AGRICULTURAL DUALISM, WAGE INEQUALITY AND DEVELOPMENT POLICIES

Ranjanendra Narayan Nag[1] --- Rakhi Banerjee[2]

[1]*St. Xaviers' College (Autonomous), Kolkata*

[2]*Gurudas College*

ABSTRACT

The main purpose of this paper is to explore how globalization affects wage inequality and welfare in a small open economy characterized by agricultural dualism . By using a three- sector general equilibrium model we establish the possibility of a decline in welfare in the trail of different liberalization measures.In particular, we examine effects of agricultural trade liberalization and capital market liberalization. We demonstrate that implicatins of these liberalization measures for welfare and wage gap are critically sensitive to agricultural dualism, factor specificity and factor intensity ranking.

Keywords: Agricultural dualism, Wage inequality, Inflow of foreign capital, Agricultural trade lioberalization, Welfare.

JEL Classification: F6, Q1, 01.

1. INTRODUCTION

Increase in income inequality adversely affects the people at the lower end of the income spectrum. The coping strength of those adversely affected would decline and this would lead to an increase in social vulnerability of the families surviving at margin. The main purpose of this paper is to explore how globalization would affect the wage gap between skilled and unskilled workers. Before doing so, we would like to address a fundamental issue of why inequality matters. Debates around this issue have grown in recent years. It is widely accepted that wage compensation should reflect workers' contributions and performance. Since workers' contribution and performance show individual variations, it is quite natural that wage inequality is a "natural" aspect of economic reality. At the same time, it has to be accepted that too much inequality on many occasions are not acceptable on moral, social or political grounds. Population surveys have revealed that subjective perceptions of happiness depend more on where an individual's income stands compared with those of other people than on the absolute level of the income. Economic costs, such as higher crime rates, higher expenditures on private and public security, worse public health outcomes and lower average educational achievements are often associated with higher

inequality. A growing body of studies has also highlighted the importance of reducing inequality to achieve poverty reduction[1].

Development with rising income inequality cannot be sustained. Once, we relate the issue of sustainable development to inequality, many other dimensions open up. One such dimension is wage inequality. Over the past two decades, we have noticed a continuous increase in the wage gap between skilled and unskilled workers in several developed and developing countries Empirical studies of Wood (1997), Tendulkar *et al.* (1996) had focused on the incidence of wage inequality in the East Asian countries and Latin American countries. Event studies had revealed that removal of tariff restrictions from sectors that use unskilled labour intensively, growth in foreign investment and decline in union strength of unskilled workers were the prime factors responsible for the growing incidence of wage inequality .The rise in skill premium had taken place both in export-oriented and import-competing industries. The increase in relative wages of skilled-labour in the 1990s was accompanied by an increase in the share of skilled-workers in total employment. *According to Global Wage Report 2008/ 2009, Minimum Wages and Collective Bargaining: Towards Policy Coherence (2008)*,more than two thirds of the developing countries had experienced increase in wage inequality in the twenty first century. However, there were some important exceptions, mainly in Latin American countries such as Brazil, Mexico and Venezuela. The countries which had recorded the largest increase in wage inequality were those that were severely hit by economic crises, such Argentina, the Republic of Korea and Thailand.

According to the conventional idea based on the Hecksher-Ohlin (H-O) and the Stolper-Samuelson theory (H-O-S), trade induced increase in the price of unskilled labour intensive (exported oriented) products would increase the wage of unskilled labourers. On the other hand, the decrease in the price of skilled labour intensive (imported) products would lead to a fall in wages of skilled workers. Empirical evidence has on many occasions proved this idea to be incorrect. A contributory factor leading to increase in wage inequality which was identified was trade in intermediate goods. It was argued that if traded goods are inputs into further production, the implications of trade on wage inequality would be different from that suggested by the standard Hecksher Ohlin Model, (Feenstra and Hanson, 1996,1997, 2003). They had argued that the production of final goods can be split into intermediate stages. They argued that firms found it optimal to "outsource" certain production stages to developing countries. The products which were shifted to developing countries were generally unskilled-labour intensive in a developed country. However, they turned out to be skilled-labour intensive in a developing country. In brief, outsourcing of the value chain increased the average skill intensity of production in developing countries thereby increasing demand for skilled labour.

Keeping in mind the available statistical findings, a legitimate inquiry is how to explain wage gap using general equilibrium framework. The theoretical literature focusing on the deteriorating wage inequality in a general equilibrium framework include works of Feenstra and Hanson (1996), Marjit *et al.* (2004), Marjit and Kar (2005), Chaudhuri and Yabuuchi (2007),

---

[1] See Global Wage Report 2008/ 2009, Minimum Wages and Collective Bargaining: Towards Policy Coherence (2008)

Chaudhuri (2007), Beladi *et al.* (2008), Chaudhuri and Yabuuchi (2008) among others. All these works had shown that given specific structural characteristics of less developed countries, trade liberalization and inflow of foreign capital might produce adverse effects on the income distribution in developing countries. The papers cited above had shown that features of labour markets, structures of production and nature of capital mobility had played crucial roles in determining the effect on wage gap. However, economists have so far paid very little attention to analyzing the consequences of emergence of export oriented modern agricultural sector   and full capital mobility on the skilled-unskilled wage inequality. To do so is the objective of the present paper.

