

# **Tourism, Trade and Domestic Welfare**

Jean-Jacques Nowak, Mondher Sahli  
and Pasquale M. Sgro

NOTA DI LAVORO 24.2004

**FEBRUARY 2004**

NRM – Natural Resources Management
------------------------------------

Jean-Jacques Nowak, *Université Lille I*  
Mondher Sahli, *Victoria University of Wellington*  
Pasquale M. Sgro, *Deakin University*

This paper can be downloaded without charge at:

The Fondazione Eni Enrico Mattei Note di Lavoro Series Index:  
<http://www.feem.it/Feem/Pub/Publications/WPapers/default.htm>

Social Science Research Network Electronic Paper Collection:  
[http://papers.ssrn.com/abstract\\_id=XXXXXX](http://papers.ssrn.com/abstract_id=XXXXXX)

The opinions expressed in this paper do not necessarily reflect the position of  
Fondazione Eni Enrico Mattei

# Tourism, Trade and Domestic Welfare

## Summary

Tourism has been regarded as a major source of economic growth and a good source of foreign exchange earnings. Tourism has also been considered as an activity that imposes costs on the host country. Such costs include increased pollution, congestion and despoliation of fragile environments and intra-generational inequity aggravation. One aspect that has been ignored is the general equilibrium effects of tourism on the other sectors in the economy. These effects can be quite substantial and should be taken into account when assessing the net benefits of a tourism boom on an economy. This paper presents a model which captures the interdependence between tourism and the rest of the economy, in particular agriculture and manufacturing. We examine the effect of a tourist boom on structural adjustment, commodity and factor prices and more importantly resident welfare. An important result obtained is that the tourist boom may “immiserize” the residents. This occurs because of two effects. The first, a favourable effect due to an increase in the relative price of the non-traded good which is termed the secondary terms of trade effect. The second, a negative effect due to an efficiency loss that occurs in the presence of increasing returns to scale in manufacturing. If this second effect outweighs the first effect, resident immiserization occurs.

**Keywords:** Tourism, Trade welfare

**JEL Classification:** F10, F22

*This paper was presented at the international conference on “Tourism and Sustainable Economic Development – Macro and Micro Economic Issues” held in Chia, Italy, on 19-20 September, 2003 and jointly organised by CRENoS (Università di Cagliari e Sassari, Italy) and Fondazione Eni Enrico Mattei, Italy, and supported by the World Bank.*

*Address for correspondence:*

Pasquale M. Sgro  
School of Economics  
Deakin University  
221 Burwood Highway  
Burwood Victoria 3125  
Australia  
Phone: +61 3 92446034  
Fax: +61 3 92446064  
E-mail: [sgro@deakin.edu.au](mailto:sgro@deakin.edu.au)

## **1. Introduction**

Tourism has often been regarded as a major source of economic growth. Various governments often invest in infrastructure to promote tourism and growth<sup>1</sup>. Tourism supplements the foreign exchange earnings already derived from trade in commodities and sometimes finances the imports of the capital goods necessary for the growth of the manufacturing sector<sup>2</sup>. Tourism has also been regarded as a mechanism for generating increased income and employment both in the formal and informal sectors<sup>3</sup>. Hazari and Ng (1993) have also highlighted important differences between trade in commodities and tourism<sup>4</sup>. However, international tourism has also at times been considered an activity that imposes costs on the host country. Much attention in this context has been paid to inflationary and low multiplier effects of tourism expansion<sup>5</sup>, increased pollution, congestion and despoilation of fragile environments<sup>6</sup>, intra-generational inequity aggravation<sup>7</sup> and even to adverse sociocultural impacts<sup>8</sup>. Less obvious but more important costs of tourism have often been neglected such as the adverse impacts of a tourism boom on other sectors resulting from general equilibrium effects. However, theoretical and empirical studies tell us that these effects can be quite substantial and have to be taken into account when assessing the net benefit of a tourism boom on an economy<sup>9</sup>.

The model used in this paper captures the interdependence and interaction between tourism and the rest of the economy; in particular, agriculture and manufacturing. This is important in view of the public debate on the effects of tourism as it highlights the problem of competition for

resources between two export-earning activities, agriculture and tourism. Furthermore, there is a concern as to whether tourism promotes or hinders the development of the manufacturing sector. Moreover, it is important to examine the welfare effects of tourism.

Specifically a tourist boom and its consequences are examined in a three-sector model of trade consisting of two internationally traded and one non-traded good. An important feature of the model is that the manufacturing good is produced with increasing returns to scale while the other goods are produced under constant returns to scale. A large proportion of a tourist's consumption is generally of non-traded goods and services and this consumption interacts with other sectors in a general equilibrium setting. Using this model, we analyse the effect of a tourism boom on structural adjustment, commodity and factor and product prices and most importantly resident welfare. An important result obtained is that the tourist boom may "immiserize" the residents. This occurs because of two effects. The first, a favourable effect due to an increase in the relative price of the non-traded good which is termed the secondary terms of trade effect. The second, a negative effect due to an efficiency loss that occurs in the presence of increasing returns to scale in manufacturing. If this second effect outweighs the first effect, resident immiserization occurs<sup>10</sup>.

## **2. The Model**

Our analysis uses a hybrid of the Ricardo-Viner-Jones (RVJ) and Heckscher-Ohlin (H-O) models under the assumption of full employment. The economy consists of three sectors; one a non-traded goods sector producing  $X_N$ , an agricultural sector producing an

exportable  $X_A$ , and a manufacturing sector producing an importable  $X_M$ . Assuming a small open economy, the terms of trade are given exogenously. It is assumed that commodities  $X_j$  ( $j=N,A$ ) are produced under constant returns to scale and  $X_M$  with increasing returns to scale. The production functions for the agriculture and non-traded goods sectors can be written as follows:

$$X_j = F_j(L_j, T_j) \quad j = A, N \quad (1)$$

where  $L_j$  and  $T_j$  represent allocations of labour and land respectively utilized in the  $j^{\text{th}}$  sector<sup>11</sup>.

These production functions exhibit positive and diminishing marginal products.

In the manufacturing sector, the production functions for a typical firm and the industry as a whole are as follows<sup>12</sup>:

$$x_M^i = g_M^i(X_M) F_M^i(l_M^i, k_M^i) \quad i = 1, 2, \dots, N \quad (2a)$$

and

$$X_M = G_M(L_M, K_M) = g_M(X_M) F_M(L_M, K_M) \quad (2b)$$

where  $x_M^i$  is a typical firm's output of the manufactured good,  $X_M$  is the total output in the manufacturing sector;  $l_M^i$  and  $k_M^i$  are labour and capital respectively employed by a typical firm in this sector;  $L_M$  and  $K_M$  are the total labour and specific capital employed in this sector. The increasing returns to scale in our model are output-generated and are external to the firm and internal to the industry. These assumptions ensure that perfect competition prevails at the

firm level and that the economy will produce along its social transformation curve. Also note that the production function for the manufacturing sector,  $X_M$ , is multiplicatively separable

The production function  $F_M$  in equation (2b) is linearly homogenous in inputs. The increasing returns to scale are captured by the term  $g_M(X_M)$  which is a positive function defined on the open interval  $]0, +\infty[$  and is twice differentiable. This type of increasing returns to scale is “neutral” in the sense that the capital intensity used in production is independent of the scale of production. It is assumed that  $X_M$  is homothetic in  $L_M$  and  $K_M$ .

