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CAPITAL MOBILITY, URBAN UNEMPLOYMENT AND TOURISM DEVELOPMENT

Manash Ranjan GUPTA

Economic Research Unit, Indian Statistical Institute, Kolkata, India

and

Priya Brata DUTTA

Economics and Politics Department, Visva-Bharati University, Bhirbhum, India

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Abstract: We develop a Harris-Todaro (1970) type of model to analyse the effect of tourism development on urban unemployment problem. How tourism development affects unemployment and national income in this model is conditional on assumptions regarding intersectoral capital mobility. If capital is perfectly mobile among all sectors, then tourism development in either region does not affect national income but raises (lowers) urban unemployment if the agricultural sector is more capital (labour) intensive than the tourism sector when urban manufacturing sector has the highest capital intensity. However, with capital being sector specific to the tourism sector but mobile between the urban manufacturing sector and the rural agricultural sector, tourism development in the either region raises urban unemployment when the urban manufacturing sector has the highest capital intensity and always raises national income in South. If capital is specific to the urban manufacturing sector but is mobile between the agricultural sector and the rural tourism sector, then tourism development in either region always raises national income but lowers the level of urban unemployment if the agricultural sector is more capital intensive than the rural tourism sector.

Key words: Tourism development, urban unemployment, rural-urban migration, general equilibrium, capital mobility.

JEL Classification Number: F66, J60, Z32.

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E-mail: priyabratadutta@gmail.com (P. B. Dutta.)

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1. INTRODUCTION

Tourism development has emerged as an engine of economic development for many less developed countries. It is one of the most significant sources of their foreign exchange earnings. For example, in 1995, HongKong earned about one billion US dollars from tourism; and this accounted for 8% of its Gross Domestic Product (GDP). In Cyprus, tourism activities accounts for about 20% of its GDP in 2014. In 2012, Tourism contributes about 15 billion US dollar to the foreign exchange earning of Jamaica; and it shares is 4.5% of its GDP. Gunduz and Hatemi-J (2005) analyses the effect of tourism development in Turkey; and shows that it has a positive impact on economic growth. Kim et. al. (2006) finds a direct relationship between tourism expansion and GDP growth in Taiwan. Balaguer and Cantavella-Jorda (2002) reports a long-term positive relationship between tourism receipts and Gross Domestic Product in Spain. Dritsakis (2004) finds a similar evidence in the context of Greece. Lee and Chang (2008) concludes that tourism development may enhance economic growth in OECD countries in the long run.

Tourism development can reduce the extent of poverty problem in less developed countries by creating employment opportunities there. For example, in Nepal, tourism sector has the second highest share in National employment as well as in national income, next to agriculture. According to Perles-Ribes et. al. (2016), tourism activities represented 10.9% of the Gross Domestic Product (GDP) and 11.9% of total employment in Spain in 2014. In Canary Islands, 31.4% of GDP and 35.9% of employment come from tourism sector in that year. These figures are 45.5% and 34.8% respectively in Balearic Islands in that year. Tourism development contributes to foreign exchange earning in dual economies too; and relevant empirical findings are available in UNWTO (2017) and Saner et. al. (2015). In India, foreign exchange earnings from international tourist arrivals at current prices has increased by more than 600% during the period from 2000–2012. In Pakistan, international tourist arrivals contribute to more than 369 million US dollar in 2012. Among the African countries, Kenya earns about 879 million US dollar and Tanzania earns about 796 US dollar from international tourism in 2015.

There exists substantial works about economic benefits of tourism development in a less developed economy. A few works analyse economic effects of tourism development without developing formal models[1]. Copeland (1991) first analyses these effects using a competitive general equilibrium model of a small open economy; and then attempts to find out conditions under which tourism development would bring welfare improvement. However, Copeland (1991) assumes a full employment model and thus ignores its effect on unemployment problem. Many other general equilibrium models have been

[1] See, for example, Mathieson and Wall (1982), Pearce (1989), Gray (1970,1982) etc.

developed extending Copeland (1991) model and re analysing its results[2]. However, there does not exist any theoretical model in the literature linking tourism development to unemployment problem except the work of Hazari and Sgro (2015, Chapter 8).

Hazari and Sgro (2015, Chapter 8) analyzes this problem in a Harris Todaro (1970) framework focusing on the urban unemployment problem resulting from rural-urban migration. They consider two regions in their model- urban and rural. Each of these two regions is again sub-divided into a traded good sector and a non-traded tourism service sector. Their analysis shows that tourism development in either region may lower the level of urban unemployment depending on the capital intensity ranking between the tourism sector and the non-tourism sector. This analysis based on the Harris-Todaro (1970) framework is of relevance to many African Countries and to the South Asian countries like India, Pakistan and Bangladesh where urban unemployment and informal sector resulting from rural-urban migration appear to be serious problem to the policy makers. However, Hazari and Sgro (2015, Chapter 8) assume capital to be specific to each region; and does not analyse the role of capital mobility between urban region and rural region.

In this paper, we want to reanalyse the effect of tourism development on urban unemployment problem using the Harris Todaro (1970) framework introducing various types of capital mobility among different sectors. Like Hazari and Sgro (2015, Chapter 8), we also assume that, the urban region faces a protected labour market with a fixed wage rate and the wage rate in the rural region is flexible and market determined. Rural-urban migration mechanism is of Harris-Todaro (1970) type; and in migration equilibrium, the expected urban wage equals the rural wage. Contrary to Hazari and Sgro (2015, Chapter 8), we introduce various alternative assumptions about inter regional and inter sectoral capital mobility; and show that effects of tourism development on unemployment and national income not only depend on the capital intensity rankings of different sectors but also on the nature of capital mobility among different sectors.