In this paper we incorporate the concept of agricultural dualism and usage of foreign capital in the agricultural sector. This assumption is based on available statistics on FDI. Some stylized facts which pertain to emergence of agricultural dualism in developing countries may be considered. The process of economic reforms has led to a significant change in the organization of production in many emerging market economies. In the globalised world, dichotomy not only exists between urban and rural sector; it also exists within the agricultural and the manufacturing sector. The agricultural sector is no longer a monolithic entity but is divided into two sub sectors namely the traditional agriculture and the modern agriculture. The difference between the above two can be assessed in terms of nature and intensity of inputs used, as well as consumption pattern of these commodities. According to the World Bank (2008), the modern agricultural sector produces processed goods primarily for exports.[2] It is to be noted that the World Trade Organisation (WTO) rules and regulations also provide some kind of incentive for the production of capital intensive, processed agricultural goods.High value agro food commodities are the fastest growing products in most developing countries expanding up to 6% to 7% a year, led by livestock product and horticulture as per World Development Report published in 2008. In the post WTO regime, the composition of international trade in agricultural products has changed significantly. In the early 1970s only six commodities which included coffee, tea, cotton, tobacco, sugar, rubber accounted for more than two thirds of total agricultural exports from developing countries. The picture has changed progressively. In 1970s and 1980s when the world was experiencing wide fluctuations in international agricultural commodity prices,   most developing countries experienced accelerated growth in non traditional agricultural commodities. World Bank (2008) pointed out that fresh and processed fruits and vegetables, fish and fish products, meat, nuts, spices and floriculture account for 43% of agro food exports from developing countries. The report also stated that there is room for further expansion of modern agricultural products especially in the agrarian based less developed countries. The report pointed out that India, Brazil, Philippines, Thailand, China, Ecuador, Costa Rica, Zimbabwe, Guatemala, Kenya, Thailand Mexico, Chile dominate the market for nontraditional agricultural products.The emerging pattern of trade is suggestive of the fact that the commodities produced in the

---

[2]   Modern agricultural sector produces high value agro food commodities such as processed fruits, vegetables, meat, fish products, nuts, spices, floriculture.

traditional agricultural sector have lost their comparative advantage and have become either import competing or non-traded. The FAO statistics revealed that the net cereal imports of developing countries have increased from 39 million tonnes a year in the mid-1970s to 103 million tonnes in 1997-99. This dependence on imports is likely to increase in the years ahead. It has been estimated that by 2030 the developing countries could be importing 265 million tonnes of cereals, which means 14 percent of their consumption, would be imported annually[3].

The distinction between skilled and unskilled labour in the present paper has been conceptualized in terms of the sectors in which they are being utilized. Through this model we explore the consequences of change in the general investment environment of the economy and agricultural trade liberalization. Due to full capital mobility, there is a tendency of the domestic rate of interest to be equalized to the world rate of interest. However, since the cost of investing in a foreign country is higher compared to the cost of investing in the home country, a country specific risk premium exists. These costs arise due to financial instability, political instability, weak governance, corruption. These costs may be referred to as "country specific risks". These additional costs associated with investing in an alien terrain makes investors wary of investing overseas. Thus, countries which want to attract foreign direct investment compensate the country specific risk with a country specific risk premium. Capital inflows are essentially associated with investor's perceptions of lower country risk. The policymakers of developing countries have been assigning priorities to improvement in quality of institutions, enforcement of prudential norms and the transparency of regulatory mechanisms. The combined effect of this new set of initiatives attracts FDI and also reduce country specific risk premium.

Through this paper we would try to explore how the wage gap between two forms of labour change if country specific risk premium decreases. In this model we capture agricultural trade liberalization in terms of increase in price of modern agricultural product. This can be attributed to the fact that globalization would entail increased market access. Apart from analyzing the effect on wage gap between skilled and unskilled labour, we would also explore the effect of globalization on social welfare.

The paper is organized as follows. In section 2 we set up the basic model and perform pertinent comparative static exercises. In section 3 we concentrate on the welfare consequences. Section 4 concludes the paper. Multiple cross effects, factor intensity ranking and factor specificity are crucial in determining the results.

2. THE MODEL AND THE COMPARATIVE STATICS

We consider a developing economy consisting of three sectors. One of the sectors is the import competing industrial sector, (X)[4]. The other two sectors belong to the broad category of

---

[3]   See World Agriculture: Towards 2015/2030. www.fao.org./docrep/004/v3557e/y3557e00.htm

[4]   In the modern day scenario the manufacturing sector of a developing country can also be export oriented in nature.

agriculture. One is the import competing traditional agricultural sector producing wage goods (Y) and the other one is the export oriented modern agricultural sector (Z).

In this model, there exist two types of labour, namely the skilled labour and the unskilled labour. The present model conceptualizes this distinction in terms of the sectors in which they are utilized. The import competing manufacturing sector is produced with the help of skilled labour and capital. Traditional agricultural product is produced with the help of land and unskilled labour. Unskilled labour, land and capital are used for producing the modern agricultural product. In the present model we assume that unskilled labour and skilled labour are not substitutable. However, two types of labour are substitutable with capital. We consider land coefficient to be fixed. The assumption can be defended with the following logic. We may argue that in one hectare of land, the number of saplings that can be grown is exogenously given. We also note that a minimum gap should exist between two saplings. In such a scenario land cannot be substituted by other inputs. Empirical evidence from developing countries, like India, also suggests that the productivity per hectare of land has remained more or less unchanged.

Instead of choosing a supply function for inflow of foreign capital to a developing country, we posit the issue of capital market liberalization in terms of interest rate equalization. The idea is this. Initially, the domestic interest rate is endogenous and higher than the world rate. However, capital market liberalization would entail that domestic rate of interest would tend to get equalized with world rate of interest. However, costs of investing in a foreign country are higher than investing in home country. These costs may be referred to as "country specific risks". In such a situation foreign interest rate plus country specific risk premium would tend to be equalized to the domestic rate of interest.

