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Abstract

Using the hybrid of Heckscher - Ohlin and Specific Factor models of trade we show that economic recession led shock results in a loss for both capitalists and skilled workers. Some of the unionized unskilled workers lose formal sector employment and move onto the informal sector. In case capital moves from formal to the informal, informal employment and wage both can go up in the informal segment. If capital does not move informal employment expands and wage drops. Thus recession may actually benefit a large number of informal workers.

Key words: International Trade, Informal sector, General Equilibrium.

JEL classification: F11, O17, D5

1. INTRODUCTION

The recessionary phase that were taking place in some parts of the world during the last couple of years, affected the consumers' confidence at large. The confidence had gone down to a considerable extent. Unquestionably, this led to a decline in the demand for final goods, especially high-priced goods. This negative demand effect resulted in a fall in price(s) of almost all the formal commodities. However, the extent of the decline in prices is not same for different commodities. Some firms were affected more by the downturn. Firms producing luxury goods, goods with income elasticity greater than unity had experienced the biggest percentage fall in demand. This is likely to encompass all high-priced goods. Whereas basic necessity goods were relatively more insulated from this shock, it does not matter where these are being produced. On the other hand as the price is relatively low the informal good should not have felt the heat of recession to the extent of formal good.

Therefore, consequent upon financial crisis and subsequent recession, price of high skilled commodity has fallen to a large extent, prices of other goods have also decreased (see Table-1), capitalists are not getting their expected returns from investment, skilled workers' wage rate have gone down substantially. Recent UCTAD report (2009) says that the global crisis has affected not only manufacturing trade, but also trade in services. Global services exports were up sharply, rising by 11 per cent in 2008, with an 8.5 per cent and 15 per cent rise achieved by developed and developing countries respectively. However, intra-year balance of payments data for 2008 clearly indicate that a turning point for services exports growth occurred in the third quarter of 2008, with a abrupt decline in the fourth quarter of 2008. These are some observed phenomena that act as exogenous shocks to any stable economy. The general apprehension is that owing to these shocks all economic agents should suffer. Formal sectors' scenario is quite intuitive and could easily be explained. Nevertheless what happens to the informal activities, if exist, and informal workers that are still unexplored. In addition the presence of informal sector is rampant across the globe. More than 70% of all employment in countries like Zambia (80.7%), Uganda (83.7%), Thailand (72.1%), Nepal (73.3%), Lithuania (72%), Ghana (78.5%), and Gambia (72.4%) falls in the category of informal sector (ILO, 2010). Developed part of the world is also not free from this. It accounts for 18% in Canada and 8% in

USA (ILO, 2002). Hence, one must look at the possible theoretical effects on informal fragments as unlike formal sector the data are not readily available for this segment.

The underlying idea of this paper is somewhat similar with a policy paper by Gruen and Corden (1970). Following Gruen and Corden (1970) several papers have been written to capture the real world feature of a developing economy where both formal and informal sectors exist and produce tradable and non-tradable goods, respectively. Essentially this structure is an amalgamation of Heckscher-Ohlin (H-O) and Specific Factor model of trade. Hybrid structure has frequently been used by the development economists to evaluate the impacts of various policy issues. Such a framework is also analyzed in earlier works of Brecher and Alezandro (1977), Beladi and Chao (1993), Beladi and Yabuuchi (2001), Jones and Marjit (1992, 2009), Marjit (2003, 2005). On the other hand in a very recent paper Marjit and Kar (2009) clearly elaborates the interconnectedness of the informal sector with other sectors of the economy and some policy implications.

Very recently Chaudhuri (2009) has attempted to clarify how recession has impacted the informal workers. He used a standard Harris-Todaro kind of framework allowing for unemployment of rural unskilled workers and emigration of skilled workers. In another paper Marjit et al (2009) also demonstrates the effect of recession on informal workers' real wage. Using three- goods, four factors models they gave an idea about the robustness of the positive effect on informal wage even when the informal commodity is tradeable.