The basic model consists of three sectors- an urban manufacturing sector, a rural agricultural sector and a rural non-traded tourism service sector. Capital is perfectly mobile among all these three sectors; and the urban manufacturing sector has the highest capital intensity. Rural labour is perfectly mobile between two rural sectors and thus there is only one rural labour market with a flexible rural wage rate. However, the urban manufacturing sector faces a protected labour market with a fixed wage rate. The basic model is then extended by considering sector specific capital to the rural tourism sector and next considering sector specific capital to the urban manufacturing sector. Finally we introduce urban tourism sector replacing the rural tourism sector.

We derive three interesting results from these models How tourism development affects urban unemployment and national income is conditional on assumptions regarding

[2] For example, Hazari and Sgro (1995) focuses on the positive effect of tourism development on foreign imported capital accumulation; Chao et. al. (2004) introduces the effect of cash in advance constraint which creates a distortion; Chao et. al. (2005) emphasizes the role of imperfect competition and of social externalities created by tourism. Hazari and Sgro (2015) analyse various issues related to tourism development in different chapters of their book.

intersectoral capital mobility. First, if capital is perfectly mobile among all sectors, then tourism development in either region does not affect national income and raises (lowers) urban unemployment if the agricultural sector is more capital (labour) intensive than the tourism sector when urban manufacturing sector has the highest capital intensity. Secondly, if capital is sector specific to the tourism sector but is mobile between the urban manufacturing sector and the rural agricultural sector, then tourism development in either region always raises national income but raises urban unemployment when the urban manufacturing sector has the highest capital intensity. Thirdly, if capital is sector specific to the urban manufacturing sector but is mobile between the agricultural sector and the rural tourism sector, then tourism development in the rural region always raises national income but lowers the level of urban unemployment if the agricultural sector is more capital intensive than the rural tourism sector. In many cases, our results are opposite to what found in Hazari and Sgro (2015, Chapter 8).

The basic model is developed in section 2 and its working is described in section 3. Sector specific capital to the tourism sector is introduced in section 4; and that to the urban manufacturing sector is introduced in section 5. Finally, the case of urban tourism sector is analysed in section 6. Concluding remarks are made in section 7.

2. THE BASIC MODEL

We consider a small open three sector economy called South with two factors of production- labour and capital. Sector M and sector A produce two traded goods; and sector T produces the non-traded tourism service to satisfy demand of international tourists. Sector M is a urban manufacturing sector and sector A is a rural agricultural sector. The tourism sector T is also located in the rural region[3]. Rural labour is perfectly mobile between sector A and sector T Rural-urban migration mechanism is of Harris-Todaro (1970) type. The urban manufacturing sector faces a protected labour market with a fixed wage rate but the common wage rate in two rural sectors is flexible and market determined. In the migration equilibrium, the expected urban wage equals the rural wage. Capital is perfectly mobile among all these three sectors[4]; and the urban manufacturing sector has the highest capital intensity of all these sectors. Rental rate on capital is perfectly flexible and this flexibility ensures full utilization of capital stock. The equilibrium price of the non-traded tourism service is determined by the equality of its supply and demand in the home market; and the tourism service is a normal good implying that its level of demand varies inversely with its price and positively with the level of income of the outside world called North. The increase in Northern income causes Northern tourists to tour more to South and thus raises the international demand for tourism service. This increase in demand is defined as tourism development in this model[5]. There is no demand for tourism service from the consumers in South.

[3] We consider an urban tourism sector in section 6.

[4] This assumption is modified in sections 4 and 5.

[5] Copeland (1991) defines tourism development as an exogenous upward shift of the demand function for tourism service.

Production function in each of these three sectors in South satisfies all standard neo-classical properties including constant returns to scale. All markets are competitive. The representative firm in each of these three sectors maximizes profit.

We use following notations.

K = Exogenously given capital endowment.

L = Exogenously given labour endowment.

a_{ji} = Per unit requirement of the jth input in ith sector for $j = L, K$ and $i = M, A, T$.

P_i = Price of the ith traded good.

P_T = Price of the non-traded tourism service.

$\bar{w}$ = Fixed urban wage rate.

w = Flexible rural wage rate.

r = Rental rate on capital.

X_i = Level of output of ith sector.

$Y_S(Y_N)$ = National income of South (North).

θ_{ji} = Distributive share of jth input in ith sector for $j = L, K$ and $i = M, A, T$.

λ_{ji} = Proportion of jth input employed in ith sector for $j = L, K$ and $i = M, A, T$.

S^h_{ji} = The elasticity of factor output coefficient of jth factor in hth sector with respect to price of ith factor for $i, j = L, K$, and $h = M, A, T$.

For example, $S^M_{LK} = \left(\frac{r}{a_{LM}}\right)\left(\frac{\partial a_{LM}}{\partial r}\right)$,

$S^M_{LL} = \left(\frac{W}{a_{LM}}\right)\left(\frac{\partial a_{LM}}{\partial W}\right)$ etc. $S^h_{ji} > 0$ for $j \neq i$; and

$S^h_{jj} < 0$.