The following symbols are used for the formal representation of the model:

a_{sx} = skilled labour coefficient in X.

a_{uy} = unskilled labour coefficient in Y

a_{uz} = unskilled labour coefficient in Z.

a_{kx} = capital output ratio in X

a_{kz} = capital output ratio in Z

a_{tz} = land output ratio in Z

a_{ty} = land output ratio in Y

w^{*} = =unionized wage rate

R=rate of return on land

r^* = international interest rate

τ =risk premium

w_s =wage of skilled labour

w_u = wage of unskilled labour.

L_u = endowment of unskilled labour

L_s = endowment of skilled labour.

T= endowment of land

P_x^*, P_z^* = international price of commodity X and Z

P_y^* = Price of product Y

θ_{uy} = distributive share of unskilled labour in Y

θ_{uz} = distributive share of unskilled labour in Z

θ_{sx} = distributive share of skilled labour in X

θ_{kx} = distributive share of capital in X

θ_{kz} = distributive share of capital in Z

θ_{ty} = distributive share of land in Y

θ_{tz} = distributive share of land in Z

λ_{uy} = proportion of unskilled labour employed in Y

λ_{uz} = proportion of unskilled labour employed in Z

λ_{kx} = proportion capital employed in X

λ_{kz} = proportion of capital employed in Z

λ_{ty} = proportion of land employed in Y

λ_{tz} = proportion of land employed in Z

λ_{sx} = proportion of skilled labour employed in X

$\hat{a}$ = proportionate change in variable a

$\sigma^{x}_{k,ls}$ = Elasticity of substitution between capital and skilled labour in X sector

$\sigma^{z}_{k,lu}$ = Elasticity of Substitution between capital and unskilled labour in Z sector

U=Utility

The general equilibrium structure of the model is as follows.

Given the assumption of perfectly competitive markets, the usual price- unit cost equality conditions relating to the three sectors of the economy are given by the following three equations, respectively:

$$a_{sx}.w_s + a_{kx}.r = P^{*}_{x} \ldots.. (1)$$

$$a_{uy}.w_u + a_{ty}.R = P^{*}_{y} \ldots.. (2)$$

$$a_{uz}.w_u + a_{kz}.r + a_{tz}.R = P^{*}_{z} \ldots\ldots (3)$$

Where $r = r^{*} + \tau$, τ - country specific risk premium

Since, in this model we have assumed that the country specific risk premium is exogenous and international interest rate is also exogenously given to the country, we find that domestic interest rate also becomes parametrically given in this model.

Given the full employment condition, the endowment equations are as follows:

$$a_{sx}X = L_s \ldots..(4)$$

$$a_{uy}.Y + a_{uz}.Z = L_u \ldots.. (5)$$

$$a_{ty}Y + a_{tz}.Z = T \ldots\ldots. (6)$$

Elasticity of substitution is as follows:

$$\frac{\hat{a}_{kx} - \hat{a}_{sx}}{\hat{r} - \hat{w}_s} = -\sigma^{x}_{k,ls} \ldots(7)$$

$$\frac{\hat{a}_{kz} - \hat{a}_{uz}}{\hat{r} - \hat{w}_u} = -\sigma^{z}_{k,lu} \ldots(8)$$

2.1. The Working of the Model

The working of the model is as follows.

The endogenous variables of the model are as follows:

Wage of the skilled labour,

Wage of the unskilled labour,

Rent of the land

The amount of manufacturing good Produced

The amount of modern agricultural product produced

and the amount of the traditional agricultural product produced.

The endogenous variables are determined simultaneously from equations (1) to (6). From equation (1) we determine the wage of skilled labour. From equations (2) and (3) we determine the wage of unskilled labour and the rent on land simultaneously. From equations (5) and (6), we determine the amount of traditional agricultural product and modern agricultural product produced. Equation (4) is used for the determination of production level in the skill intensive manufacturing sector.

2.2. Comparative Static Exercise

First, we concentrate on the effects of a fall in risk premium of the country. The policymakers of developing countries have been assigning priorities to improvement in quality of institutions, enforcement of prudential norms and the transparency of regulatory mechanisms. The combined effect of this new set of initiatives attracts FDI and also reduce country specific risk premium.

Differentiating equations (1)-(6) with $\hat{\tau}$ we have (See Mathematical Appendix for detailed derivation)

$$\hat{R} = -\frac{\tau}{r}\hat{\tau}\frac{\theta_{kz}}{\theta_{tz} - \dfrac{\theta_{uz}\theta_{ty}}{\theta_{uy}}} \ldots..(9)$$

$$\hat{w}_u = \frac{\tau}{r}\hat{\tau}\frac{\theta_{ty}}{\theta_{uy}}\frac{\theta_{kz}}{\theta_{tz} - \dfrac{\theta_{uz}\theta_{ty}}{\theta_{uy}}} \ldots.(10)$$

$$\hat{w}_s = -\frac{\theta_{kx}}{\theta_{sx}}\frac{\tau}{r}\theta_{kz}\hat{\tau} \ldots.(11)$$

$$\hat{X} = -\frac{1}{\theta_{kx} + \theta_{sx}} \theta_{kx} \sigma_{k,ls}^{x} (1 + \frac{\theta_{kx}}{\theta_{sx}}) \frac{\tau}{r} \hat{\tau} \ ....(.12)$$