Using the production function  $X_M$  defined in equation (2b), the rate of returns to scale,  $e_M$ , is specified below:

$$e_M = (dg_M/dX_M) \cdot (X_M/g_M) = F_M(L_M, K_M)g'_M(X_M) \quad (3)$$

where  $e_M$  is defined over the open interval  $]0, 1[$  in the case of increasing returns.

The full employment conditions can be specified as follows:

$$a_{LA} X_A + a_{LN} X_N = L_{AN} = \bar{L} - L_M \quad (4)$$

$$a_{TA} X_A + a_{TN} X_N = \bar{T} \quad (5)$$

$$a_{LM} X_M = L_M \quad (6)$$

$$a_{KM} X_M = K_M = \bar{K} \quad (7)$$

where the  $a_{ij}$ 's denote the variable input coefficients.  $L_{AN}$  the amounts of labour in the agriculture and non-traded goods sectors and  $L_M$  is the amount of labour used in the manufacturing sectors,  $\bar{L}$ ,  $\bar{T}$  and  $\bar{K}$  are the inelastically supplied factors labour, land and capital respectively. Note that the subset of sectors A and N forms a Heckscher-Ohlin structure with an endogenous labour supply [equations (4) and (5)]. The endogenous labour supply  $(\bar{L} - L_M)$  is determined by the amount of labour used in the manufacturing sector<sup>13</sup>. There is an RVJ structure between this subset and the manufacturing sector.

Under the assumption of profit maximization, interior solution and competitive markets, the price side of our model is as follows:

$$a_{LA} w + a_{TA} t = 1 \quad (8)$$

$$a_{LN} w + a_{TN} t = P_N \quad (9)$$

$$a_{LM} w + a_{KM} r = P \quad (10)$$

where  $P_N$  and  $P$  are the relative price of the non-traded and manufactured good respectively;  $w$ ,  $t$  and  $r$  are the wage rate, rental on land and the rental on capital. The agriculture good has been chosen as the numeraire. Assuming a small open economy, the terms of trade,  $P$ , is given. The relative price of the non-traded good,  $P_N$ , is determined domestically by the forces of demand and supply.

The quasi-concave aggregate utility function for the residents is as follows:

$$U = U(D_A, D_M, D_N) \quad (11)$$

where  $D_j$ , ( $j = A, M, N$ ) denotes the demand for the agriculture, manufactured and non-traded goods respectively by the residents.

Given utility maximization, it follows (from the equilibrium conditions) that:

$$\frac{\partial U}{\partial D_A} = \frac{1}{P_M} \frac{\partial U}{\partial D_M} = \frac{1}{P_N} \frac{\partial U}{\partial D_N} \quad (12)$$

where  $\frac{\partial U}{\partial D_j}$  ( $j = A, M, N$ ) denotes marginal utility.

The demand for the non-traded good consists of resident demand ( $D_N$ ) and tourist demand ( $D_{NT}$ ) which can be written as follows:

$$D_N = D_N(P, P_N, Y) \quad (13)$$

$$D_{NT} = D_{NT}(P, P_N, \Delta) \quad (14)$$

where  $Y$  is resident income and  $\Delta$  is a variable that captures foreign income and other exogenous domestic amenities such as indigenous culture, fashion, special events and so on that distinguish tourist attractions in one country from another. All goods in consumption are substitutes and normal. We assume that  $\frac{\partial D_{NT}}{\partial \Delta} > 0$  so that a tourist boom in our model is captured by an exogenous increase in  $\Delta$ .



The market clearing conditions for the non-traded good and the resident budget constraint are as follows:

$$D_N + D_{NT} = X_N \quad (15)$$

$$Y = P X_M + P_N X_N + X_A = P_N D_N + P D_M + D_A \quad (16)$$

It is useful to represent the above model by using two diagrams, which highlight the interaction among the sectors and the factors of production. We represent the initial equilibrium of the model in Figure 1 where in quadrant II, the unit cost function for the agricultural sector is drawn as a  $P_A$  in the space  $(w, t)$ . Also shown are the iso-cost curves for the agriculture (given  $P_A = 1$ ) and non-traded goods sector  $P_N^0$ . These curves are drawn under the assumption that the non-traded goods sector is labour intensive.

Given a solution for  $P_N$  from the non-traded good market (see Figure 2, quadrant II), we can determine the equilibrium values of  $w$  and  $t$  as shown by  $w^0$  and  $t^0$ . In quadrant I, we have the isocost curve for the manufacturing sector  $P$  whose price is internationally given for the small country case. The equilibrium solution for  $w^0$  also determines the equilibrium value of  $r$  as shown by  $r^0$ .

In quadrant III, the curve  $aa'$  is the marginal product of labour curve in the manufacturing sector. The mathematical conditions necessary for this case are derived in the section III. Generally the marginal product curve for an increasing returns to scale technology can have any

shape [Panagariya (1986)]. From quadrant III, the equilibrium value  $w^o$  enables us to determine the employment level  $L_M^0$  in the manufacturing sector. Since  $OL_M^0$  of total labour supply is used in the manufacturing sector, the residual  $\bar{L} - OL_M^0$  determines the supply of labour for the other two sectors,  $L_{AN}^0$ .

Given this residual supply  $L_{AN}^0$  and the quantity of land,  $\bar{T}$ , we can draw the Edgeworth-Bowley box in quadrant IV of Figure 1. Also illustrated is the contract curve  $O_A O_N^o$  drawn under the assumption that the non-traded good sector is labour intensive. Given the equilibrium wage/rental ratio on land determined in quadrant II, we can identify the point  $D^0(X_A^0, X_N^0)$  on the contract curve which determines the allocation of labour and land between the two sectors, agriculture and non-traded goods. From the factor allocation in quadrant IV of Figure 1, we can derive the production possibility curve  $Z^0 Z^0{}^1$  for goods  $X_A$  and  $X_N$  in quadrant I of Figure 2, given the quantity of labour  $L_{AN}^0$ .<sup>7</sup> In quadrant II of Figure 2, we have drawn the tourist demand curve  $D_{NT}$  and the non-traded good supply curve  $X_N$ . Note that for illustrative purposes only, we have made the simplifying assumption that residents do not consume the non-traded good. The actual results in the model presented in the following section are derived for the general case of both resident and tourist demand for the non-traded good. The equilibrium price and quantity are shown as  $P_N^0$  and  $X_N^0$ . In quadrant I, given  $P_N^0$ , we can determine the production point  $F^0(X_A^0, X_N^0)$  while in quadrant III, we have the demand ( $D_M^0$ ) and private ( $pmc_M$ ) and social ( $smc_M$ ) marginal cost curves for the manufacturing sector. Note that the axes

are labelled  $X_M$ ,  $D_M$  and  $P$ . Given the international price  $P$ , to satisfy the demand  $D_M^0$ , we import  $D_M^0 - X_M^0$  of the manufacturing good. Due to the increasing returns to scale technology in this sector, the social marginal cost curve is below the private marginal cost curve, giving rise to a welfare loss represented by the shaded area. While in quadrant IV, we determine resident welfare. The national income budget line is represented by the line  $Y^0Y^{01}$  while its slope is determined by the relative price ratio  $P$ . The vertical intercept of this budget line  $OY^0$  is made up of the sum of  $X_A^0 + P_N^0 X_N^0 + P X_M^0$ , the values of which can be read from quadrant I and III. Also illustrated in quadrant I of Figure 2 is  $OY_{AN}^0$  which represents the income generated in the Heckscher-Ohlin subset of the economy. Given the resident utility function  $U$  defined in equation (11), with the restriction that resident consumption of the non-traded good is zero, we can determine the social indifference curve  $U_0$  with equilibrium at  $G^0$ . Note that the  $G^0$  includes the imports  $D_M^0 - X_M^0$  of the manufactured good derived in quadrant III.