Also, $S^h_{ji} + S^h_{jj} = 0$ for $j \neq i$.

$\hat{x}$ = $\frac{dx}{x}$ = Relative change in x.

Following equations describe the model.

$$P_M = a_{LM}\bar{w} + a_{KM}r \quad (1);$$

$$P_A = a_{LA}w + a_{KA}r \quad (2);$$

$$P_T = a_{LT}w + a_{KT}r \quad (3);$$

$$D(P_T, Y_N) = X_T \quad with \quad D_1 < 0 \quad and \quad D_2 > 0 \tag{4};$$

$$w = \frac{\bar{w} a_{LM} X_M}{a_{LM} X_M + L_U} \tag{5};$$

$$a_{LM} X_M + a_{LA} X_A + a_{LT} X_T + L_U = L \tag{6};$$

$$a_{KM} X_M + a_{KA} X_A + a_{KT} X_T = K \tag{7};$$

and

$$Y_S = \bar{w} a_{LM} X_M + w(a_{LA} X_A + a_{LT} X_T) + rK \tag{8}.$$

Here, equations (1), (2) and (3) represent competitive equilibrium conditions in sectors M, A and T, respectively. Equation (4) represents the demand supply equality in the market for non-traded tourism service. Left hand side of this equation represents the demand function for tourism service. Demand for tourism service varies inversely with its price and positively with the income of northern consumers. Equation (5) represents the Harris-Todaro (1970) migration equilibrium condition which shows that expected urban wage is equal to actual rural wage. Equations (6) and (7) stand for equilibrium conditions in the labour market and in the capital market respectively. Equation (8) shows national income of South. Using equations (5) and (6), we express equation (8) as follows

$$Y_S = wL + rK \tag{8.1}.$$

3. WORKING OF THE BASIC MODEL

There are eight unknowns in this model given by w, r, P_T, X_M, X_A, X_T, L_U and Y_S with eight independent equations. P_M, P_A, K, L and $\bar{w}$ are parameters. Y_N is also a parameter here; and we analyse the effect of tourism development with respect to exogenous change in this parameter.

The model works as follows. r is determined from equation (1), given P_M. w is determined from equation (2), given P_A. From equation (3), P_T is determined. X_T is determined from equation (4) given Y_N. L_U is determined from equation (5), in terms of X_M. X_M and X_A are simultaneously determined from equations (6) and (7). Finally Y_S is determined from equation (8.1). A change in Y_N does not affect w and r. Hence it does not affect Y_S. So the tourism development does not affect factor prices and national income in South.

From equation (4), we have

$$\hat{X}_T = E_{YN} \hat{Y}_N \tag{9};$$

where E_{YN} represents the income elasticity of demand for tourism service.

Here $E_{YN} >$ because tourism service is non-inferior by assumption. So the level of output of tourism service varies positively with level of Northern income.

Using equations (5), (6), (7) and (9), we have[6]

[6] Derivations of equations (10) and (11) are shown in the Appendix.

$$\hat{X}_M = -\frac{E_{YN}\left(\lambda_{LT}\lambda_{KA} - \lambda_{KT}\lambda_{LA}\right)}{\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \quad (10);$$

and

$$\hat{X}_A = -\frac{E_{YN}\left(\lambda_{LM}\lambda_{KT}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LT}\right)}{\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \quad (11).$$

Equations (10) and (11) show that the nature of effect of tourism development on the level of output of sectors M and A depends on the capital intensity ranking among all these three sectors. The urban manufacturing sector is already assumed to have the highest capital intensity ranking. So $\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)$ is always negative. This means that the urban manufacturing sector is more capital intensive than the rural agricultural sector. Then, due to tourism development in the rural region, output of the urban manufacturing sector is increased (decreased) if the agricultural sector is more capital (labour) intensive than the tourism sector; and, output of the agricultural sector is always decreased as urban manufacturing sector is always more capital intensive than the rural tourism sector, i.e., as $\left(\lambda_{LM}\lambda_{KT}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LT}\right)$ is always negative.

From equation (5), we have

$$L_U = \left(\frac{\bar{w}}{w} - 1\right) a_{LM} X_M \quad (5.1).$$

Equation (5.1) then shows that level of urban unemployment varies positively with the level of output of the urban manufacturing sector.

This leads to the following proposition.

Proposition 1: Suppose that capital is perfectly mobile among all sectors and the urban manufacturing sector has the highest capital intensity. Then, if the agricultural sector is more capital (labour) intensive than the rural tourism sector, tourism development in the rural region (i) does not affect national income and (ii) raises (lowers) the level of urban unemployment.

This result is completely opposite to what is found in Hazari and Sgro (2015, Chapter 8); and the source of the difference lies in the assumption regarding intersectoral capital mobility. In Hazari and Sgro (2015, Chapter 8), capital does not move between the rural region and the urban region. However, in this model, capital is perfectly mobile among all three sectors. If tourism sector has the highest labour intensity, then due to tourism development, tourism sector absorbs more labour and less capital. Hence the availability of capital labour ratio for the urban manufacturing and the agricultural sector is increased. So the urban manufacturing sector expands and the agricultural sector contracts because, by assumption, urban manufacturing sector is more capital intensive. Expansion of urban manufacturing sector raises expected urban wage and thus encourages rural urban migration; and this worsens urban unemployment problem. We find an opposite picture when agricultural sector has the highest labour intensity because, due to tourism development, tourism sector then absorbs more capital and less labour. National income always remains unchanged in this case because tourism development does not affect factor-prices in this model. Here national income is exactly equal to factor income because we do not consider any tax or subsidy policy.