$$\hat{Y} = -\lambda_{uz}\theta_{kz}\sigma_{k,lu}^{z}(1) \frac{1}{[\lambda_{uy} - \frac{\lambda_{uz}\lambda_{ty}}{\lambda_{tz}}]} \frac{1}{1-\theta_{tz}} (\frac{\tau}{r}\hat{\tau} - \frac{\tau}{r}\hat{\tau}\frac{\theta_{ty}}{\theta_{uy}}\frac{\theta_{kz}}{\theta_{tz} - \frac{\theta_{uz}\theta_{ty}}{\theta_{uy}}}) \ ....(13)$$

$$\hat{Z} = (\frac{\lambda_{tz}}{\lambda_{ty}}) \ [\lambda_{uz}\theta_{kz}\sigma_{k,lu}^{z}(1) \frac{1}{[\lambda_{uy} - \frac{\lambda_{uz}\lambda_{ty}}{\lambda_{tz}}]} \frac{1}{1-\theta_{tz}} (\frac{\tau}{r}\hat{\tau} - \frac{\tau}{r}\hat{\tau}\frac{\theta_{ty}}{\theta_{uy}}\frac{\theta_{kz}}{\theta_{tz} - \frac{\theta_{uz}\theta_{ty}}{\theta_{uy}}}) \ ].(12)$$

From the above mathematical derivations we come to the following proposition.

Proposition 1: Consequent upon fall in country specific risk premium, wage gap between skilled and unskilled labourers increase provided modern agricultural sector is land intensive compared to the traditional agricultural sector.

Comment: As country specific risk premium falls, wage of skilled labour increases. This follows from equation (1). It is to be noted that as risk premium falls, there is a change in equation (3). A fall in risk premium can be thought of as an increase in RHS of equation (3). If the modern agricultural sector is land intensive compared to the traditional agricultural sector, then following the Stolper Samuelson Theorem, the wage of the unskilled labour falls and the rent on land increases. From the above derivations we find that:

$$\hat{w}_{u} - \hat{w}_{s} = \frac{\tau}{r}\hat{\tau}\frac{\theta_{ty}}{\theta_{uy}}\frac{\theta_{kz}}{\theta_{tz} - \frac{\theta_{uz}\theta_{ty}}{\theta_{uy}}} - [-\frac{\theta_{kx}}{\theta_{sx}}\frac{\tau}{r}\theta_{kz}\hat{\tau}]$$

It goes without saying that there is worsening of income distribution between skilled and unskilled labour. It follows from the fact that the wage of skilled labour rises and that of unskilled labour falls.

Corollary A:. Consequent upon fall in country specific risk premium, production in the skill intensive sector increases. On the other hand, land intensive modern agricultural sector contracts and traditional agricultural sector expands.

Comment: As risk premium of a country falls, wage of the skilled labour rises (follows from equation 1). This can be thought of as an increase in skilled labour endowment of the economy. This is because of the fact that the skilled labour usage in the skill intensive sector decreases and capital usage in the same increases. As level of skilled labour increases, production of the skill intensive sector rises. We also find from the above set of equations that:

$$\hat{w}_{u} - \hat{r} = \frac{\tau}{r}\hat{\tau}(\theta_{ty} - \theta_{tz}) > 0$$

As $(\frac{\hat{w}_u}{\hat{r}})$ increases, there is a fall in utilization of unskilled labour. This can be thought of as an increase in the endowment of unskilled labour. Given, that the traditional agricultural sector is labour intensive, production of the traditional agricultural sector rises and following the Rybzynscki argument, production in the modern agricultural sector falls.

Next, we turn to examine the effect of agricultural trade liberalization. The process of removing agricultural trade restrictions would allow farmers to take advantage of higher world prices. Thus, liberalizing agricultural trade would equalize the domestic agricultural price to the higher world price for a small open economy.

Differentiating equations (1-6) with respect to price of traded agricultural sector we have (Refer to mathematical appendix for detailed derivation)

$$\hat{w}_s = 0 \ ....(14)$$

$$\hat{w}_u = -\frac{\theta_{ty}}{\theta_{uy}} \{ \frac{1}{\theta_{tz} - \frac{\theta_{uz}\theta_{ty}}{\theta_{uy}}} \} \hat{P}_z^* \ ....(15)$$

$$\hat{R} = -\frac{\theta_{ty}}{\theta_{uy}} \{ \frac{1}{\theta_{tz} - \frac{\theta_{uz}\theta_{ty}}{\theta_{uy}}} \} \hat{P}_z^* \ .....(16)$$

$$\hat{X} = 0 \ ...(17)$$

$$\hat{Y} = [\lambda_{uz}\theta_{kz}\sigma_{k,lu}^z (1) \frac{1}{[\lambda_{uy} - \frac{\lambda_{uz}\lambda_{ty}}{\lambda_{tz}}]}] \{ -\frac{\theta_{ty}}{\theta_{uy}} \{ \frac{1}{\theta_{tz} - \frac{\theta_{uz}\theta_{ty}}{\theta_{uy}}} \} \hat{P}_z^* \} \ ....(18)$$

$$\hat{Z} = [-(\frac{\lambda_{ty}}{\lambda_{tz}}) \lambda_{uz}\theta_{kz}\sigma_{k,lu}^z (1) \frac{1}{[\lambda_{uy} - \frac{\lambda_{uz}\lambda_{ty}}{\lambda_{tz\,t}}]}] \{ -\frac{\theta_{ty}}{\theta_{uy}} \{ \frac{1}{\theta_{tz} - \frac{\theta_{uz}\theta_{ty}}{\theta_{uy}}} \} \hat{P}_z^* \} \ .(19)$$

From the above equations we come to the following proposition.