In this paper we use a stylized developing economy structure where both formal and informal sector co-exist. Even within formal sector, itself, laborers used in the production of different commodities are not homogeneous. One is skilled good sector and the other is unskilled good sector where labor enjoys the benefit of unionized work force. On the other hand informal sector employs unorganized unskilled workers with absolutely intersectorally mobile capital. Two central phenomena of the structure are: only the formal goods' prices are internationally determined and the formal unskilled workers get fixed wage rate. Formal unskilled wage is, essentially, the key driving force of our paper. And on the other hand as long as the informal good is non-traded[1] any international economic shock like recession would not seep into the

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[1] However, informal good could be assumed to be traded as well. The prime thing that we assume here is an unchanged price of informal good. Here it is also important to mention that one can easily determine the equilibrium

informal segment of the economy through price effect. Nevertheless, loer income of consumers due to recession may influence domestically determined informal price. We are ignoring such complexities for simplicity. Thus whatever happens to this segment that is as a consequence of change in relative factor return. Once the recessionary phase starts it affects the formal sector's price due to lack of demand. By virtue of the structure of the model capital gets the first shove as unskilled wage is pre-determined in the formal segment. Capitalists internalizing the distress would have helped increasing the skilled workers' wage had the price of skilled goods not changed. But this may not happen in reality (Also see Table-1). Hence the return to skilled workers would depend on the degree of initial fright on capital and change in skilled good's price. However, as there is no change in informal good's price (assumed), the informal workers must gain as the return to the mobile factor goes down. In output front there might be some interesting outcomes. After being saddened in the formal unskilled segment capital immediately flows out and subsequently the output contracts. Whereas, the skilled good producers would try to substitute skilled labor by relatively less costly capital. The output effect depends on the relative changes in factor return. Beside, in the informal sector, producers economize on labor usage as wage goes up and rental falls. Thus full employment condition of unskilled labor ensures an increase in output.

The paper is arranged in the following fashion. Section 2 deals with the basic assumptions and the model. Results are analyzed in section 3. A variant of the basic model with restricted capital mobility between formal and informal sector is discussed in section 4. Section 5 provides the concluding remarks.

2. BASIC ASSUMPTIONS AND THE MODEL

Let us assume a small open economy where there are three goods (X , Y and Z) out of which two (X and Y) are produced in the formal sector and the rest (Z) is produced in the informal sector. Formal workers are organized but not the informal workers. All the goods are different and only formal goods are traded. All goods use same capital (K) as the mobile factor of production and hence the return to capital (r) is same everywhere. One commodity (X) of the formal set up uses skilled workers (S) as specific factor and the other uses unskilled labor (L) as

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price of non-traded informal good following any standard Cobb-Douglas preference for informal good. See Marjit et al (2009) for further details.

the same. Unskilled workers are organized in the formal segment whereas the informal unskilled workers have to face a competitive market. Therefore, unskilled wage in the formal and informal segments are not identical. The underlying assumption behind the existence of informal activity is that who don't find job in the formal unionized market, immediately rush to the informal segment. No one can afford to remain unemployed because of survival question. Here the informal sector, at least, gives some people the way of earning their livelihood. This is precisely why informal sector survives in spite of not abiding by all government rules and regulations. One must note that the general concern about the poor people is not the lack of job opportunities but the wage rate at which they are forced to work. This phenomenon is very much present in our framework since formal workers are likely to get higher wage ($\overline{w}$) than their informal counterpart.

Therefore, the model has three goods X, Y and Z produced in the neo-classical framework using three factors such as skilled labor (S), unskilled labor (L) and capital (K). Capital is perfectly mobile across X, Y and Z. S is specific to X and gets w_S as wage. Both L and K are mobile between Y and Z. Laborers are monopolized through trade union in Y. They get $\overline{w}$ as wage. Capital gets identical return r across sectors. Who are not fortunate enough to work in Y, has to go out of the formal segment. Because of their livelihood they need to find out alternative workplace. This is provided by Z. If Z is never produced, some labor must remain unemployed. Therefore Z is a necessity for perfectly competitive full employment framework. Prices of the traded goods are given from the international market by virtue of small country assumption. All markets are assumed to be competitive. Moreover, we have the standard neo-classical assumptions of constant returns to scale (CRS) 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). We use the following notations: $P_j \Rightarrow$ price of the jth commodity ($j = X, Y, Z$); $w_S \Rightarrow$ skilled wage; $\overline{w} \Rightarrow$ unskilled formal wage; $w \Rightarrow$ unskilled informal wage; $r \Rightarrow$ rate of return to K; $a_{ij} \Rightarrow$ share of the ith factor in j^{th} commodity ($i = S,L,K$ and $j = X,Y,Z$); $\theta_{ij} \Rightarrow$ share of the ith factor in j^{th} commodity ($i = S,L,K$ and $j = X,Y,Z$); $S \Rightarrow$ total supply of skilled labor; $\overline{L} \Rightarrow$ total supply of unskilled labor; $\overline{K} \Rightarrow$ total supply of capital, K.