### 3. Results

In this section, we present the implications of a tourist boom on relative prices, outputs, factor incomes and resident welfare. The tourism boom is captured by change in  $\Delta$  in equation (14).

By totally differentiating the cost equations (8) and (9) which make up the Heckscher-Ohlin bloc, we obtain the standard Stolper-Samuelson result:

$$\hat{w} = \frac{\mathbf{q}_{TA}}{|\mathbf{q}|} \hat{P}_N \quad (17)$$

Figure 1

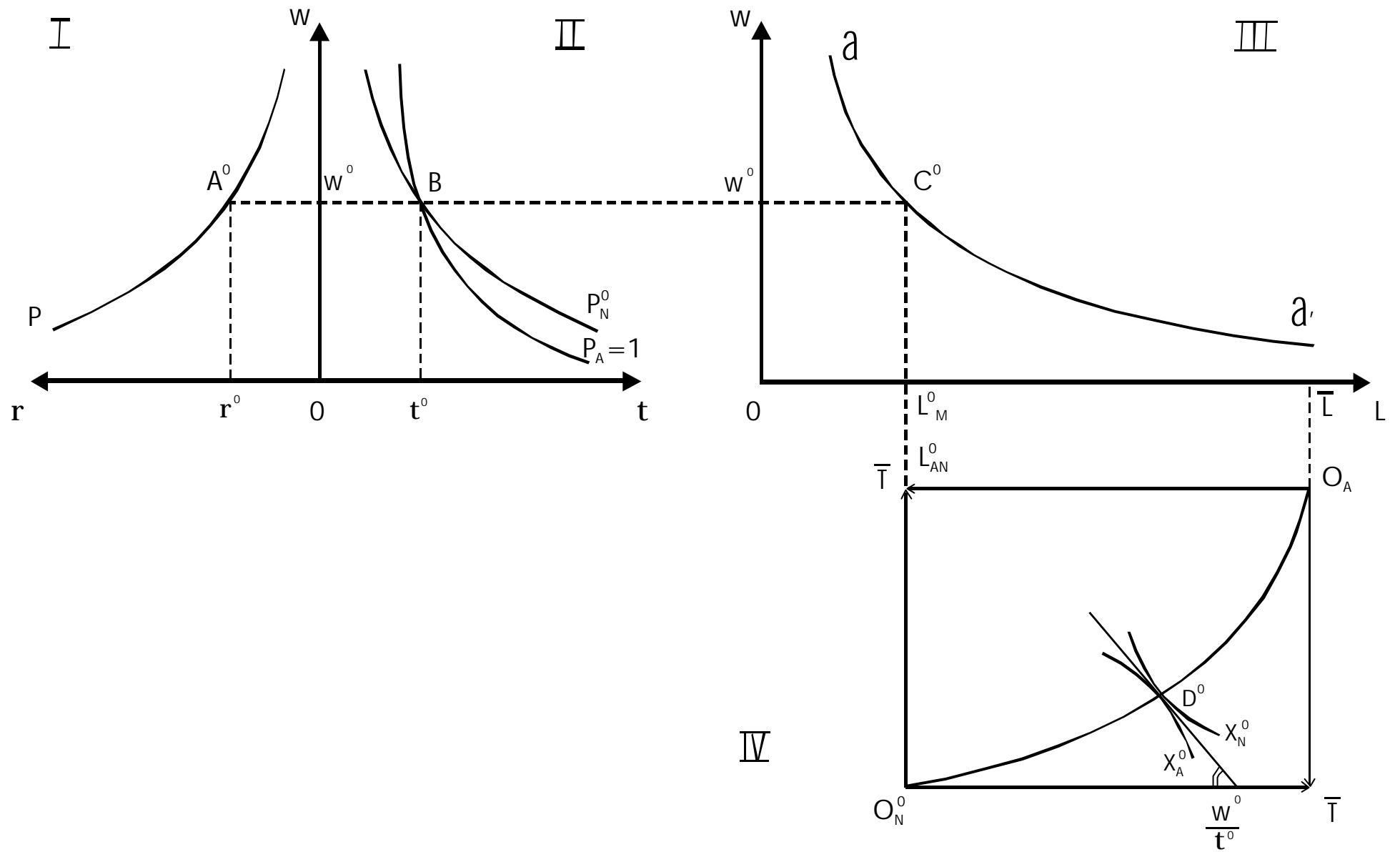
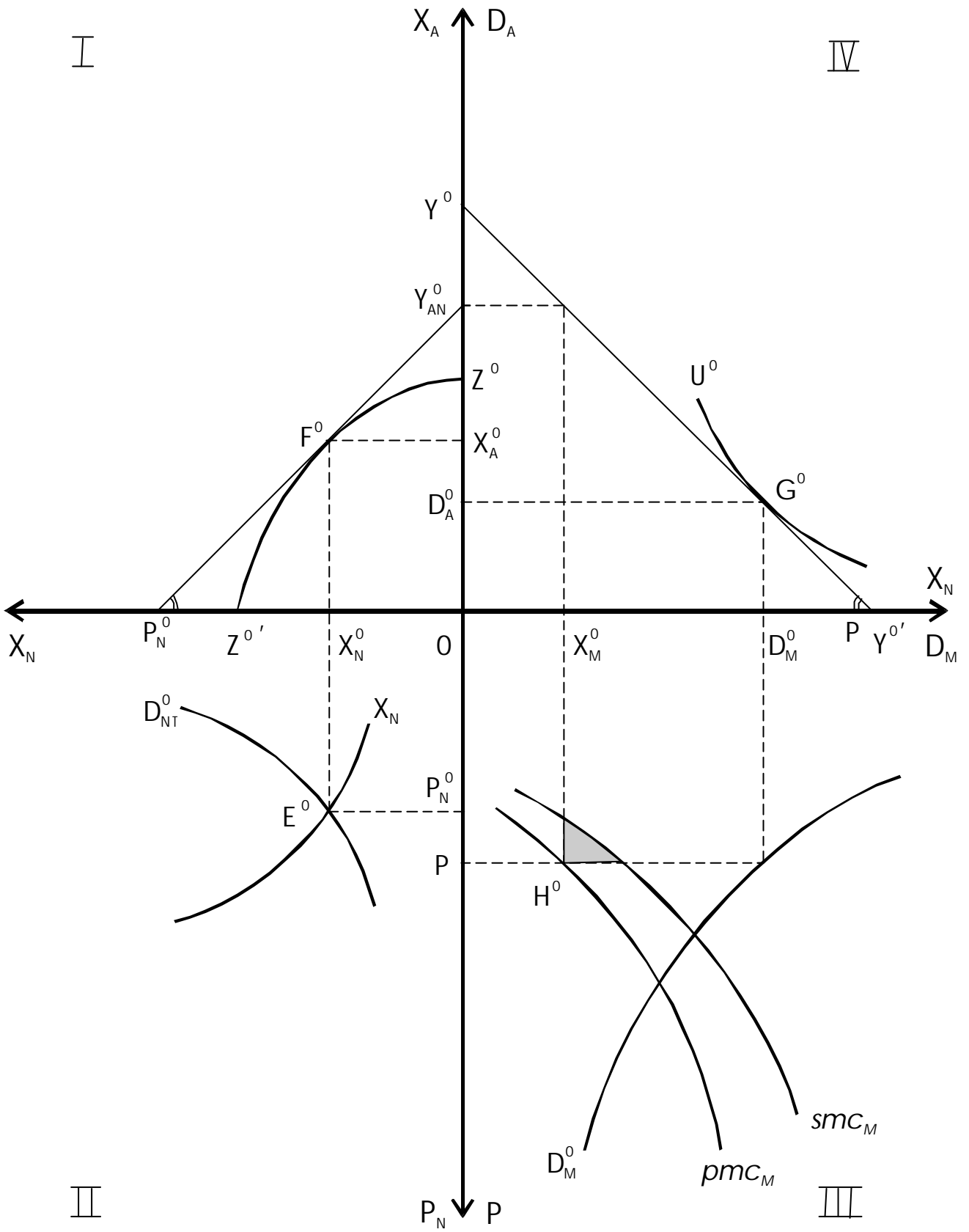