4. SECTOR SPECIFIC CAPITAL TO TOURISM SECTOR

In this section, we introduce a sector specific capital in the tourism sector in an otherwise identical basic model. Tourism infrastructure like transportation, hotels, resorts, amusement centers etc and maintenance infrastructure of environmental quality may be considered as examples of such specific capital. So equations (1), (2), (4)–(6) of section 2 and following new equations now describe this new model.

$$P_{T=}a_{LT}w + a_{NT}R \tag{3E};$$

$$a_{KM}X_M + a_{KA}X_A = K \tag{7E};$$

$$Y_S = \bar{w}a_{LM}X_M + w\left(a_{LA}X_A + a_{LT}X_T\right) + rK + RN \tag{8E};$$

and

$$a_{NT}X_T = N \tag{12}.$$

Here, N and R stand for the endowment of sector specific capital and its rental rate. Equation (3E) represents competitive equilibrium condition in the tourism service sector and equation (12) shows equilibrium in the market for sector specific capital.

Using equations (5) and (6), we express equation (8E) as follows.

$$Y_S = wL + rK + RN \tag{8E.1}.$$

There are nine unknowns in this model given by w, r, R, P_T, X_M, X_A, X_T, L_U and Y_S with nine independent equations. P_M, P_A, K, N, L, $\bar{w}$ and Y_N are parameters.

The model works as follows. r and w are determined from equations (1) and (2). Equations (3E), (4) and (12) simultaneously solve for R, P_T and X_T. L_U is determined from equation (5) in terms of X_M; and then X_M and X_A are determined from equations (6) and (7E). Finally Y_S is determined from equation (8E.1).

From equations (3E), (4) and (12) we have

$$\hat{R} = \frac{-E_{YN}}{S^T_{NN} + \theta_{KT}e_P}\hat{Y}_N \tag{13};$$

and

$$\hat{X}_T = \frac{S^T_{NN}E_{YN}}{S^T_{NN} + \theta_{KT}e_P}\hat{Y}_N \tag{14}.$$

Here E_P represents the price elasticity of demand for tourism service. By assumption, $E_{YN} >$, $S^T_{NN} <$ and $E_P <$. So the level of output of the tourism sector as well as the rental rate on sector specific capital in the tourism sector varies positively with level of Northern income.

Using equations (5), (6), (7E), (13) and (14), we have

$$\hat{X}_M = -\frac{\lambda_{KA}\lambda_{LT}E_{YN}\left(S^T_{NN} - S^T_{LN}\right)}{\left(S^T_{NN} + \theta_{KT}E_P\right)\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \tag{15};$$

and

$$\hat{X}_A = \frac{\lambda_{KM}\lambda_{LT}E_{YN}\left(S^T_{NN} - S^T_{LN}\right)}{\left(S^T_{NN} + \theta_{KT}E_P\right)\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \tag{16}.$$

Equations (15) and (16) show how tourism development affects the level of output of

two traded goods X_M and X_A. Here also $\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right) < 0$, by assumption. $S^T_{NN} < 0$, $S^T_{LN} > 0$ and $E_P < 0$. So $\left(S^T_{NN} - S^T_{LN}\right) < 0$ and $\left(S^T_{NN} + \theta_{KT}E_P\right) < 0$. This implies that, $\frac{\hat{X}_M}{\hat{Y}_N} > 0$ and $\frac{\hat{X}_A}{\hat{Y}_N} < 0$.

Hence, due to tourism development level of output of the urban manufacturing (rural agricultural sector) is increased (decreased).

From equation (5.1), we find that the level of urban unemployment is increased due to the expansion of the urban manufacturing sector caused by tourism development.

Finally, combining equations (8E.1) and (13) we find that the national income of South is also increased due to tourism development.

We can establish the following proposition.

Proposition 2: Suppose that capital is specific to the tourism sector but is mobile between the urban manufacturing sector and the rural agricultural sector and that the urban manufacturing sector has the highest capital intensity. Then tourism development in the rural region (i) raises the level of urban unemployment and (ii) always raises national income in South.

So, in this case too, our result is different from the corresponding one of Hazari and Sgro (2015, Chapter8). We now attempt to explain the intuition behind this proposition. Tourism development raises the rental rate on capital specific to the tourism sector but does not alter the rural wage rate and the rental rate on mobile capital. So, on the one hand, the national (factor) income is increased; and, on the other hand, the tourism sector becomes more labour intensive. So it absorbs more labour; and thus availability of capital labour ratio for the urban manufacturing sector and the agricultural sector is increased. This must cause an expansion of the urban manufacturing sector and a contraction of the agricultural sector because the urban manufacturing sector has the highest capital intensity. Since the level of urban employment is proportional to the size of the urban manufacturing sector, urban unemployment level must go up in this case. Hazari and Sgro (2015, Chapter 8) neither considers the role of sector specific capital in the tourism sector nor allows capital mobility between the urban region and the rural region.

