHS is definitely positive. Because,

$$\widehat{W} = \widehat{P_Z}\left\{\frac{\sigma_Z.\theta_{LZ} + \Delta.\theta_{TZ} - \alpha.\sigma_Z.\theta_{LZ}}{\sigma_Z.\theta_{LZ} + \Delta.\theta_{TZ}}\right\} = \widehat{P_Z}\left\{\frac{\sigma_Z.\theta_{LZ}(1-\alpha) + \Delta.\theta_{TZ}}{\sigma_Z.\theta_{LZ} + \Delta.\theta_{TZ}}\right\}$$

As $0 < \alpha < 1$, $\widehat{W} > 0$ due to an increase in Pz.

A positive $\widehat{W}$ also implies $(\sigma_Z.\theta_{LZ} + \Delta.\theta_{TZ}) > \alpha.\sigma_Z.\theta_{LZ}$.

Equation (A.7) asserts that,

$$\left(\widehat{W} - \widehat{P_Z}\right) = (-)\widehat{P_Z}\left(\frac{\alpha.\sigma_Z.\theta_{LZ}}{\sigma_Z.\theta_{LZ}+\Delta.\theta_{TZ}}\right) \tag{A.8}$$

Therefore, for $\widehat{P_Z} > 0$, $\left(\widehat{W} - \widehat{P_Z}\right) < 0$ Or, $\widehat{W} < \widehat{P_Z}$ (A.9)

Equation (A.9) coupled with the argument of (A.1) ensures a positive $\hat{R}$ and $\hat{R} > \widehat{W}$. This is evident from (A.5) as $\widehat{W} < \widehat{P_Z}$. Therefore, $\left(\widehat{W} - \hat{R}\right) < 0$ which indicates a positive $\hat{Z}$ due to an increase in Pz through equation (A.2).

APPENDIX B

Using a circumflex over a variable to represent proportional change,

From (1), (2) and (3) we have,

$$\widehat{W_S}\theta_{SX} + \hat{r}\theta_{KX} = 0 \quad \text{(B.1)}$$

$$\widehat{\widehat{W}}\ \theta_{LY} + \hat{r}\ \theta_{KY} = \ \hat{t}.t \quad \text{(B.2)}$$

$$\widehat{W}\ \theta_{LZ} + \hat{R}\ \theta_{TZ} = (1-\alpha).\widehat{P_Z} - \alpha.\hat{\alpha} \quad \text{(B.3)}$$

From full employment conditions one can arrive at,

$$\hat{X} = \hat{S} - \widehat{a_{SX}} \quad \text{(B.4)}$$

$$\widehat{X}.\lambda_{KX} + \widehat{Y}.\lambda_{KY} = \widehat{K} \quad \text{(B.5)}$$

$$\hat{Z} = \hat{T} - \widehat{a_{TZ}} \quad \text{(B.6)}$$

$$\widehat{Y}.\lambda_{LY} + \hat{Z}.\lambda_{LZ} = \hat{L} - \widehat{L_N}.\lambda_{LN} \quad \text{(B.7)}$$

Again from equation (13) one gets,

$$\beta.X.\hat{X} + \beta.Y\left\{\hat{Y} + t\left(\hat{Y} + \hat{t}\right)\right\} = \{(1-\beta)P_Z.Z\}\left(\hat{Z} + \widehat{P_Z}\right) \quad \text{(B.8)}$$

On the other hand, equation (7) can also be delineated in the following form with proportional changes.

$$\hat{\alpha} + \widehat{P_Z} + \hat{Z} - \widehat{L_N} = \widehat{W} - (\widehat{1-bq}) \quad \text{(B.9)}$$

From (B.6) we get

$$\hat{Z} = (-)\sigma_Z.\theta_{LZ}\left(\widehat{W} - \hat{R}\right) \quad \text{(B.10)}$$

Where $\sigma_Z = \frac{\widehat{a_{TZ}} - \widehat{a_{LZ}}}{\widehat{W} - \hat{R}}$, representing the elasticity of substitution in Z and θ is the distributive share of factor(s).