Figure 2



$$\hat{t} = -\frac{\mathbf{q}_{LA}}{|\mathbf{q}|} \hat{P}_N \quad (18)$$

where the  $\mathbf{q}_{ij}$ 's are the cost shares, the  $(\wedge)$  notation denotes relative changes and  $|\mathbf{q}| = \mathbf{q}_{LN} - \mathbf{q}_{LA} = \mathbf{q}_{TA} - \mathbf{q}_{TN}$  describes the labour/land factor intensity which is positive for the case where the non-traded good is labour intensive vis-à-vis the agriculture good. Thus if the price of  $\hat{P}_N$ , the non-traded good, rises,  $w$ , the price of the factor used intensely in its production, rises and  $t$  falls.

Totally differentiating (2b), (10), using (3) and after some manipulation, we obtain

$$e_M \hat{X}_M = \mathbf{q}_{LM} \hat{w} + \mathbf{q}_{KM} \hat{r} \quad (19)$$

From equation (7), and (17) – (19) above, we obtain the following expression for  $\hat{X}_M$  :

$$\hat{X}_M = -\mathbf{f}_M \hat{P}_N \quad (20)$$

where  $\mathbf{f}_M = \frac{\mathbf{q}_{LM} \mathbf{q}_{TA}}{(1 - e_M) \mathbf{x}_M |\mathbf{q}|}$ ,  $\mathbf{x}_M = \left( \frac{e_M}{1 - e_M} \right) \mathbf{q}_{LM} - \frac{\mathbf{q}_{KM}}{\mathbf{s}^M}$  and  $\mathbf{s}^j$  is the elasticity of substitution between the primary factors in sector  $j$ . The term  $\mathbf{x}_M$  is the elasticity of the marginal physical product of labour with respect to a change in labour in  $X_M$  and is assumed to be negative for stability<sup>14</sup>.

From equation (6) and (20), we obtain the following expression for change in the labour demand in the manufacturing sector:

$$\hat{L}_M = -\frac{\mathbf{q}_{TA}}{|\mathbf{q}|} \hat{P}_N \quad (21)$$

By using equation (21), we have the change in the labour supply for the agriculture and non-traded goods sectors:

$$\hat{L}_{AN} = -\frac{\mathbf{m}_M}{\mathbf{m}_{AN}} \frac{\mathbf{q}_{TA}}{|\mathbf{q}|} \hat{P}_N \quad (22)$$

where  $\mathbf{m}_j$ , ( $j = M, AN$ ) is the labour share in  $j$ , e.g.  $\mathbf{m}_{AN} = \frac{L_{AN}}{L}$ .

From the full employment conditions in the Heckscher-Ohlin subset [equations (4), (5)] and (22), we obtain the following output changes for sectors  $X_A$  and  $X_N$ .

$$\hat{X}_A = -\mathbf{f}_A \hat{P}_N \quad (23)$$

$$\hat{X}_N = \mathbf{f}_N \hat{P}_N \quad (24)$$

where  $\mathbf{f}_j = \left[ (\mathbf{I}_{Li} \varrho_T + \mathbf{I}_{Ti} \varrho_L) - \mathbf{I}_{Ti} \frac{\mathbf{m}_M}{\mathbf{m}_{AN}} \frac{\mathbf{q}_{TA}}{\mathbf{x}_M} \right] \frac{1}{|\mathbf{q}| |\mathbf{I}|}$ ,  $i, j = A, N$ ,  $i \neq j$ . The term

$\mathbf{f}_j$  is the price elasticity of supply in sector  $j$ ;  $\mathbf{I}_{Li}$  and  $\mathbf{I}_{Ti}$  are factor shares defined in

sectors  $X_A$  and  $X_N$ . For example,  $I_{LA} = \frac{L_A}{L_{AN}}$ ,  $I_{TN} = \frac{T_N}{T}$ .

Note that  $|I| = I_{LN} - I_{TN} = I_{TA} - I_{LA}$  has the same sign as  $|q|$  since there are no distortions in the labour market.  $\varphi_i, i = T, L$  is the elasticity of factor  $i$  in sector A and N with respect to  $(t/w)$  at constant outputs and factor endowments.

From the full employment condition (4), (6), (7), the production function (2b), and using the definition of  $e_M$ , we obtain the following relationship between the slope of the production possibility surface and relative prices:

$$dX_A + P_N dX_N + P_M dX_M = e_M dX_M \quad (25)$$

Note that due to the presence of a distortion (here as increasing returns to scale), there is a non-tangency between the production possibility surface and relative prices.

Using equations (11), (12), (16) and (25) we obtain the following expression for the change in resident welfare:

$$\hat{y} = g_N \hat{D}_N + g_M \hat{D}_M + g_A \hat{D}_A = y \hat{P}_N \quad (26)$$

where  $y = \left[ d_{NT} + \left( \frac{e_M}{1-e_M} \right) \frac{q_{TA}}{|q|} \frac{d_M q_{LM}}{x_M} \right] \begin{matrix} \leq \\ > \end{matrix} 0$ ,



$\mathbf{d}_{NT}$  is the share of international tourist demand in national income, and  $\mathbf{d}_M$ , is the share of manufacturing output in national income.

By differentiating (13) – (15), we obtain:

$$\hat{X}_N = \hat{D}_{NT} \mathbf{a}_{NT} + \hat{D}_N \mathbf{a}_N \quad (27)$$

where  $\mathbf{a}_N = \frac{D_N}{X_N}$ ,  $\mathbf{a}_{NT} = \frac{D_{NT}}{X_N}$

$$\hat{D}_{NT} = -\mathbf{e}_{NT} \hat{P}_N + \mathbf{b}_{NT} \hat{\Delta} \quad (28)$$

$$\hat{D}_N = -\mathbf{e}_N \hat{P}_N + \mathbf{h}_N \hat{y} \quad (29)$$

where  $\mathbf{e}_i > 0, (i = N, NT)$  is the compensated price elasticity of demand,  $\mathbf{h}_N$  is the resident income elasticity of the non-traded goods and  $\mathbf{b}_{NT}$  measures the sensitivity of the tourist demand to the tourist shock.

Using (24), (26)-(29) we obtain:

$$\hat{P}_N = (\mathbf{a}_{NT} \mathbf{b}_{NT} / \Omega) \hat{\Delta} \quad (30)$$

where  $\Omega = \mathbf{f}_N + \mathbf{a}_{NT} \mathbf{e}_{NT} + \mathbf{a}_N \mathbf{e}_N - \mathbf{a}_N \mathbf{e}_N \Psi$  is the excess supply elasticity of the non-traded good in general equilibrium and is positive for stability in this market.

From the above equations, we are now able to describe the consequences of an increase in tourism on the key variables.