5. SECTOR SPECIFIC CAPITAL TO URBAN SECTOR

In this section, we introduce a sector specific capital in the urban manufacturing sector following Hazari and Sgro (2015, Chapter 8). They divide the urban manufacturing sector into two subsectors- tourism and non-tourism; and allow mobility of capital between these two subsectors. However, capital is sector specific to the urban region in their model. Contrary to that, we have a single non-tourism urban manufacturing sector in this model and capital is specific only to that sector. Many machineries and equipments are specialized in the production of manufactured goods. For example, sewing machine and/or dyebath are specialized in the production of clothes. These specialized inputs may be considered as appropriate example of specific capital to the urban sector. However, another type of capital is mobile between the agricultural sector and the rural tourism sector in our model; and Hazari and Sgro (2015, Chapter 8) also assumes the

same. So equations (1), (4)–(6) of section 2 and following new equations now describe the new model.

$$P_A = a_{LA}w + a_{NA}R \tag{2F};$$

$$P_{T=}a_{LT}w + a_{NT}R \tag{3F};$$

$$a_{KM}X_M = K \tag{7F};$$

$$a_{NA}X_A + a_{NT}X_T = N \tag{9F};$$

and

$$Y_S = \bar{w}a_{LM}X_M + w\left(a_{LA}X_A + a_{LT}X_T\right) + rK + RN \tag{8F}.$$

Using equations (5) and (6), we express equation (8F) as follows

$$Y_S = wL + rK + RN \tag{8F.1}.$$

There are nine unknowns in this model given by w, r, R, P_T, X_M, X_A, X_T, L_U and Y_S with nine independent equations. P_M, P_A, K, N, L, $\bar{w}$ and Y_N are parameters. The model works as follows. r is determined from equation (1). Given P_T, w and R are determined from equations (2F) and (3F). Equation (7F) solves for X_M. Then equations (4), (5), (6) and (9F) simultaneously solve for P_T, X_T, X_A and L_U. Finally, Y_S is determined from equation (8F.1).

Using equations (2F) and (3F), we have

$$\hat{w} = -\frac{\theta_{KA}\hat{P}_T}{|\theta|} \tag{17};$$

and

$$\hat{R} = \frac{\theta_{LA}\hat{P}_T}{|\theta|} \tag{18}.$$

Here sign of $|\theta| = (\theta_{LA}\theta_{KT} - \theta_{LT}\theta_{KA})$ represents the capital intensity ranking between sector A and sector T. Following Hazari and Sgro (2015, Chapter 8), we assume the rural agricultural sector, A to be more capital intensive than the rural tourism sector, T; and this implies that $|\theta| < 0$.

Using equations (4), (5), (6) and (9F), we have

$$\hat{P}_T = -\frac{E_{YN}}{(e_P - C)}\hat{Y}_N \tag{19};$$

where,

$$C = \frac{\lambda_{LA}B - \lambda_{KA}D}{|\lambda|};$$

$$D = \frac{1}{|\theta|}\left[-\left\{(1-\lambda_{LA}-\lambda_{LT}) - \lambda_{LA}S^A_{LL} - \lambda_{LT}S^T_{LL}\right\}\theta_{KA} - \left(\lambda_{LA}S^T_{LK} + \lambda_{LT}S^T_{LK}\right)\theta_{LA}\right] > 0;$$

$$B = \frac{1}{|\theta|}\left[\left(\lambda_{KA}S^A_{KL} + \lambda_{KT}S^T_{KL}\right)\theta_{KA} - \left(\lambda_{KA}S^A_{KK} + \lambda_{KT}S^T_{KK}\right)\theta_{LA}\right] < 0;$$

and

$$|\lambda| = (\lambda_{LA}\lambda_{KT} - \lambda_{LT}\lambda_{KA}) < 0\,.$$

$|\lambda| < 0$ implies that the agricultural sector is more capital intensive than the rural tourism sector; and $D > 0$, $B < 0$ and $|\lambda| < 0 \Rightarrow C > 0$.

So equation (19) shows that $\left(\frac{\hat{P}_T}{\hat{Y}_N}\right) > 0$. Hence tourism development raises the price of the non-traded tourism service.

From, equations (17), (18) and (19), we have

$$\hat{w} = \frac{\theta_{KA}}{|\theta|}\frac{E_{YN}}{(e_P - C)}\hat{Y}_N \tag{20};$$

and

$$\hat{R} = -\frac{\theta_{LA}}{|\theta|}\frac{E_{YN}}{(e_P - C)}\hat{Y}_N \tag{21}.$$

This equation (20) shows that $\left(\frac{\hat{w}}{\hat{Y}_N}\right) > 0$. So tourism development raises the rural wage rate, w. Then equation (5) shows that urban unemployment, L_U, is reduced. The increase in Y_N lowers R when w is raised. However, P_T varies positively with Y_N; and so $(wL + RN)$ is always increased following a rise in P_T. r is independent of Y_N and so the level of income of south, Y_S, is always increased due to tourism development. This result is identical to that obtained by Hazari and Sgro (2015, Chapter 8).

So we have the following proposition.

Proposition 3: Suppose that capital is specific to the urban manufacturing sector but is mobile between the agricultural sector and the rural tourism sector. Then, if the agricultural sector is more capital intensive than the rural tourism sector, tourism development in the rural region (i) raises the rural wage rate and lowers the level of urban unemployment and (ii) always raises national income in South.