Competitive requirements for profits to be just exhausted are given by:

$$w_s \, a_{sx} + r \, a_{kx} = P_x \tag{1}$$

$$\bar{w} \, a_{ly} + r \, a_{ky} = P_y \tag{2}$$

$$w \, a_{lz} + r \, a_{kz} = P_z \tag{3}$$

$$\bar{w} > w$$

On the other hand, competitive conditions that factors be fully employed are:

$$a_{sx}.X = \bar{S} \tag{4}$$

$$a_{ly}.Y + a_{lz}.Z = \bar{L} \tag{5}$$

$$a_{kx}.X + a_{ky}.Y + a_{kz}.Z = \bar{K} \tag{6}$$

The solution to the system is very straightforward. For given commodity prices we can solve for three unknown factor returns, w_s , w and r. $\bar{w}$ is already fixed by the trade union. Because of standard neo-classical CRS assumption we have all technological co-efficients i.e, a_{ij}s for the factors used in production. Therefore, outputs – X, Y and Z can be found from equation (4) – (6) if the factor endowments are constant at $\bar{S}, \bar{L}$ and $\bar{K}$.

3. RESULTS AND THE ANALYSIS

We start from the fact that prices of the formal sector goods have gone down. Returns to capital and skilled labor are also decreased simultaneously. First we shall corroborate these facts by using a simple general equilibrium trade model that we have just framed. Then we shall turn to examine the consequences on the informal workers and informal activities.

The comparative static properties of our model can be established by considering the effects of changes in the parameters like prices of commodities. For this purpose we assume the technologies to be given and constant. Throughout the paper we shall use caret notation to denote a proportionate change.

3. A. Effects on Factor Returns

The underlying idea of this section is very simple to understand. As long as goods are bought from and sold only in the domestic market, recession would not be able to put its mark on

those goods and associated factors' return if we assume away the income effect[2]. This is exactly what happens to our unskilled informal sector and the reverse takes place for the traded goods comprising of skilled good and unskilled formal good. Once there is a change in the prices of the goods, factors' return must change. The extent of change would depend upon the specificity of use, existence of trade unions, factor mobility etc. Now let us chalk out the channels through which these price changes alter the returns to factors.

Differentiating the price equations totally and rearranging yields

$$\widehat{w}_s\,\theta_{sx} + \hat{r}\theta_{kx} = \hat{P}_x \qquad\qquad (7)$$
$$\widehat{\overline{w}}\theta_{ly} + \hat{r}\theta_{ky} = \hat{P}_y \qquad\qquad (8)$$
$$\widehat{w}\,\theta_{lz} + \hat{r}\theta_{kz} = \hat{P}_z \qquad\qquad (9)$$

$\widehat{\overline{w}} = 0$, because of trade union negotiation wage for organized labor is fixed at $\overline{w}$.

Solving for $\hat{r}$ and $\widehat{w}_s$ we get

$$\hat{r} = \frac{\hat{P}_y}{\theta_{ky}} \qquad\qquad (10)$$

$$\widehat{w}_s = \left(\hat{P}_x - \frac{\hat{P}_y}{\theta_{ky}}\theta_{kx} \right)\frac{1}{\theta_{sx}} \qquad\qquad (11)$$

$\hat{r} < 0$ if $\hat{P}_y < 0$. The intuition is very clear. The other factor used in Y is labor whose retuen is fixed at $\overline{w}$. Any change in the price of final commodity must be totally appropriated by capital. Since capital is mobile across X and Y, the return to skilled labor should crucially depend on the change in the price of X and on the factors' share in the commodity price. From equation (11)

$$\widehat{w}_s < 0 \text{ iff } \left(\hat{P}_x - \frac{\hat{P}_y}{\theta_{ky}}\theta_{kx} \right) < 0$$

Or, $\quad \dfrac{\hat{P}_x}{\hat{P}_y} < \dfrac{\theta_{kx}}{\theta_{ky}} \qquad\qquad (12)[3]$

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[2] See footnote 1 for a related issue.