Proposition 2: Following Agricultural Trade Liberalization, wage gap between the skilled and the unskilled labour increases if the modern agricultural sector is land intensive compared to the traditional agricultural sector.

Comment: Following agricultural trade liberalization, wage of skilled labour remains unchanged. If the modern agricultural sector is land intensive compared to the traditional agricultural sector, wage of the unskilled labour would fall and rent on land would increase. This follows from the Stolper -Samuelson Theorem.

From the above derivations we find that:

$$\hat{w}_s - \hat{w}_u = \frac{\theta_{ty}}{\theta_{uy}}\{\frac{1}{\theta_{tz} - \frac{\theta_{uz}\theta_{ty}}{\theta_{uy}}}\}\hat{P}_z^*$$

As wage of skilled labour remains unchanged and wage of the unskilled labour falls, it goes with saying that wage gap between skilled and unskilled labour increases.

Corollary B: Following Agricultural Trade Liberalization, production of the skill intensive sector remains unchanged. Production of the modern agricultural sector increases whereas production of traditional agricultural sector contracts.

Comment: The manufacturing sector uses a specific factor, skilled labour. As the skilled labour force remains unchanged, there is no change in the sector using skilled labour. Following agricultural trade liberalization, wage of unskilled labour falls. This leads to an increase in labour usage in the agricultural sector. This can be thought of as fall in unskilled labour endowment. If modern agricultural sector is land intensive compared to traditional agricultural sector, production in the modern agricultural sector expands and that in the traditional agricultural sector contracts.

3. WELFARE ANALYSIS

We would make use of the concept of expenditure function to explore the effect of fall in the risk premium and agricultural trade liberalization on welfare of the economy. Since, total expenditure at domestic prices is equal to the value of production of X,Y,Z at domestic prices net of interest income repatriated back, we get[5]:

$$E[P_x^*, P_{y'}^*, P_z^{*'}, U] = P_x^* X + P_y^* Y + P_z^* Z - rK_f \quad _{6}\ldots(120$$

Where, K_f = Foreign capital

Where

$E[P_x^*, P_y^*, P_z^*, U]$ = expenditure function

$$\frac{\delta E(P_x^*, P_y^*, P_{y'}^*, U)}{\delta U} > 0, \frac{\delta E(P_x^*, P_y^*, P_z^*, U)}{\delta P_x^*} > 0, \frac{\delta E(P_x^*, P_y^*, P_{z,}^* U)}{\delta P_y^*} > 0, \frac{\delta E(P_x^*, P_{y'}^*, P_z^*, U)}{\delta P_z^*} > 0$$

Moreover, expenditure function is concave in product prices.

We now concentrate on the effect of a fall in country specific risk premium. Differentiating the expenditure function with respect to risk premium we have:

---

[5]   Refer to Ethier (1988).

[6]   When all goods are traded and no tariff is imposed domestic price is equal to foreign price.

$$\frac{\delta E(P_x^*, P_y^*, P_z^*, U)}{\delta U} dU = XP_x^* \hat{X} + YP_y^* \hat{Y} + ZP_z^* \hat{Z} - K_f d\tau \; ....(21)$$

Replacing the values of the variables we have:

$$\frac{\delta E(P_x^*, P_y^*, P_z^*, U)}{\delta U} dU = -P_x^* \tau \hat{\tau} \frac{X}{r(\theta_{kx} + \theta_{sx})} \theta_{kx} \sigma_{k,ls}^x (1 + \frac{\theta_{kx}}{\theta_{sx}}) +$$

$$\tau \hat{\tau} \frac{1}{r} (-P_y^* Y + \frac{\lambda_{tz}}{\lambda_{ty}} P_z^* Z)(1 - \frac{\theta_{ty}\theta_{kz}}{\theta_{uy}\{\theta_{tz} - \frac{\theta_{uz}\theta_{ty}}{\theta_{uy}}\}}) \frac{\lambda_{uz}\theta_{kz}\sigma_{k,lu}^z}{(1-\theta_{tz})\{\lambda_{uy} - \frac{1}{\lambda_{tz}}\lambda_{uz}\lambda_{ty}\}} - K_f d\tau$$

Consequent upon fall in country specific risk premium, production in the skill intensive sector increases. On the other hand, the land intensive modern agricultural sector contracts and the traditional agricultural sector expands. The change in output composition affects the value of production measured at domestic prices. The increase in the skill intensive sector and the traditional agricultural sector helps in increasing the value of production measured at domestic prices. On the other hand, the fall in production of the modern agricultural sector leads to a fall in the value of production at domestic prices. This depresses welfare. On the other hand, reduction in fall of country specific risk premium reduces the amount of interest income repatriated back. This increases welfare. Hence, there are various effects acting on welfare of the economy. If the negative effect arising due to fall in the value of production at domestic prices outweighs the positive effect which follows from increase in value of production at domestic prices and fall in interest income repatriated back, total social welfare of the economy falls. The sufficient condition for immeserisation is as follows:

$$-P_x^* \tau \hat{\tau} \frac{X}{r(\theta_{kx} + \theta_{sx})} \theta_{kx} \sigma_{k,ls}^x (1 + \frac{\theta_{kx}}{\theta_{sx}}) +$$

$$\tau \hat{\tau} \frac{1}{r} (-P_y^* Y + \frac{\lambda_{tz}}{\lambda_{ty}} P_z^* Z)(1 - \frac{\theta_{ty}\theta_{kz}}{\theta_{uy}\{\theta_{tz} - \frac{\theta_{uz}\theta_{ty}}{\theta_{uy}}\}}) \frac{\lambda_{uz}\theta_{kz}\sigma_{k,lu}^z}{(1-\theta_{tz})\{\lambda_{uy} - \frac{1}{\lambda_{tz}}\lambda_{uz}\lambda_{ty}\}} - K_f d\tau < 0$$

We now concentrate on the effect of agricultural trade liberalization.