We now provide intuitive explanation behind this proposition. Here the rural sector, with its two subsectors and with capital mobility between them, works like a Heckscher-Ohlin sub-system. Tourism development raises the relative price of tourism service. So the rural wage rate is increased and the rental rate on capital is decreased following the Stolper-Samuleson effect because the tourism sector is more labour intensive than the agricultural sector. An increase in the rural wage rate implies an increase in the opportunity cost of rural urban migration. So the rate of migration as well as the level of urban unemployment is decreased in this case. We obtain exactly opposite result when this capital intensity ranking between these two rural subsectors is reversed.

6. URBAN TOURISM SECTOR

In this section, we introduce an Urban tourism sector following Hazari and Sgro (2015, Chapter 8) replacing the rural tourism sector. So the urban sector is now divided into two subsectors- tourism T and manufacturing 1. Both these subsectors employ labour at fixed wage rate, $\bar{w}$. However, contrary to their work, we have a single non-tourism rural agricultural sector 2 in this model.

6.1. Capital mobility

We first assume that capital is mobile among all these three sectors. So equation (4) of section 2 and following new equations now describe the new model.

$$P_{M=}a_{LM}\bar{w} + a_{KM}r \tag{1G};$$

$$P_{T=}a_{LT}\bar{w} + a_{KT}r \tag{2G};$$

$$P_{A=}a_{LA}w + a_{KA}r \tag{3G};$$

$$w = \frac{\bar{w}\,(a_{LM}X_M + a_{LT}X_T)}{a_{LM}X_M + a_{LT}X_T + L_U} \tag{5G};$$

$$a_{LM}X_M + a_{LT}X_T + a_{LA}X_A + L_U = L \tag{6G};$$

$$a_{KM}X_M + a_{KT}X_T + a_{KA}X_A = K \tag{7G};$$

and

$$Y_S = \bar{w}\,(a_{LM}X_M + a_{LT}X_T) + wa_{LA}X_A + rK \tag{8G}.$$

Using equations (5G) and (6G), we express equation (8) as follows

$$Y_S = wL + rK \tag{8G.1}.$$

There are eight unknowns in this model given by w, r, P_T, X_M, X_A, X_T, L_U and Y_S with eight independent equations. P_M, P_A, K, L, $\bar{w}$ and Y_N are parameters. We analyse the effect of tourism development with respect to exogenous change in Y_N.

The model works as follows. r is determined from equation (1G), given P_M. w is determined from equation (3G), given P_A. From equation (2G), P_T is determined. X_T is determined from equation (4), given Y_N. L_U is determined from equation (5G) in terms of X_M and X_T. X_M and X_A are simultaneously determined from equations (6G) and (7G). Finally Y_S is determined from equation (8G.1). A change in Y_N does not affect w and r. Hence it does not affect Y_S. So the tourism development in the urban region does not affect factor prices and national income in South.

Using equations (5), (6G), (7G) and (9), we have[7]

$$\hat{X}_M = -\frac{E_{YN}\left(\lambda_{LT}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KT}\lambda_{LA}\right)}{\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \tag{22};$$

and

$$\hat{X}_A = -\frac{E_{YN}\frac{\bar{w}}{w}\left(\lambda_{LM}\lambda_{KT} - \lambda_{KM}\lambda_{LT}\right)}{\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \tag{23}.$$

Equations (22) and (23) show how tourism development affects the level of output of sectors M and A depending on the capital intensity ranking among all these three sectors. Here also $\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)$ is always negative because the urban manufacturing sector has the highest capital intensity. Then, due to tourism development in the urban region, output of the urban manufacturing sector is increased (decreased) if the rural agricultural sector is more capital (labour) intensive than the urban tourism sector; and, output of the agricultural sector is always decreased as urban sector is always more capital intensive than the urban tourism sector, i.e., as $(\lambda_{LM}\lambda_{KT} - \lambda_{KM}\lambda_{LT})$ is always negative. $(a_{LM}X_M + a_{LT}X_T)$ must go up when X_M is increased. So equation (5G)

[7] Derivation of equations (22) and (23) are shown in Appendix.

shows an increase in L_U in this case. So the level of urban unemployment is increased if the urban tourism sector has the highest labour intensity.

So we can establish the following proposition

Proposition 4: Suppose that capital is perfectly mobile among all sectors and the urban manufacturing (tourism) sector has the highest capital (labour) intensity. Then tourism development in the urban region (i) raises the level of urban unemployment and (ii) does not affect national income.

The intuition behind this proposition 4 is similar to that behind Proposition 1 because here also the tourism development implies the development of the most labour intensive sector and capital as well as labour is perfectly mobile among all these three sectors. This result is completely different from that of Hazari and Sgro (2015, Chapter 8), which states that, due to urban tourism development urban unemployment is decreased.

6.2. Sector specific capital to Tourism sector

In this section, we introduce a sector specific capital in the urban tourism sector in an otherwise identical model described in section 6.1. So equations (1G), (2G), (4), (5G), (6G) of section 6.1 and following new equations describe this new model.

$$P_{T=}a_{LT}\bar{w} + a_{KT}R \tag{3H};$$

$$a_{KM}X_M + a_{KA}X_A = K \tag{7H};$$

$$Y_S = \bar{w}\left(a_{LM}X_M + a_{LT}X_T\right) + wa_{LA}X_A + rK + RN \tag{8H};$$

and

$$a_{NT}X_T = N \tag{12H}.$$

Here N and R stand for the endowment of sector specific capital in the tourism sector and its rental rate respectively.