[3] Note that both $\hat{P}_y$ and $\hat{P}_y$ are negative. Thus the condition for $\widehat{w}_s$ to be negative should read as $\dfrac{\hat{P}_x}{\hat{P}_y} > \dfrac{\theta_{kx}}{\theta_{ky}}$.

The conventional notion is that skilled labor using X must also be using more capital than Y. In that case $\frac{\theta_{kx}}{\theta_{ky}} > 1$. If both P_x and P_y fall at the same rate, w_s must fall. The argument is as follows. $\hat{r}$ must be more than $\widehat{P_y}$, because $\widehat{P_y}$ is a weighted sum of $\hat{r}$ and $\widehat{w}$ but no change in unionized wage is possible. When P_x falls at a rate identical with P_y and r falls at a rate higher than this, w_s would also decrease but at a lower rate than that of r. Therefore, if both P_x and P_y fall at the same rate, w_s must fall[4]. In case when P_x is reduced at a rate higher than P_y, the possibility of $|\widehat{w_s}| > |\hat{r}|$ arises. This depends on factors' share in price. Note that, here, both $\widehat{w_s}$ and $\hat{r}$ fall simultaneously.

A fall in the price of Y is actually dampening the negative effect on $\widehat{w_s}$. Because when P_y falls r also falls and being the mobile factor it also shares the blow of recession a bit. Even under certain circumstances w_s may turn out to be the most horrible sufferers.

Substituting $\hat{r}$ and from equation (9) we get

$$\widehat{w} = \left(\widehat{P_z} - \hat{r}\theta_{kz}\right)\frac{1}{\theta_{lz}}$$

If $\widehat{P_z}$ is assumed to be constant and we substitute the value of $\hat{r}$, the above equation boils down to

$$\widehat{w} = -\hat{r}\frac{\theta_{kz}}{\theta_{ky}}.\frac{1}{\theta_{lz}} > 0 \text{ (Since } \widehat{P_y} < 0 \text{)} \tag{13}[5]$$

Whether informal unskilled wage increases or not that crucially depends on the change in P_y. If P_y falls informal workers must gain irrespective of factor intensity assumption. Nevertheless, if labor's share in Z increases (capital's share falls) return to informal workers increases at a lower rate. However, P_x can not affect w. The reason is that the structure is of H-O nugget (Jones and Marjit, 1992) kind and r gets determined from equation (2) alone.

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[4] If there is no change in P_x, w_s should in fact rise. This is also true from the condition mention at footnote 3. But we are not at all interested in this phenomenon because this is not what happened in actuality.

[5] If the informal good is considered to be a substitute for the formal unskilled good price of the informal good must rise because of an increase in demand. Traditionally formal good's price is greater than that of informal good. When P_y goes up, people start moving towards low-priced substitute or close substitute in the informal sector. Hence P_z rises and w increases further.

The argument behind an increase in w is very simple and clear-cut. Driven by a slash in the rental in the formal segment capital flocks into informal segment and creates an excess demand for informal laborers. This excess demand pulls up the informal wage. Note that the real wage for informal workers also goes up. Informal unskilled laborers are better off. While the labor union puts the safeguard on organized unskilled workers.

Therefore the proposition is immediate:

Proposition I: Consequent upon recession:
(a) Capitalist must suffer if both the formal goods experience a price cut or only P_y falls.
(b) Return to skilled worker will go down if both P_x and P_y fall at the same rate given that $\frac{\theta_{kx}}{\theta_{ky}} > 1$.
(c) Both the monetary and real wage for informal sector workers go up.

Proof: See discussion above.