Again from (B.7) we have,

$$\hat{Z} = (-)\widehat{L_N}\ \ \frac{\lambda_{LN}}{\lambda_{LZ}} - \widehat{Y}.\frac{\lambda_{LY}}{\lambda_{LZ}} \quad \text{(B.11)}$$

Comparing (B.10) and (B.11)

$$\left(\widehat{W} - \hat{R}\right) = \widehat{L_N}\ \ \frac{\lambda_{LN}}{\lambda_{LZ}}\frac{1}{\sigma_Z.\theta_{LZ}} + \widehat{Y}.\quad \frac{\lambda_{LY}}{\lambda_{LZ}}\frac{1}{\sigma_Z.\theta_{LZ}} \quad \text{(B.12)}$$

Then manipulating (B.12) and using (B.3) one can easily deduce the value of $\widehat{W}, \widehat{W_N}$. On the other hand using the equation of change from (B.8) and then comparing it with (B.10) or (B.11) we can have the equilibrium value of Pz.

From equation (B.8) and (B.11)

$$\widehat{P_Z} = (-)S_X\sigma_X\frac{\theta_{KX}}{\theta_{SX}}\frac{t}{\theta_{KY}}\hat{t} + S_Y\sigma_X\frac{\theta_{KX}}{\theta_{SX}}\frac{\lambda_{KX}}{\lambda_{KY}}\frac{t}{\theta_{KY}}(1+t)\hat{t} - \hat{Z} + t\hat{t}$$

$$or, \widehat{P_Z} = (-)S_X\sigma_X\frac{\theta_{KX}}{\theta_{SX}}\frac{t}{\theta_{KY}}\hat{t} + S_Y\sigma_X\frac{\theta_{KX}}{\theta_{SX}}\frac{\lambda_{KX}}{\lambda_{KY}}\frac{t}{\theta_{KY}}(1+t)\hat{t} + \left(\widehat{L_N}\ \frac{\lambda_{LN}}{\lambda_{LZ}} + \hat{Y}.\frac{\lambda_{LY}}{\lambda_{LZ}}\right) + t\hat{t}$$

$$or, \widehat{P_Z} = (-)S_X\sigma_X\frac{\theta_{KX}}{\theta_{SX}}\frac{t}{\theta_{KY}}\hat{t} + S_Y\sigma_X\frac{\theta_{KX}}{\theta_{SX}}\frac{\lambda_{KX}}{\lambda_{KY}}\frac{t}{\theta_{KY}}(1+t)\hat{t} + \left\{\widehat{L_N}\frac{\lambda_{LN}}{\lambda_{LZ}} + \delta_Y\hat{t}\right\} + t\hat{t} \qquad \text{(B.13)}$$

Where, $S_X = \frac{\beta.X}{(1-\beta).P_Z.Z}$ and $S_Y = \frac{\beta.Y}{(1-\beta).P_Z.Z}$ and $\delta_Y = \frac{\lambda_{LY}}{\lambda_{LZ}}.\sigma_X.\frac{\theta_{KX}}{\theta_{SX}}.\frac{\lambda_{KX}}{\lambda_{KY}}.\frac{t}{\theta_{KY}}.\hat{t}$

APPENDIX C

Following a reduction in t, from price equations

$$\hat{r} = \hat{t}.\frac{t}{\theta_{KY}} < 0 \qquad \text{(C.1)}$$

$$\widehat{W_S} = -\frac{\theta_{KX}}{\theta_{SX}}.\frac{t}{\theta_{KY}}.\hat{t} > 0 \qquad \text{(C.2)}$$