Differentiating the expenditure function with respect to price of traded agricultural commodity we have:

$$\frac{\delta E(P_x^*, P_y^*, P_z^*, U)}{\delta U} \frac{dU}{dP_z^*} = Z + P_x^* \frac{\delta X}{\delta P_z^*} + P_y^* \frac{\delta Y}{\delta P_z^*} + P_z^* \frac{\delta Z}{\delta P_z^*} - \frac{\delta E}{\delta P_z^*} \; ...(22)$$

Replacing the values of the variables we find:

$$\frac{\delta E(P_x^*, P_y^*, P_z^*, U)}{\delta U} \frac{dU}{dP_z^*} = -\frac{\delta E}{\delta P_z^*} + Z +$$

$$(P_y^* \frac{Y}{P_z^*} - \frac{\lambda_{ty} Z}{\lambda_{tz}}) \, [\lambda_{uz} \theta_{kz} \sigma_{k,lu}^z (1) \frac{1}{[\lambda_{uy} - \frac{\lambda_{uz} \lambda_{ty}}{\lambda_{tz}}]}] \{-\frac{\theta_{ty}}{\theta_{uy}} \{\frac{1}{\theta_{tz} - \frac{\theta_{uz} \theta_{ty}}{\theta_{uy}}}\}$$

The change in welfare depends on the change in the value of production at domestic price and also physical volume of export of Z. Following Agricultural Trade Liberalization, production of the skill intensive sector remains unchanged. Production of the modern agricultural sector increases whereas production of the traditional agricultural sector contracts. The increase in the production of the modern agricultural sector increases value of production measured at domestic prices. However, there is a negative effect on value of production at domestic prices due to fall in the production of the traditional agricultural sector. It is also to be noted that from Sheppard's Lemma it follows that $\frac{\delta E}{\delta P_z^*}$ is demand for modern agricultural product. The term Z denotes supply of modern agricultural product. Hence, $(Z - \frac{\delta E}{\delta P_z^*})$ represents physical volume of exports of the export oriented modern agricultural produce.

We thus notice that there are various effects acting on welfare of the economy. If the negative effect on welfare outweighs the positive effect, immeserisation follows. Sufficient condition for immeserisation is as follows:

$$(Z - \frac{\delta E}{\delta P_z^*}) + (P_y^* \frac{Y}{P_z^*} - \frac{\lambda_{ty} Z}{\lambda_{tz}}) \, [\lambda_{uz} \theta_{kz} \sigma_{k,lu}^z (1) \frac{1}{[\lambda_{uy} - \frac{\lambda_{uz} \lambda_{ty}}{\lambda_{tz}}]}] \{-\frac{\theta_{ty}}{\theta_{uy}} \{\frac{1}{\theta_{tz} - \frac{\theta_{uz} \theta_{ty}}{\theta_{uy}}}\} < 0$$

From the above analysis, we come to the following proposition:

Proposition 3: Possibility of immeserisation exists if there is a fall in country specific risk premium or the country embarks upon a policy of agricultural trade liberalization.

4. CONCLUSION

Through this paper we have examined the consequences of a fall in country specific risk premium and agricultural trade liberalization. Stylised facts have motivated us to construct a model where foreign capital is being utilized not only by the manufacturing sector but also by the modern export oriented agricultural sector. An increase in FDI and agricultural trade liberalization leads to worsening of income distribution between skilled and unskilled workers.

Moreover, immeserisation may become a reality in both the cases. However, what should also be noted is that these results are crucially dependent on factor usage, factor intensity ranking and factor specificity. The present model can be extended in various directions. One such extension is the introduction of a non traded agricultural sector.

In times of globalization, worsening income distribution and a fall in total factor rewards of the economy are disturbing global phenomena. Hence, the sequence, speed and modalities of globalization need to be judiciously worked out.

4.1. Mathematical Appendix

4.1.1. Mathematical Appendix of Section 2

Given the assumption of perfectly competitive markets, the usual price- unit cost equality conditions relating to the three sectors of the economy are given by the following three equations, respectively:

$$a_{sx}.w_s + a_{kx}.r = P^*_x \dots (1)$$

$$a_{uy}.w_u + a_{ty}.R = P^*_y \dots (2)$$

$$a_{uz}.w_u + a_{kz}.r + a_{tz}.R = P^*_z \dots (3)$$

Given the full employment condition, the endowment equations are given as follows.

$$a_{sx}X = L_s \dots (4)$$

$$a_{uy}.Y + a_{uz}.Z = L_u \dots (5)$$

$$a_{ty}Y + a_{tz}.Z = T \dots (6)$$

Where,'

$$r = r^* + \tau$$

4.1.2. Fall in the Risk Premium

From the price system condition we have:

$$\theta_{sx}.\hat{w}_s + \theta_{kx}.\hat{r} = 0 \dots (a1)$$

$$\theta_{uy}.\hat{w}_u + \theta_{ty}.\hat{R} = 0 \dots (a2)$$

$$\theta_{uz}.\hat{w}_u + a_{kz}.\hat{r} + a_{tz}.\hat{R} = 0 \dots (a3)$$

From (a1, a2, a3) we have:

$$\hat{R} = -\frac{\tau}{r}\hat{\tau}\frac{\theta_{kz}}{\theta_{tz} - \dfrac{\theta_{uz}\theta_{ty}}{\theta_{uy}}} \quad .....(8)$$

$$\hat{w}_u = \frac{\tau}{r}\hat{\tau}\frac{\theta_{ty}}{\theta_{uy}}\frac{\theta_{kz}}{\theta_{tz} - \dfrac{\theta_{uz}\theta_{ty}}{\theta_{uy}}} \quad ....(9)$$

$$\hat{w}_s = -\frac{\theta_{kx}}{\theta_{sx}}\frac{\tau}{r}\theta_{kz}\hat{\tau} \quad ....(.10)$$