Here it is important to note that under the assumption of a same rate of fall in the prices of all goods (say $\widehat{P_x} = \widehat{P_y} = \widehat{P_z} = \hat{P}$) the relevant expression for the change in informal wage becomes, $\hat{w} = \frac{1}{\theta_{lz}} \hat{P} \left(\frac{\theta_{ky}-\theta_{kz}}{\theta_{ky}} \right)$. Therefore, informal wage would fall if Y is capital-intensive compared to Z. If $\theta_{ky} < \theta_{kz}$ informal wage would go up under recession. In fact, the change in P_z can easily be assumed to be a fraction of changes in P_x and P_y as demand for Z comes from the income generated out of X and Y. Let it be $\alpha < 1$. Under these circumstances $\hat{w} = \frac{1}{\theta_{lz}} \hat{P} \left(\alpha - \frac{\theta_{kz}}{\theta_{ky}} \right)$. Therefore w would rise if $\alpha < \frac{\theta_{kz}}{\theta_{ky}}$ and the explicit condition for a hike in informal wage is $\alpha\theta_{ky} < \theta_{kz} < \theta_{kz}$. This implies that even under the condition of capital-intensive Y, w has a chance to go up if P_z falls (if at all) at a rate lower than that of in P_x and P_y. Similarly one can derive the modified condition with α for a decrease in informal wage.

3. B. Output effects

As the prices of the goods alter, there is subsequent amendment in the factor returns. Keeping the endowments of factors constant producer would go for substituting the factors in use

depending on the elasticity of substitution, internal reallocation of factors among different uses etc. The effects on output could be formally derived as follows.

Totally differentiating the full employment condition (4) – (6) and using the concept of elasticity of substitution one can have,

$$\hat{X} = \hat{\bar{S}} - \hat{a}_{sx} \tag{14}$$

$$\hat{Y}\lambda_{ly} + \hat{Z}\lambda_{lz} = \lambda_{lz}\sigma_z\theta_{kz}(\hat{w} - \hat{r}) - \lambda_{ly}\sigma_y\theta_{ky}\hat{r} \tag{15}$$

$$\hat{Y}\lambda_{ky} + \hat{Z}\lambda_{kz} = -\lambda_{kz}\sigma_z\theta_{lz}(\hat{w} - \hat{r}) + \lambda_{ky}\sigma_y\theta_{ly}\hat{r} - \lambda_{kx}\sigma_x(\widehat{w_s} - \hat{r}) \tag{16}$$

Where,

$$\sigma_x = \frac{\hat{a}_{kx} - \hat{a}_{sx}}{\widehat{w_s} - \hat{r}}, \sigma_y = \frac{\hat{a}_{ky} - \hat{a}_{ly}}{\hat{w} - \hat{r}}, \sigma_z = \frac{\hat{a}_{kz} - \hat{a}_{lz}}{\hat{w} - \hat{r}}$$

Solving for $\hat{X}, \hat{Y}$ and $\hat{Z}$ we get

$$\hat{X} = \sigma_x(\widehat{w_s} - \hat{r})\theta_{kx} \tag{17}$$

$$\hat{Y} = \frac{1}{|\lambda|}\big[\lambda_{lz}\lambda_{kz}\sigma_z\theta_{kz}(\hat{w} - \hat{r}) - \lambda_{ly}\lambda_{kz}\sigma_y\theta_{ky}\hat{r} - \lambda_{lz}\lambda_{ky}\sigma_y\theta_{ly}\hat{r} + \lambda_{kx}\lambda_{lz}\sigma_x(\widehat{w_s} - \hat{r}) +$$

$$\lambda_{lz}\lambda_{kz}\sigma_z\theta_{lz}(\hat{w} - \hat{r})\big] \tag{18}$$

$$\hat{Z} = \frac{1}{|\lambda|}\big[\lambda_{ly}\lambda_{ky}\sigma_y\theta_{ly}\hat{r} + \lambda_{ly}\lambda_{ky}\sigma_y\theta_{ky}\hat{r} - \lambda_{kx}\lambda_{ly}\sigma_x(\widehat{w_s} - \hat{r}) - \lambda_{ly}\lambda_{kz}\sigma_z\theta_{lz}(\hat{w} - \hat{r}) -$$

$$\lambda_{lz}\lambda_{ky}\sigma_z\theta_{kz}(\hat{w} - \hat{r})\big] \tag{19}$$

If Y is relatively capital intensive (compared to Z), $|\lambda| < 0$. On the other hand when if capital's share of cost is higher in X relative to Y i.e, $\frac{\theta_{kx}}{\theta_{ky}} > 1$, $(\widehat{w_s} - \hat{r}) > 0$. In that case the outcomes are quite unambiguous: $\hat{X} > 0$[6], $\hat{Z} > 0$ and $\hat{Y} < 0$. This results resembles the complementarity nature in the production of X and Z. Thus we state the following proposition:

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[6] This outcome is quite interesting. Say production of X has risen. Due to lack of demand, caused by people's attitude of not spending much now on high-priced goods, P_x would fall further and hence will strengthen the losses of capital and skilled labor. The economic intuition for this baffling result is not complicated. Since r falls more than w_s producers try to employ more capital in order to economize on skilled labor usage. Given the endowment of skilled labor X output goes up as required capital comes from Y.