Using equations (5G) and (6G), we express equation (8H) as follows.

$$Y_S = wL + rK + RN \tag{8H.1}.$$

The model works as follows. r and w are determined from equations (1) and (2). Equations (3H), (4) and (12H) simultaneously solve for R, P_T and X_T. L_U is determined from equation (5G) in terms of X_M; and then X_M and X_A are determined from equations (6G) and (7H). Finally Y_S is determined from equation (8H.1).

From equations (3H), (4) and (12H) we have

$$\hat{R} = \frac{-E_{YN}}{S^T_{NN} + \theta_{NT}e_P}\hat{Y}_N \tag{24};$$

and

$$\hat{X}_T = \frac{S^T_{NN}E_{YN}}{S^T_{NN} + \theta_{NT}e_P}\hat{Y}_N \tag{25}.$$

Here, $E_{YN} > 0$, $S^T_{NN} < 0$ and $E_P < 0$. So here also the level of output of the tourism sector, X_T, as well as the rental rate on sector specific capital in the tourism sector, R, varies positively with level of Northern income.

Using equations (5G), (6G), (7H), (24) and (25), we have[8]

$$\hat{X}_M = -\frac{\lambda_{KA}\lambda_{LT}E_{YN}\frac{\bar{w}}{w}\left(S_{NN}^T - S_{LN}^T\right)}{\left(S_{NN}^T + \theta_{KT}E_P\right)\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \tag{26};$$

and

$$\hat{X}_A = \frac{\lambda_{KM}\lambda_{LT}E_{YN}\frac{\bar{w}}{w}\left(S_{NN}^T - S_{LN}^T\right)}{\left(S_{NN}^T + \theta_{KT}E_P\right)\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \tag{27}.$$

Equations (26) and (27) show how tourism development affects the level of output of two traded goods X_M and X_A. Here also$\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right) < 0$, by assumption. $S_{NN}^T < 0$, $S_{LN}^T >$ and $E_P < 0$. So $\left(S_{NN}^T - S_{LN}^T\right) < 0$ and $\left(S_{NN}^T + \theta_{KT}E_P\right) < 0$. This implies that, $\frac{\hat{X}_M}{\hat{Y}_N} > 0$ and $\frac{\hat{X}_A}{\hat{Y}_N} < 0$.

Hence, due to tourism development in the urban region, level of output of the urban manufacturing (rural agricultural) sector is increased (decreased).

Equation (25) shows that X_T varies positively with Y_N. Hence $(a_{LM}X_M + a_{LT}X_T)$ is increased in this case. Now equation (5G.1) shows that the level of urban unemployment, L_U, is increased due to the expansion of the urban sector caused by tourism development.

Finally, combining equations (8H.1) and (24) we find that the national income of South is also increased due to tourism development. An increase in Y_N does not affect w and r but raises R. So Y_S is always increased.

This leads to the following proposition

Proposition 5: Suppose that capital is specific to the tourism sector but is mobile between the urban manufacturing sector and the agricultural sector and the urban manufacturing sector is more capital intensive than the agricultural sector. Then tourism development in the urban region (i) raises urban unemployment and (ii) always raises national income in South.

The intuition behind this proposition 5 is also similar to that behind proposition 2 because the sector specific capital plays the same role in both the cases. Location of tourism sector does not matter. This result is also completely different from that of Hazari and Sgro (2015, Chapter 8), where, due to urban tourism development, urban unemployment is decreased.

7. CONCLUSION

In this paper, following Hazari and Sgro (2015, chapter 8), we analyse the effect of tourism development on urban unemployment problem using a Harris Todaro (1970) framework and introducing capital mobility between the urban region and the rural region. However, contrary to Hazari and Sgro (2015, Chapter 8), our analysis shows that effects of tourism development on unemployment and national income not only depends on the capital intensity rankings of different sectors but also on the nature of capital mobility among different sectors.

[8] Derivation of equations (26) and (27) are shown in the Appendix.

We derive many interesting results different from Hazari and Sgro (2015, Chapter 8). How tourism development affects unemployment and national income in this model is conditional on assumptions regarding intersectoral capital mobility. If capital is perfectly mobile among all sectors, then tourism development in either region does not affect national income but raises (lowers) urban unemployment if the agricultural sector is more capital (labour) intensive than the tourism sector when urban manufacturing sector has the highest capital intensity. However, with capital being specific to the tourism sector but mobile between the urban manufacturing sector and the rural agricultural sector, tourism development in either region raises urban unemployment when the urban manufacturing sector has the highest capital intensity and always raises national income. If capital is specific to the urban manufacturing sector but is mobile between the agricultural sector and the rural tourism sector, then tourism development in the rural region always raises national income but lowers the level of urban unemployment if the agricultural sector is more capital intensive than the rural tourism sector. Our results are different from (similar to) those of Hazari and Sgro (2015, Chapter 8) when capital is mobile (immobile) between the urban region and the rural region. However, results are independent of the regional location of the tourism sector.

Our model suffers from all standard limitations of a Harris-Todaro (1970) model; and also fails to consider many important realistic aspects of tourism development. Negative environments effects and positive socio-cultural effects of tourism development are not introduced here. Since tourism development raises the demand for luxury goods and poor workers in a less developed economy mainly consume essential goods, the resource allocation problem between luxuaries and necessities in the non-tradable goods sector is also an interesting area of research. Tourism development, i.e., the demand expansion for tourism service, may take place due to infrastructural development in the tourism sector; and in that case, cost of tourism development must be considered. We plan to take case of these problems in our future research.