And setting $\hat{\alpha} = \widehat{P_Z} = 0$ in the price equation of Z we get,

$$\widehat{W}\ \theta_{LZ} + \hat{R}\ \theta_{TZ} = 0 \qquad \text{(C.3)}$$

Using the elasticity of substitution for Z one gets,

$$\hat{Z} = (-)\sigma_Z.\theta_{LZ}\left(\widehat{W} - \hat{R}\right) \qquad \text{(C.4)}$$

Applying the elasticity of substitution in X and Y sector we obtain,

$$\hat{X} = (-)\sigma_X.\frac{\theta_{KX}}{\theta_{SX}}.\frac{t}{\theta_{KY}}.\hat{t}\ > 0 \text{ ; as } \hat{t} < 0. \qquad \text{(C.5)}$$

$$\hat{Y} = \sigma_X.\frac{\theta_{KX}}{\theta_{SX}}.\frac{\lambda_{KX}}{\lambda_{KY}}.\frac{t}{\theta_{KY}}.\hat{t}\ < 0 \text{ ; as } \hat{t} < 0. \qquad \text{(C.6)}$$

From the full employment condition of L and plugging $\widehat{L_N}\ \left(= \hat{Z} - \widehat{W}\right)$ from (8) and $\hat{Y}$ from the previous equation

$$\hat{Z} = (-)\left\{(-)\frac{\lambda_{LN}}{\lambda_{LZ}}\widehat{W} - \frac{\lambda_{LN}}{\lambda_{LZ}}\sigma_Z.\theta_{LZ}\left(\widehat{W} - \hat{R}\right) + \lambda_{LY}.\sigma_X.\frac{\theta_{KX}}{\theta_{SX}}.\frac{\lambda_{KX}}{\lambda_{KY}}.\frac{t}{\theta_{KY}}.\hat{t}\right\} \qquad \text{(C.7)}$$

Comparing (C.4) and (C.7) and manipulating a bit

$$\left(\widehat{W} - \hat{R}\right) = \frac{1}{\lambda_{LZ}+\lambda_{LN}}\left\{\lambda_{LZ}.\lambda_{LY}.\sigma_X.\frac{\theta_{KX}}{\theta_{SX}}.\frac{\lambda_{KX}}{\lambda_{KY}}.\frac{t}{\theta_{KY}}.\hat{t} - \lambda_{LN}.\widehat{W}\right\} \qquad \text{(C.8)}$$

Judiciously using (C.3) and (C.8) yields

$$\widehat{W} = \frac{\lambda_{LZ}.\lambda_{LY}.\sigma_X.\frac{\theta_{KX}}{\theta_{SX}}.\frac{\lambda_{KX}}{\lambda_{KY}}.\frac{t}{\theta_{KY}}.\hat{t}.\frac{\Delta.\theta_{TZ}}{\lambda_{LN}}}{1+\Delta.\theta_{TZ}} \qquad \text{(C.9)}$$

where, $\Delta = \frac{\lambda_{LN}}{\lambda_{LZ}+\lambda_{LN}}$.

It is evident from (C.9) that $\widehat{W} < 0$ as $\hat{t} < 0$. Therefore $\hat{R}$ must be positive from equation (C.3). Hence $\left(\widehat{W} - \hat{R}\right) < 0$. This inequality guarantees a positive $\hat{Z}$. This is the same thing that we got in the main text. Furthermore, this also ensures $\widehat{L_N} = \left(\hat{Z} - \widehat{W}\right) > 0$.

References

Agenor, R. and P. Montiel (1997) - Development Macroconomic, 2nd edition, NJ: Princeton University Press.

Carruth, A., and A. Oswald (1981) - The Determination of Union and Non-Union wage- rates, *European Economic Review*, 16 (2), pp 285-302

Beladi, H. and C. Chao (1993) – Non-traded goods, urban unemployment and welfare in LDCs. *European Journal of Political Economy*, 9(2), pp 281-292.

Beladi, H. and S. Marjit, (1992). Foreign Capital and Protectionism, *Canadian Journal of Economics*, Canadian Economics Association, 25(1), pp 233-38.