Proposition II: *A recessionary phase leads to the expansion of informal activities along with skilled product but the unionized formal segment shrinks. The precise condition for this outcome is* $\theta_{kx} > \theta_{ky}$ *and Y is capital intensive compared to Z.*

Proof: See the above analysis.

Here it is not less interesting to see how the fortunes of informal workers fluctuate with where the recessionary effect is taking place first. Say P_x decreases keeping P_y constant. r would remain unaffected and w_s has to absorb the entire shock of a price cut in X. Note that $\hat{w}_s > \hat{P}_x$ as $0 < \theta_{sx} < 1$. On the other hand as there is no change in P_z (by assumption) and r, informal wage w would remain unaltered. Whereas if P_y falls keeping P_x unperturbed, r has to fall. As r falls w_s must increase. Similarly, the informal wage w will also increase. These two effects depict the extreme form of effects on informal wage. The generalization of these two effects together is discussed in the preceding paragraphs.

4. A VARIANT OF THE BASIC MODEL

It is often argued that the nature of capital that formal and informal sector use are not identical. Formal segment of the society might have the option to borrow financial capital from government or non-government banks but the informal sector has to rely heavily on the local private money lenders due to inherent extra-legality. Informal sector can survive without any permanent production house but it is not possible for the formal production units. These features are very much prevalent in the developing economies which are vastly covered with informal units and are in the prime focus of the current paper. Therefore it would not be insensible to introduce a variant of the basic model with the following variations.

In this section we consider the basic model with capital immobility between formal and informal sectors. Let us assume that X and Y use similar kind of capital and the informal good Z uses different kind of capital[7]. First we talk about the intuitive explanations as to what happens to informal wage. If only P_x falls there would be no change in r but w_s would fall unambiguously.

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[7] For a similar kind of model with endogenous determination of Pz refer to Marjit et al (2009).

As w_s falls X producers economize on the usage of capital leading to an increase in a_{sx}. Therefore formal skilled output contracts (from full employment condition). Capital will move out of X to Y and consequently Y output expands. The expansion in output creates an upsurge in demand for unskilled workers. This will cause an increase in informal wage, w.

However, when only P_y falls, r must fall causing an in crease in w_s. Since relative factor prices change, quantity of output will also be adjusted through elasticity of substitution. Here a_{sx} will go down and X would expand. This is possible only when capital comes from Y. The moment capital goes out of Y some unskilled laborers are also released from Y. This chunk of labor goes to Z and pushes w down.

Therefore what happens to informal wage that not only depends on which sector is internalizing the recessionary shock. The mobility of capital also plays a crucial role. With immobile capital we get distinctly different effects on W due to similar kind of shocks compared to the structure with perfect inter-sectorally mobile capital.

Now let us establish our intuitive claim mathematically. The set of equations becomes,

Price equations are:

$$w_s\, a_{sx} + r\, a_{kx} = P_x \tag{20}$$

$$\overline{w}\, a_{ly} + r\, a_{ky} = P_y \tag{21}$$

$$w\, a_{lz} + R\, a_{Tz} = P_z \tag{22}$$

Full employment conditions are:

$$a_{sx}.X = \bar{S} \tag{23}$$

$$a_{ly}.Y + a_{lz}.Z = \bar{L} \tag{24}$$

$$a_{kx}.X + a_{ky}.Y + a_{kz}.Z = \bar{K} \tag{25}$$

$$a_{TZ}.Z = \bar{T} \tag{26}$$

Following the same process that we applied earlier we can easily calculate the values of the following:

$$\hat{r} = \frac{\hat{P}_y}{\theta_{ky}} \; ; \; \widehat{w}_s = \left(\hat{P}_x - \frac{\hat{P}_y}{\theta_{ky}}\theta_{kx}\right)\frac{1}{\theta_{sx}}$$

$$\hat{X} = \sigma_x \frac{\theta_{kx}}{\theta_{sx}}\left(\hat{P}_x - \frac{\hat{P}_y}{\theta_{ky}}\right) \tag{27}$$