Irrespective of the labour intensity of the non-traded goods sector, its price and output always increase and the output of the agricultural sector falls. In our model,  $P_N$  can be interpreted as the relative price of an export and hence its increase is, in fact, an improvement in the terms of trade.

The response of the other key variables depends on the labour intensity of the non-traded goods sector. If this sector is labour intensive ( $|\mathbf{q}| > 0$ ), the wage rate increases and both the rental on land and capital fall. Due to the wage increase (and resultant increase in costs), the output of the manufacturing sector falls. Note that the tourist expansion comes at a cost to the manufacturing sector. Moreover as the manufacturing output was already sub-optimal at the initial market equilibrium (due to the increasing returns to scale), this decrease in output worsens the welfare loss (second term in square brackets of  $\Psi$  in (26)). This welfare loss can outweigh the welfare gain [captured by  $\mathbf{d}_{NT}$  in  $\Psi$  in (26)] due to the terms of trade effect [ $\hat{P}_N > 0$ ]. Hence resident welfare (income) may fall as a result of the increase in tourism.

If the non-traded goods is land intensive ( $|q| < 0$ ), the wage rate falls, the rental on capital and land rise and the outputs of both  $X_M$  and  $X_N$  rise. Hence, the expansion in tourism helps the development of the manufacturing sector. Resident welfare (income) rises as both the effects referred to above are positive. That is, the terms of trade effect is still favourable while the expansion of the manufacturing sector reduces the welfare loss at the market equilibrium<sup>15</sup>.

Figure 3

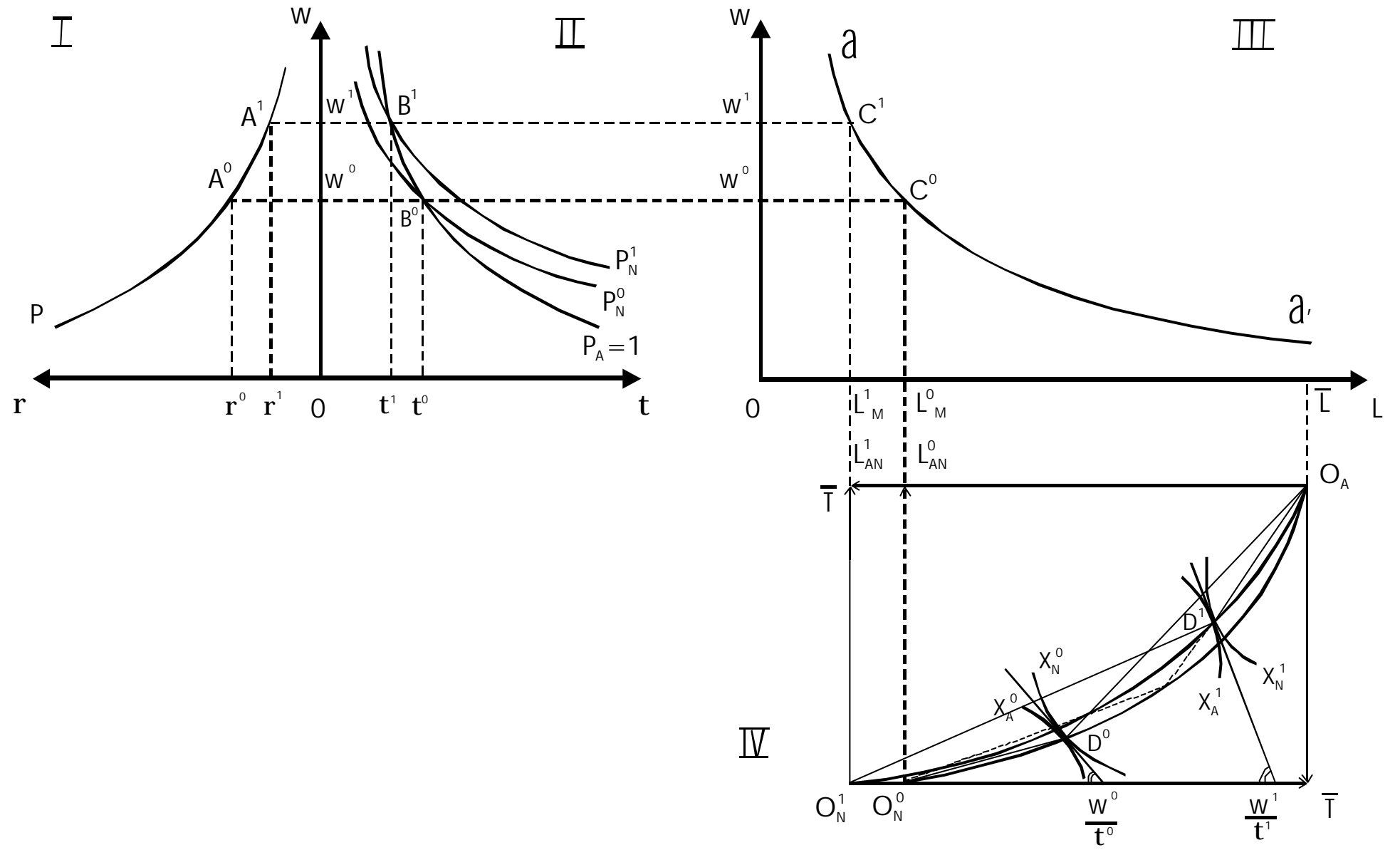
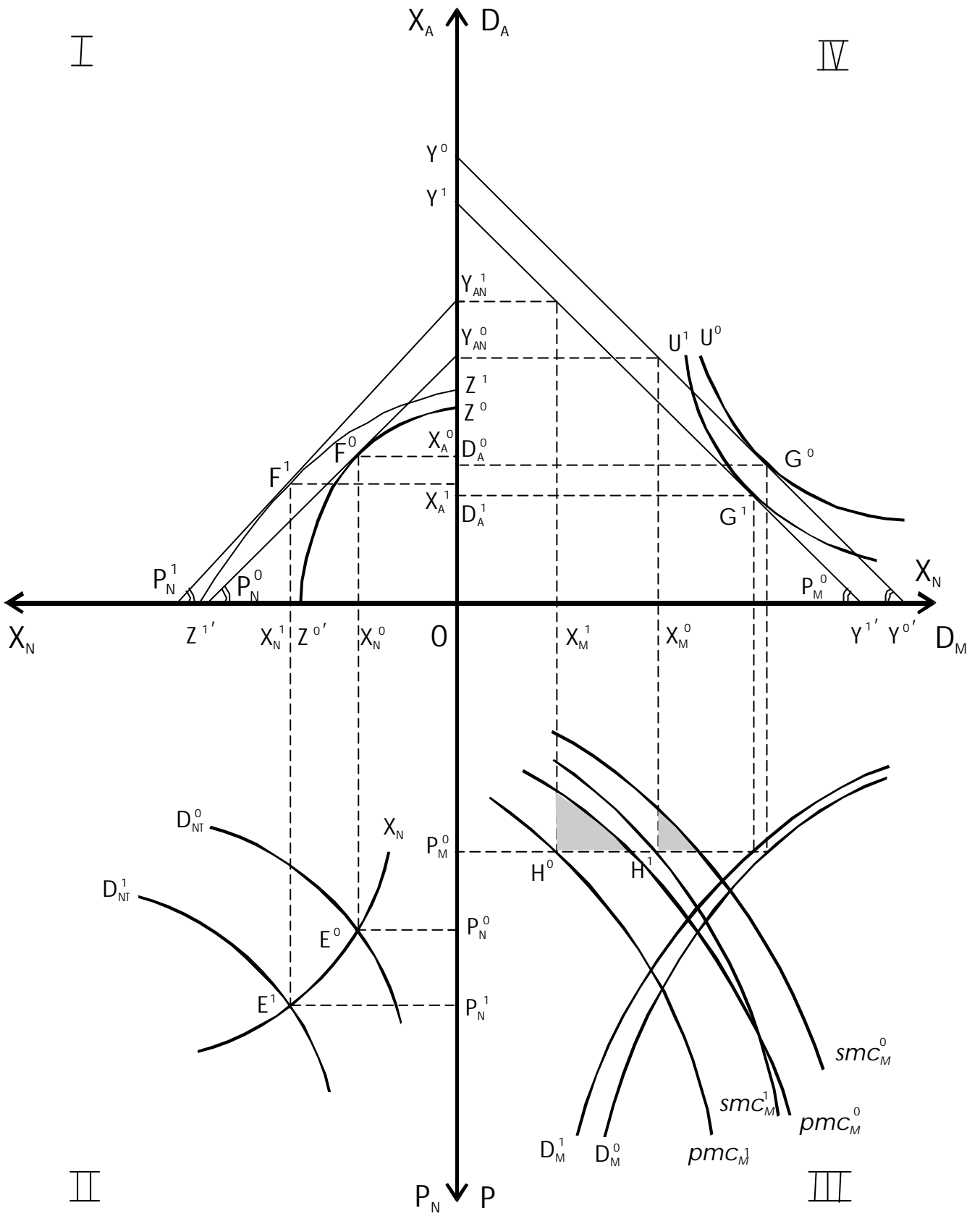