Beladi, H. and S. Yabuuchi (2001) – Traiff induced capital inflow and welfare in the presence of unemployment and informal sector, *Japan and the World Economy*, 13(1), pp 51-60.

Bhagwati, J. (1982) - Directly Unproductive Profit Seeking (DUP) Activities. *Journal of Political Economy*, 90(5), pp 988-1002.

Chaudhuri, S. (2003). How and how far to liberalize a developing economy with informal sector and factor market distortions, *Journal of International Trade & Economic Development*, 12(4), pp 403-428.

Chaudhuri, S. and U. Mukhopadhyay, (2010). Revisiting the Informal Sector: A General Equilibrium Approach, Springer, Heidelberg.

Ethier, W. (1984) – *Higher dimensional issues in trade theory*. In R. W. Jones and P. B. Kenen (Eds) Handbook of International Economics, Vol. 1, Amsterdam,: North-Holland.

Gruen, F. and M. Corden (1970) – *A tariff that worsens terms of trade*. In I. A. McDougall and R. H. Snapes (Eds) Studies in International Economics, Amsterdam,: North-Holland

Jones, R.W. (1965) – The Structure of Simple General Equilibrium Models. *Journal of Political Economy*, 73, pp.557-572.

Jones, R.W. (1971) – *A three-factor model in theory, trade and history*. In Bhagwati, J et al (Eds) Trade, Balance of Payments and Growth, North- Holland, Amsterdam, pp. 3-21.

Jones, R.W. and S. Marjit (1992) – *International trade and endogenous production structure*. In Neuefeind, W et al (Eds) Economic Theory and International Trade: Essays in honour of J. Trout Rader, Sringer Verlag.

Jones, R.W. and S. Marjit (2008) – Competitive trade models and real world features. *Economic Theory*, doi: 10.1007/s00199-0394-0.

Kar, S. and S. Marjit (2001) – Informal sector in general equilibrium: welfare effects of trade policy reforms, *International Review of Economics and Finance*, 10(3), pp 289-300.

Konard, K. A. and S. Skaperdas (1998) – Extortion, *Economica*, 65(260) pp 461-477.

Mandal, B. and S. Marjit (2010) – Corruption and Wage Inequality?. *International Review of Economics and Finance*, 19(1), pp 166-172.

Marcoullier D and L. Young (1995) - The black hole of graft : predatory state and the informal economy, *American Economic Review* ,85 (3), pp630-646

Marjit, S. (2003) – Economic reform and informal wage: A general equilibrium analysis. *Journal of Development Economics*, 72(1), pp 371-378.

Marjit, S. & H. Beladi, (1999).- Complementarity between Import Competition and Import Promotion, *Journal of Economic Theory*, 86(2), pp 280-285.

Marjit, S., S. Ghosh, & A. Biswas, (2007) - Informality, corruption and trade reform, European *Journal of Political Economy*, 23(3), pp 777-789.

Marjit, S. and S. Kar, (2009) – A Contemporary Perspective on the Informal Labor Market: Theory, Policy and the Indian experience, *Economic and Political Weekly*, XLIV(14).

Marjit, S. and S. Kar, (2009a) – Urban Informal Sector and Poverty, *International Review of Economics and Finance*, 18(4), pp631-642.

Marjit, S. & S. Kar, and H. Beladi, (2007) - Trade Reform and Informal Wages, *Review of Development Economics*, 11(2), pp 313-320.

Marjit, S., S. Kar, & H. Beladi, (2007a) - Protectionary bias in agriculture: A pure economic argument, *Ecological Economics*, 63(1), pp 160-164.

Skaperdas, S. (1992) – Cooperation, conflict and power in the absence of property rights, *American Economic Review*, 82(4), pp 720-739.

Skaperdas, S. and S. Constantinos (1997) – The distribution of income in the presence of appropriative activities, *Economica*, 64(253), pp 101-117.