Appendix: Derivation of equations (10) and (11)

From equations (5) and (6), we have

$$a_{LM}X_M\bar{w} + a_{LA}X_A w + a_{LT}X_T w = wL \tag{A1}.$$

Totally differentiating equation (A1), we have

$$\lambda_{LM}\frac{\bar{w}}{w}\hat{X}_M + \lambda_{LA}\hat{X}_A + \lambda_{LT}\hat{X}_T = 0 \tag{A2}.$$

Using equations (9) and (A2), we obtain

$$\lambda_{LM}\frac{\bar{w}}{w}\hat{X}_M + \lambda_{LA}\hat{X}_A = -\lambda_{LT}E_{YN}\hat{Y}_N \tag{A3}.$$

Totally differentiating equation (7) and using equation (9), we have

$$\lambda_{KM}\hat{X}_M + \lambda_{KA}\hat{X}_A = -\lambda_{KT}E_{YN}\hat{Y}_N \tag{A4}.$$

From equations (A3) and (A4), we obtain

$$\hat{X}_M = -\frac{E_{YN}\left(\lambda_{LT}\lambda_{KA} - \lambda_{KT}\lambda_{LA}\right)}{\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \tag{A5}.$$

and

$$\hat{X}_A = -\frac{E_{YN}\left(\lambda_{LM}\lambda_{KT}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LT}\right)}{\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \tag{A6}.$$

Equations (A5) and (A6) are same as equations (10) and (11) in the body of the paper.

Derivation of equations (22) and (23)

From equations (5G) and (6), we have

$$\bar{w}\left(a_{LM}X_M + a_{LT}X_T\right) + wa_{LA}X_A = wL \tag{A7}.$$

Totally differentiating equation (A1), we have

$$\lambda_{LM}\frac{\bar{w}}{w}\hat{X}_M + \lambda_{LA}\hat{X}_A + \lambda_{LT}\frac{\bar{w}}{w}\hat{X}_T = 0 \tag{A8}.$$

Using equations (9) and (A8), we obtain

$$\lambda_{LM}\frac{\bar{w}}{w}\hat{X}_M + \lambda_{LA}\hat{X}_A = -\lambda_{LT}\frac{\bar{w}}{w}E_{YN}\hat{Y}_N \tag{A9}.$$

Totally differentiating equation (7G) and using equation (9), we have

$$\lambda_{KM}\hat{X}_M + \lambda_{KA}\hat{X}_A = -\lambda_{KT}E_{YN}\hat{Y}_N \tag{A10}.$$

From equations (A9) and (A10), we obtain

$$\hat{X}_M = -\frac{E_{YN}\left(\lambda_{LT}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KT}\lambda_{LA}\right)}{\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \tag{A11};$$

and

$$\hat{X}_A = -\frac{E_{YN}\frac{\bar{w}}{w}\left(\lambda_{LM}\lambda_{KT} - \lambda_{KM}\lambda_{LT}\right)}{\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \tag{A12}.$$

Equations (A11) and (A12) are same as equations (22) and (23) in the body of the paper.

Derivation of equations (26) and (27)

Totally differentiating equation (A7), we have

$$\lambda_{LM}\frac{\bar{w}}{w}\hat{X}_M + \lambda_{LA}\hat{X}_A + \lambda_{LT}\frac{\bar{w}}{w}\hat{X}_T + \lambda_{LT}\frac{\bar{w}}{w}\hat{a}_{LT} = 0$$

$$\Longrightarrow \lambda_{LM}\frac{\bar{w}}{w}\hat{X}_M + \lambda_{LA}\hat{X}_A + \lambda_{LT}\frac{\bar{w}}{w}\hat{X}_T + \lambda_{LT}\frac{\bar{w}}{w}S_{LN}^T\hat{R} = 0 \tag{A13}.$$

Using equations (24), (25) and (A13), we have

$$\lambda_{LM}\frac{\bar{w}}{w}\hat{X}_M + \lambda_{LA}\hat{X}_A = -\frac{\lambda_{KA}\lambda_{LT}E_{YN}\frac{\bar{w}}{w}\left(S_{NN}^T - S_{LN}^T\right)}{\left(S_{NN}^T + \theta_{KT}E_P\right)}\hat{Y}_N \tag{A14}.$$

Totally differentiating equation (7H), we obtain

$$\lambda_{KM}\hat{X}_M + \lambda_{KA}\hat{X}_A = 0 \tag{A15}.$$

From equations (A14) and (A15), we obtain

$$\hat{X}_M = -\frac{\lambda_{KA}\lambda_{LT}E_{YN}\frac{\bar{w}}{w}\left(S^T_{NN} - S^T_{LN}\right)}{\left(S^T_{NN} + \theta_{KT}E_P\right)\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \tag{A16};$$

and

$$\hat{X}_A = \frac{\lambda_{KM}\lambda_{LT}E_{YN}\frac{\bar{w}}{w}\left(S^T_{NN} - S^T_{LN}\right)}{\left(S^T_{NN} + \theta_{KT}E_P\right)\left(\lambda_{LM}\lambda_{KA}\frac{\bar{w}}{w} - \lambda_{KM}\lambda_{LA}\right)}\hat{Y}_N \tag{A17}.$$

Equations (A16) and (A17) are same as equations (26) and (27) in the body of the paper.

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