From the endowment equation we have:

$$\lambda_{sx}\hat{X} = -\lambda_{sx}\hat{a}_{sx} \quad .....(.a4)$$

$$\lambda_{uy}.\hat{Y} + \lambda_{uz}.\hat{Z} = -\lambda_{uy}\hat{a}_{uy} - \lambda_{uz}\hat{a}_{uz} \quad ..... (a5)$$

$$\lambda_{ty}\hat{Y} + \lambda_{tz}.\hat{Z} = 0 \quad .... (a6)$$

Elasticity of substitution is as follows:

$$\frac{\hat{a}_{kx} - \hat{a}_{sx}}{\hat{r} - \hat{w}_s} = -\sigma_{k,ls}^{x} \quad ...(a7)$$

$$\frac{\hat{a}_{kz} - \hat{a}_{uz}}{\hat{r} - \hat{w}_u} = -\sigma_{k,lu}^{z} \quad ...(a8)$$

From (a4-2.a8) and also equations (8), (9) we have the following equations.

$$\hat{X} = -\frac{1}{\theta_{kx} + \theta_{sx}}\theta_{kx}\sigma_{k,ls}^{x}(1 + \frac{\theta_{kx}}{\theta_{sx}})\frac{\tau}{r}\hat{\tau} \quad ....(11)$$

$$\hat{Y} = -\lambda_{uz}\theta_{kz}\sigma_{k,lu}^{z}(1)\frac{1}{[\lambda_{uy} - \dfrac{\lambda_{uz}\lambda_{ty}}{\lambda_{tz}}]}\frac{1}{1-\theta_{tz}}(\frac{\tau}{r}\hat{r} - \frac{\tau}{r}\hat{\tau}\frac{\theta_{ty}}{\theta_{uy}}\frac{\theta_{kz}}{\theta_{tz} - \dfrac{\theta_{uz}\theta_{ty}}{\theta_{uy}}}) \quad ....(12)$$

$$\hat{Z} = (\frac{\lambda_{tz}}{\lambda_{ty}})\ \lambda_{uz}\theta_{kz}\sigma_{k,lu}^{z}(1)\frac{1}{[\lambda_{uy} - \dfrac{\lambda_{uz}\lambda_{ty}}{\lambda_{tz}}]}\frac{1}{1-\theta_{tz}}(\frac{\tau}{r}\hat{r} - \frac{\tau}{r}\hat{\tau}\frac{\theta_{ty}}{\theta_{uy}}\frac{\theta_{kz}}{\theta_{tz} - \dfrac{\theta_{uz}\theta_{ty}}{\theta_{uy}}})].(13)$$

4.1.3. The Agricultural Trade Liberalization

From the price system condition we have:

$$\theta_{sx}.\hat{w}_s = 0 \;.....\text{(a11)}$$

$$\theta_{uy}.\hat{w}_u + \theta_{ty}.\hat{R} = 0 \;.....\text{(a22)}$$

$$\theta_{uz}.\hat{w}_u + a_{tz}.\hat{R} = \hat{P}_z^* \;......\text{(a33)}$$

From (a11, a22,a33) we have:

$$\hat{w}_s = 0 \;....\text{(14)}$$

$$\hat{w}_u = -\frac{\theta_{ty}}{\theta_{uy}}\{\frac{1}{\theta_{tz} - \dfrac{\theta_{uz}\theta_{ty}}{\theta_{uy}}}\}\hat{P}_z^* \;....\text{(15)}$$

$$\hat{R} = -\frac{\theta_{ty}}{\theta_{uy}}\{\frac{1}{\theta_{tz} - \dfrac{\theta_{uz}\theta_{ty}}{\theta_{uy}}}\}\hat{P}_z^* \;.....\text{(16)}$$

From the endowment equation we have:

$$\lambda_{sx}\hat{X} = -\lambda_{sx}\hat{a}_{sx} \;.....\text{(a4)}$$

$$\lambda_{uy}.\hat{Y} + \lambda_{uz}.\hat{Z} = -\lambda_{uy}\hat{a}_{uy} - \lambda_{uz}\hat{a}_{uz} \;.....\text{(a5)}$$

$$\lambda_{ty}\hat{Y} + \lambda_{tz}.\hat{Z} = 0 \;.......\text{(a6)}$$

Elasticity of substitution is as follows:

$$\frac{\hat{a}_{kx} - \hat{a}_{sx}}{\hat{r} - \hat{w}_s} = -\sigma_{k,ls}^x \;...\text{(a7)}$$

$$\frac{\hat{a}_{kz} - \hat{a}_{uz}}{\hat{r} - \hat{w}_u} = -\sigma_{k,lu}^z \;...\text{(a8)}$$

From (a4–a8) and also equations (.13), (14) we have the following equations.