Figure 4



It will be useful to use our Figures 1 and 2 to illustrate some of the results. We will illustrate the case of immiserizing growth. In quadrant II of Figure 4, the increase in tourism induces an increase in  $P_N$ . Recall that, for illustrative purposes only, we assume that residents do not consume  $X_N$ . By the Stolper-Samuelson effect the wage rate,  $w$ , increases at the expense of the rental rates on land as described in quadrant II of Figure 3. The manufacturing sector reduces its demand for labour as shown in quadrant III of Figure 3, which results in an increased labour supply for the HOS subset of the economy ( $X_A$  and  $X_N$ ). In quadrant IV of Figure 3, we have represented both the factor prices and the labour supply effects on outputs  $X_A$  and  $X_N$ . The expansion of  $X_N$  and contraction of  $X_A$  production are illustrated in quadrant I of Figure 4 by the shift in the production point from  $F^0$  to  $F'$ . We can identify the terms of trade and increased labour supply effects on resident income in quadrant I of Figure 4 by the distance  $Y_{AN}^0 Y_{AN}^1$ .

As a result of the increases in  $P_N$ , both the  $(pmc_M)$  and  $(smc_M)$  curves shift to the left with the  $pmc_M$  curve shifting more than the  $(smc_M)$  curve because the private firm in  $X_M$  do not internalise the effects of the increasing returns to scale. As a result the welfare loss (represented by the shaded area) becomes largest. This increase in the welfare loss outweighs the increase in income from the terms of trade effect as illustrated by the movement from the social indifference curve  $U^0$  to  $U^1$  in quadrant IV of Figure 4.

#### **4. Conclusion**

It is frequently asserted that international tourism may be costly to the host country. A great deal of attention has been paid to the most obvious costs due to externalities associated with tourism activity (pollution, congestion and sociocultural impacts). However a general equilibrium analysis of the effects of tourism on structural adjustment and welfare in the presence of externalities is lacking. This paper addresses this problem.

Under certain conditions, welfare and manufacturing output may fall as a result of increased tourism. This can occur when the non-traded tourism sector is more labour intensive than the agricultural traded sector. The empirical evidence on factor intensities suggest that this case is more likely to prevail and this theoretical possibility should therefore be taken seriously<sup>16</sup>.

The distortion literature establishes that a tax-cum-subsidy policy is required to correct the distortion. Note that due to the monopoly power in trade in tourism, the taxing opportunities are broader, for example, tourism tax receipts could be used to subsidize the manufacturing sector.

## Footnotes

\* We thank an anonymous referee for useful comments. The first two authors would like to thank the French Embassy in Australia for its generous support which helped finance this research.

1. Various governments have pursued aggressive policies for promoting tourism. Singapore, Hong Kong, Thailand, Tunisia and Egypt are prime examples of such policies. See also the papers by Copeland (1991), and Nowak and Sahli (1999) who highlight the differences between conventional trade and tourism.
2. See for example Sinclair and Bote Gomez (1996) for Spain and Pye and Lin (1983) for Asian NIC.
3. See de Kadt, (1979), WTO (1998), while on the issue of tax revenue for the government, Bird, (1992), and to promote growth, Hazari and Sgro, (1995).
4. Domestic residents pay for some of these amenities via taxes. For further elaboration on the differences between tourism trade and commodities trade, see Copeland (1991), Hazari and Sgro (1995), Hazari and Nowak (2000).
5. See for example Cazes (1992) and Sheldon (1990).
6. See for example Cater and Goodall (1992), Eber (1992).
7. See for example Long (1991).
8. See for example Krippendorf (1991).
9. Empirical evidence shows that in some cases tourism development is detrimental to agriculture, as on the Spanish Mediterranean coast (Tyrakowski (1986)), in Caribbean



countries (Bryden (1973), Weaver (1988)), in Bali or in many parts of Mexico (Latimer (1985)). Computable general equilibrium modeling experiments on Australia (Adams and Parmenter (1995)) and Hawaii (Zhou et al. (1997)) also suggest that an increase in the demand for tourism may seriously crowd out agriculture and manufacturing activities, with no change in overall output.

10. In the “Dutch Disease” literature, Corden and Neary (1982), and Neary and van Wijnbergen (1986) have emphasized the detrimental consequences of a booming traded good sector and other traded good sectors, especially on manufacturing industry. In our model, since the foreign tourists consume the local non-traded good, the booming sector is the non-traded sector, which makes our analysis different to the “Dutch Disease” model, although structural effects may still exist.
11. Several studies stress competition for the using of land and labor between agriculture and tourism, see Bryden (1973), Latimer (1985), Telfer and Wall (1996).
12. This particular formulation is used, for example, by Panagariya (1980) (1986), Herberg and Kemp (1969) and Choi and Yu (1984).
13. In general with endogenous labour supply the price-output response maybe perverse and the production possibility curve may not be concave [Kemp and Jones (1962), Martin and Neary (1980)]. To avoid this problem in the H-O subset we impose restrictions on the price elasticities.
14. Panagariya (1986) proved that a necessary and sufficient condition for stability in the RVJ model is that the weighted sum of the sectoral marginal physical product of labour be negative. In this case the price-output response is normal and the production

possibility curve is concave. Given that there are no production or factor market distortions from the H-O subset (sectors  $X_A$  and  $X_N$ ), and given the footnote 13 above, it is easy to show that the corresponding elasticity is always negative for this subset. Therefore it is sufficient to assume  $\alpha_M < 0$  for stability in our model.

15. Also note that both the Heckscher-Ohlin-Komiya (HOK) and the RVJ models can be derived from our more general model by making specific simplifying assumptions. In the HOK model, by allowing capital mobility between all the sectors, we obtain the price and output results of Komiya (1967) and the welfare result does not have a terms of trade effect. Welfare will rise or fall depending on the labour intensity of  $X_N$  vis-à-vis the other two sectors. To obtain the RVJ model, we add land immobility between  $X_A$  and  $X_N$ . In this case the rise in  $P_N$  always increases the wage rate and the results are qualitatively identical to the case above where ( $|q| > 0$ ), i.e. the non-traded good sector is labour intensive. Also note that the return to the specific factor in the non-traded good sector in the RVJ model rises but in our model decreases. Our model is also based on the assumption of competitive markets, full employment and interior solutions.
16. See for example Krueger A.O. et al., (1983).