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$$\hat{Y} = (-)\frac{\lambda_{kx}}{\lambda_{ky}}\sigma_x\frac{\theta_{kx}}{\theta_{sx}}\left(\hat{P}_x - \frac{\hat{P}_y}{\theta_{ky}}\right) \tag{28}$$

$$\hat{Z} = -\theta_{lz}\sigma_Z(\hat{w} - \hat{R}) \tag{29}$$

Through a simple manipulation we can arrive at the desired expression for $\hat{w}$.

$$\hat{w} = (-)\frac{\lambda_{ly}}{\lambda_{lz}}\frac{\lambda_{kx}}{\lambda_{ky}}\frac{\theta_{Tz}}{\theta_{lz}}\frac{\theta_{kx}}{\theta_{sx}}\frac{\sigma_x}{\sigma_z}\left(\hat{P}_x - \frac{\hat{P}_y}{\theta_{ky}}\right) \tag{30}$$

A careful investigation of equation (30) discloses that if only P_x falls w would increase and w would fall if P_y falls. If both P_x and P_y fall at the same rate w falls unequivocally as $\theta_{ky} < 1$. One can easily follow the implications for $\hat{X}$, $\hat{Y}$ and $\hat{Z}$ under these conditions. Note that when w decreases (increases) R must increase (decrease) as P_z is assumed to be constant.

5. CONCLUSION AND POSSIBLE EXTENSIONS

We have constructed a general equilibrium trade model with informal sector to substantiate what could happen to the skilled labor, capitalist and commodity production due to an economic recession. This is also shown that the capitalist are the worst sufferers of this situation. However, the informal sector, which provides the alternative opportunity for unskilled workers, actually expands subsequent upon this exogenous shock. Informal workers, in fact, may gain even in "all-loosing" scenario. In output front informal segment grows though formal segment has mixed outcome. Skilled labor-using production goes up whereas unskilled labor using formal segment contracts. It has also been explained what role the capital mobility plays in determining the effect of a recessionary change on output, and on factor return in general and on informal wage in particular.

The structure that we have used in this paper is merely a general one where we got some basic results by using the standard trade theoretic arguments. However, this model can easily be applied to show how a recessionary phase could help ameliorating the wage inequality conundrum. In fact, the result is quite apparent from our model. On the other hand if we assume the capital market to be administered, the first blow would be on the labor market, be it skilled or unskilled. Labor would suffer the most. One can also introduce some institutional problems like bureaucratic corruption associated with so-called "extra-legal" sector in our framework to show that the recession not only help augmenting the informal fragment but also enhance the degree

and size of intermediation activities required to take care of institutional complications. Depending upon the specific production function for intermediation there might be subsequent Rybczynski effects on outputs as well. Lastly our model can easily be extended to bring in an importable intermediate input producing sector which supplies its outputs as inputs to the skilled good sector. Then one can check the simultaneous effects of recession and trade reform (assuming import to be subject to tariff and no export drawback system is applied). In the structure that we just laid down one can easily bring in the issue of determination of P_z where equilibrium P_z depends on income from X and Y. Hence due to recession demand for Z should fall and subsequently leads to a fall in P_z. Thus the effect on w would be modified further. From a different perspective we can assume the informal sector to supply a low-quality substitute good for the high-quality formal goods. A recession would cause a shift in demand in favor of informal good. Thus P_z should increase and consequent change in w would be there. In fact, one can also consider the situation where the informal sector supplies an input to the formal sector. Here implications for w would also be very interesting under different conditions coupled with recession (Marjit (2003) is in the same line but it focuses on the effects of economic reform).

Table 1. The steep fall in traded commodity prices

Commodity group	Peak in 2008*	Jan 2009*	% change
All commodities (excluding crude petroleum)	299.5	189.4	-37
Food	280.6	196.5	-30
Tropical beverages	193.5	165.5	-15
Vegetable oilseeds and oils	370.5	191.7	-48
Agricultural raw materials	228.6	145.6	-36
Minerals, ores and metals	391.6	203.5	-48
Crude petroleum	469.5	155.6	-67

Source: UNCTAD secretariat calculations.

* Price indexes of all and main commodity groups (in terms of current dollars).

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