$$\hat{X} = 0 \;...\text{(17)}$$

$$\hat{Y} = \lambda_{uz}\theta_{kz}\sigma_{k,lu}^z (1)\frac{1}{[\lambda_{uy} - \dfrac{\lambda_{uz}\lambda_{ty}}{\lambda_{tz\,t}}]}]\{-\frac{\theta_{ty}}{\theta_{uy}}\{\frac{1}{\theta_{tz} - \dfrac{\theta_{uz}\theta_{ty}}{\theta_{uy}}}\}\hat{P}_z^*\} \;....\text{(18)}$$

$$\hat{Z} = -(\frac{\lambda_{ty}}{\lambda_{tz}}) \; \lambda_{uz}\theta_{kz}\sigma_{k,lu}^{z} (1) \frac{1}{[\lambda_{uy} - \frac{\lambda_{uz}\lambda_{ty}}{\lambda_{tzt}}]}] \{-\frac{\theta_{ty}}{\theta_{uy}}\{\frac{1}{\theta_{tz} - \frac{\theta_{uz}\theta_{ty}}{\theta_{uy}}}\}\hat{P}_{z}^{*}\} \, .(19)$$

REFERENCES

Beladi, H., S. Chaudhuri and S. Yabuuchi, 2008. Can international factor mobility reduce wage inequality in a dual economy? Review of International Economics, 16(5): 893-903.

Beyer, H., P. Rojas and R. Vergara, 1999. Trade liberalisation and wage inequality. Journal of Development Economics, 59: 103-123.

Chaudhuri, S., 2007. Foreign capital, welfare and urban unemployment in the presence of agricultural dualism. Japan and the World Economy, 19: 149-165.

Chaudhuri, S., 2008. Fair wage hypothesis, foreign capital inflow and skilled-unskilled wage inequality in presence of agricultural dualism (papers.ssrn.com/sol3/papers.cfm?_abstract_id=1226048) Retrieved and viewed on 1.12.12 at 7.30 P.M.

Chaudhuri, S. and S. Yabuuchi, 2007. Economic liberalisation and wage inequality in presence of labour market imperfection. International Review of Economics and Finance, 1: 592-603.

Chaudhuri, S. and S. Yabuuchi, 2008. Foreign capital and skilled-unskilled wage inequality in a developing economy with non-traded goods, Marjit, S., Yu, E. (Eds.), Contemporary and emerging issues in trade theory and policy. UK.: Emerald Group Publishing Limited.

Ethier, W.J., 1988. Modern international economics. 2nd Edn., New York. Lodon: WW Norton and Company.

Economic Survey, 1998-1999. Economic Survey (2005-2006). Available from www.indiabudget.nic.in [Accessed 11.6.13 at 10 p.m].

Feenstra, R.C. and G.H. Hanson, 1996. Foreign investment, outsourcing and relative wages, Feenstra, Grossman and Irwin (Eds) Political economy of trade policies: Essays in honour of J.N.Bhagawati., Cambridge: MIT Press.

Feenstra, R.C. and G.H. Hanson, 1997. Foreign direct investment and relative wages: Evidence from Mexico's Maquiladoras, Journal of International Economics, 42(3/4): 371-393.

Feenstra, R.C. and G.H. Hanson, 2003. Global production sharing and rising inequality: A survey of trade and wages, Choi, E.K and Harrigan, J (Eds), Handbook of international trade. London: Basil Blackwell.

Food and Agricultural Organnisation, 2012. Agriculture, trade and food security issues and options in the WTO negotiation. Available from www.fao.org [Accessed 1.11.2012 at 9 P.M].

Food and Agricultural Organnisation, 2012. Monitoring access to food and household food security. FAO corporate document repository. Available from www.fao.org [Accessed 28.8.12 at 9.30 A.M].

Food and Agriculture Organisation (FAO), 1985. Fifth world food survey, rome. Available from www.fao.org [Accessed 30.11.12 at 10 A.M].

Food and Agriculture Organisation (FAO), 2002. World agriculture: Towards 2015/2030. Available from www.fao.org/docrep/004/y3557e/y3557e00.htm [Accessed 12.02.2012 at 12.20 PM].

Food and Agriculture Organisation (FAO), 2004. The state of agricultural commodity markets. Available from www.fao.org [Accessed 12.02.2012 at 11.30 PM].

Food and Agriculture Organisation (FAO), 2012. Corporate document repository. The market for non-traditional agricultural exports, section 5. Available from www.fao.org [Accessed 1.11.12 at 10 A.M].

Food and Agriculture Organisation (FAO), 2012. Corporate document repository, title. The market for non traditional agricultural exports. Available from http://www.fao.org/docrep/007/y5445e/y5445e07.htm#bm07 [Accessed 1.10.12 at 5.30 PM].

Hanson, G.H. and A. Harrison, 1999. Trade liberalisation and wage inequality in Mexico. Industrial and Labour Relations Review, 52(2): 271-288.

Marjit, S., 2003. Economic development, trade and wages. German Economic Review, 4: 1-17.

Marjit, S., H. Beladi and S. Chakrabarty, 2004. Trade and wage inequality in developing countries. Economic Inquiry, 42(2): 295-303.

Marjit, S. and S. Kar, 2005. Emigration and wage inequality. Economic Letters, 88: 141-145.

Tendulkar, S., D.K. Sundaram and L.R. Jain, 1996. Macroeconomic policies and poverty in India, 1966-67 to 1993-94. Monograph, New Delhi.

Wood, A., 1997. Openness and wage inequality in developing countries: The Latin American challenge to East Asian conventional wisdom. World Bank Research Observer, 11(1): 33-57.

World Bank, 2008. World development report. Washington D.C: Agriculture for Development Published in the year 2007 by Oxford University Press for The World Bank.