## References

- Adams P.D. and B.R. Parmenter (1995), "An Applied General Equilibrium Analysis of the Economic Effects of Tourism in a Quite Small, Quite Open Economy", Applied Economics, vol.27, n°10, p.985-94.
- Bhagwati, J.N. (1971 ) "The Generalized Theory of Distortion and Welfare" in J.N . Bhagwati, R . Jones, R Mundell and J. Vanek (eds) Trade, Balance of Payments and Growth", Amsterdam North Holland.
- Bird R.M. (1992), "Taxing Tourism in Developing Countries", World Development, vol. 20, n°8, p.1145-58.
- Bryden, J.M. (1973) Tourism and Development: A Case Study of the Commonwealth Caribbean, London: Cambridge University Press .
- Cater E. and B. Goodall (1992), "Must Tourism destroy its Resource Base?", in: A.M. Mannion and S.R. Bowlby (eds.), Environmental Issues in the 1990s, Chichester: John Wiley.
- Cazes G. (1992), Tourisme et Tiers-Monde: un bilan controversé, Paris: L'Harmattan.
- Choi, J-Y and E.S.H. Yu (1984) "Gains from Trade under Variable Returns to Scale", Southern Economic Journal, 49, p.979-992.
- Copeland, B.R. (1991) "Tourism, Welfare and Industrialization in a Small Open Economy" Economica, 58, p.515-529.
- Corden W.M. and J.P. Neary (1982), "Booming sector and de-industrialisation in a small open economy", Economic Journal, vol.92, pp.825-48.

- de Kadt E. (1979), Tourism: Passport to Development, Oxford: Oxford University Press.
- Eber S. (ed.) (1992), Beyond the Green Horizon Principles for Sustainable Tourism,  
Godalming: World Wide Fund of Nature.
- Hazari, B.R. and A. Ng (1993) "An Analysis of Tourists Consumption of Non-traded Goods  
and Services on the Welfare of the Domestic Consumers" International Review of  
Economics and Finance 2, p.3-58.
- Hazari, B.R. and P.M. Sgro (1995) "Tourism and Growth in a dynamic model of trade"  
Journal of International Trade and Economic Development, 4(2), p.243-252.
- \_\_\_\_\_ (2001) "Price Discrimination, Tourism and Welfare"  
mimeographed.
- Hazari, B.R and J.J. Nowak (2000) "Why Tourists Should be Taxed: A Trade Theoretic  
Explanation" mimeographed.
- Herberg, H and M.C. Kemp (1969) "Some implications of variable returns to scale", Canadian  
Journal of Economics, 2, p.403-415.
- Kemp, M.C. and R.W. Jones (1962) "Variable Labour Supply and the Theory of International  
Trade", Journal of Political Economy, 70, p.30-36.
- Komiya, R. (1967) "Non-traded goods and the pure theory of international trade", International  
Economic Review 8 (2): p.132-52.

- Krippendorff J. (1991), "Towards New Tourism Policies", in: S. Medlik (ed.), Managing Tourism, p.301-306, London: Butterworth, Heinemann.
- Krueger A.O. et al. (1983), Trade and Employment in Developing Countries: synthesis and conclusions, NBER, Chicago: The University of Chicago Press.
- Latimer, H. (1986), "Developing Island Economies: Tourism v Agriculture", Tourism Management, 6, p.32-42.
- Long V.H. (1991), "Government-Industry-Community interaction in Tourism Development in Mexico", in: M.T. Sinclair and M.J. Stabler (eds.), The Tourism Industry: an International Analysis, Wallingford: C.A.B International.
- Martin, Q.P. and J.P. Neary (1980) "Variable Labour Supply and the Purse Theory of International Trade", Journal of International Economics, 10, p.549-59.
- Neary J.P. and S. Van Wijnbergen (eds.) (1986), Natural Resources and the Macroeconomy, Basil Blackwell: Oxford.
- Nowak, J-J and M. Sahli (1999) "L'analyse d'un boom touristique dans une petite economie ouverte" Revue de Economique Politique, 105,5 p. 729-749.
- Panagariya, A. (1980) "Variable Returns to Scale in General Equilibrium Theory Once Again", Journal of International Economics, 10, p.499-526 .
- \_\_\_\_\_ (1986) "Increasing Returns and the Specific Factor Model" Southern Economic Journal, 86, p.1-17.
- Pye E.A. and T.B. Lin (eds.) (1983), Tourism in Asia: The Economic Impact, Singapore: Singapore University Press.

- Sheldon P.J. (1990), "A Review of Tourism Expenditure Research", in: C.P. Cooper (ed.), Progress in Tourism, Recreation and Hospitality Management, vol. 2, London: Belhaven.
- Sinclair M.T. and V. Bote Gomez (1996), "Tourism, the Spanish Economy and the Balance of Payments", in: M. Barke, M. Newton and J. Towner (eds.), Tourism in Spain: Critical Perspectives, Wallingford: C.A.B International.
- Telfer D.J. and G. Wall (1996), "Linkages between Tourism and Food Productions", Annals of Tourism Research, 23, 3, p.635-653.
- Tyrakowski K. (1986), "The Role of Tourism in Land Utilization Conflicts on the Spanish Mediterranean Coast" Geojournal, 13, p.19-26
- Weaver D. (1988), "The Evolution of a Plantation Tourism Landscape on the Caribbean Island of Antigua", Tijdschrift voor Economische en Sociale Geographie, n°79, p.319-331.
- World Tourism Organization (1998), Tourism Economic Report, first edition, Madrid.
- Zhou D., J.F. Yanagida, U. Chakravorty and P. Leung (1997), "Estimating Economic Impacts from Tourism", Annals of Tourism Research, vol.24, n°1, p.76-89.

## NOTE DI LAVORO DELLA FONDAZIONE ENI ENRICO MATTEI

### Fondazione Eni Enrico Mattei Working Paper Series

Our Note di Lavoro are available on the Internet at the following addresses:

<http://www.feem.it/Feem/Pub/Publications/WPapers/default.html>

<http://www.ssrn.com/link/feem.html>

### NOTE DI LAVORO PUBLISHED IN 2003

PRIV	1.2003	<i>Gabriella CHIESA and Giovanna NICODANO</i> : <u>Privatization and Financial Market Development: Theoretical Issues</u>
PRIV	2.2003	<i>Ibolya SCHINDELE</i> : <u>Theory of Privatization in Eastern Europe: Literature Review</u>
PRIV	3.2003	<i>Wietze LISE, Claudia KEMFERT and Richard S.J. TOL</i> : <u>Strategic Action in the Liberalised German Electricity Market</u>
CLIM	4.2003	<i>Laura MARSILIANI and Thomas I. RENSTRÖM</i> : <u>Environmental Policy and Capital Movements: The Role of Government Commitment</u>
KNOW	5.2003	<i>Reyer GERLAGH</i> : <u>Induced Technological Change under Technological Competition</u>
ETA	6.2003	<i>Efrem CASTELNUOVO</i> : <u>Squeezing the Interest Rate Smoothing Weight with a Hybrid Expectations Model</u>
SIEV	7.2003	<i>Anna ALBERINI, Alberto LONGO, Stefania TONIN, Francesco TROMBETTA and Margherita TURVANI</i> : <u>The Role of Liability, Regulation and Economic Incentives in Brownfield Remediation and Redevelopment: Evidence from Surveys of Developers</u>
NRM	8.2003	<i>Elissaios POPYRAKIS and Reyner GERLAGH</i> : <u>Natural Resources: A Blessing or a Curse?</u>
CLIM	9.2003	<i>A. CAPARRÓS, J.-C. PEREAU and T. TAZDAÏT</i> : <u>North-South Climate Change Negotiations: a Sequential Game with Asymmetric Information</u>
KNOW	10.2003	<i>Giorgio BRUNELLO and Daniele CHECCHI</i> : <u>School Quality and Family Background in Italy</u>
CLIM	11.2003	<i>Efrem CASTELNUOVO and Marzio GALEOTTI</i> : <u>Learning By Doing vs Learning By Researching in a Model of Climate Change Policy Analysis</u>
KNOW	12.2003	<i>Carole MAIGNAN, Gianmarco OTTAVIANO and Dino PINELLI (eds.)</i> : <u>Economic Growth, Innovation, Cultural Diversity: What are we all talking about? A critical survey of the state-of-the-art</u>
KNOW	13.2003	<i>Carole MAIGNAN, Gianmarco OTTAVIANO, Dino PINELLI and Francesco RULLANI (lix)</i> : <u>Bio-Ecological Diversity vs. Socio-Economic Diversity. A Comparison of Existing Measures</u>
KNOW	14.2003	<i>Maddy JANSSENS and Chris STEYAERT (lix)</i> : <u>Theories of Diversity within Organisation Studies: Debates and Future Trajectories</u>
KNOW	15.2003	<i>Tuzin BAYCAN LEVENT, Enno MASUREL and Peter NIJKAMP (lix)</i> : <u>Diversity in Entrepreneurship: Ethnic and Female Roles in Urban Economic Life</u>
KNOW	16.2003	<i>Alexandra BITUSIKOVA (lix)</i> : <u>Post-Communist City on its Way from Grey to Colourful: The Case Study from Slovakia</u>
KNOW	17.2003	<i>Billy E. VAUGHN and Katarina MLEKOV (lix)</i> : <u>A Stage Model of Developing an Inclusive Community</u>
KNOW	18.2003	<i>Selma van LONDEN and Arie de RUIJTER (lix)</i> : <u>Managing Diversity in a Globalizing World</u>
Coalition		
Theory	19.2003	<i>Sergio CURRARINI</i> : <u>On the Stability of Hierarchies in Games with Externalities</u>
Network		
PRIV	20.2003	<i>Giacomo CALZOLARI and Alessandro PAVAN (lx)</i> : <u>Monopoly with Resale</u>
PRIV	21.2003	<i>Claudio MEZZETTI (lx)</i> : <u>Auction Design with Interdependent Valuations: The Generalized Revelation Principle, Efficiency, Full Surplus Extraction and Information Acquisition</u>
PRIV	22.2003	<i>Marco LiCalzi and Alessandro PAVAN (lx)</i> : <u>Tilting the Supply Schedule to Enhance Competition in Uniform-Price Auctions</u>
PRIV	23.2003	<i>David ETTINGER (lx)</i> : <u>Bidding among Friends and Enemies</u>
PRIV	24.2003	<i>Hannu VARTIAINEN (lx)</i> : <u>Auction Design without Commitment</u>
PRIV	25.2003	<i>Matti KELOHARJU, Kjell G. NYBORG and Kristian RYDQVIST (lx)</i> : <u>Strategic Behavior and Underpricing in Uniform Price Auctions: Evidence from Finnish Treasury Auctions</u>
PRIV	26.2003	<i>Christine A. PARLOUR and Uday RAJAN (lx)</i> : <u>Rationing in IPOs</u>
PRIV	27.2003	<i>Kjell G. NYBORG and Ilya A. STREBULAIEV (lx)</i> : <u>Multiple Unit Auctions and Short Squeezes</u>
PRIV	28.2003	<i>Anders LUNANDER and Jan-Eric NILSSON (lx)</i> : <u>Taking the Lab to the Field: Experimental Tests of Alternative Mechanisms to Procure Multiple Contracts</u>
PRIV	29.2003	<i>TangaMcDANIEL and Karsten NEUHOFF (lx)</i> : <u>Use of Long-term Auctions for Network Investment</u>
PRIV	30.2003	<i>Emiel MAASLAND and Sander ONDERSTAL (lx)</i> : <u>Auctions with Financial Externalities</u>
ETA	31.2003	<i>Michael FINUS and Bianca RUNDSHAGEN</i> : <u>A Non-cooperative Foundation of Core-Stability in Positive Externality NTU-Coalition Games</u>
KNOW	32.2003	<i>Michele MORETTO</i> : <u>Competition and Irreversible Investments under Uncertainty</u>
PRIV	33.2003	<i>Philippe QUIRION</i> : <u>Relative Quotas: Correct Answer to Uncertainty or Case of Regulatory Capture?</u>
KNOW	34.2003	<i>Giuseppe MEDA, Claudio PIGA and Donald SIEGEL</i> : <u>On the Relationship between R&amp;D and Productivity: A Treatment Effect Analysis</u>
ETA	35.2003	<i>Alessandra DEL BOCA, Marzio GALEOTTI and Paola ROTA</i> : <u>Non-convexities in the Adjustment of Different Capital Inputs: A Firm-level Investigation</u>

GG	36.2003	<i>Matthieu GLACHANT</i> : <u>Voluntary Agreements under Endogenous Legislative Threats</u>
PRIV	37.2003	<i>Narjess BOUBAKRI, Jean-Claude COSSET and Omrane GUEDHAMI</i> : <u>Postprivatization Corporate Governance: the Role of Ownership Structure and Investor Protection</u>
CLIM	38.2003	<i>Rolf GOLOMBEK and Michael HOEL</i> : <u>Climate Policy under Technology Spillovers</u>
KNOW	39.2003	<i>Slim BEN YOUSSEF</i> : <u>Transboundary Pollution, R&amp;D Spillovers and International Trade</u>
CTN	40.2003	<i>Carlo CARRARO and Carmen MARCHIORI</i> : <u>Endogenous Strategic Issue Linkage in International Negotiations</u>
KNOW	41.2003	<i>Sonia OREFFICE</i> : <u>Abortion and Female Power in the Household: Evidence from Labor Supply</u>
KNOW	42.2003	<i>Timo GOESCHL and Timothy SWANSON</i> : <u>On Biology and Technology: The Economics of Managing Biotechnologies</u>
ETA	43.2003	<i>Giorgio Busetti and Matteo MANERA</i> : <u>STAR-GARCH Models for Stock Market Interactions in the Pacific Basin Region, Japan and US</u>
CLIM	44.2003	<i>Katrin MILLOCK and Céline NAUGES</i> : <u>The French Tax on Air Pollution: Some Preliminary Results on its Effectiveness</u>
PRIV	45.2003	<i>Bernardo BORTOLOTTI and Paolo PINOTTI</i> : <u>The Political Economy of Privatization</u>
SIEV	46.2003	<i>Elbert DIJKGRAAF and Herman R.J. VOLLEBERGH</i> : <u>Burn or Bury? A Social Cost Comparison of Final Waste Disposal Methods</u>
ETA	47.2003	<i>Jens HORBACH</i> : <u>Employment and Innovations in the Environmental Sector: Determinants and Econometrical Results for Germany</u>
CLIM	48.2003	<i>Lori SNYDER, Nolan MILLER and Robert STAVINS</i> : <u>The Effects of Environmental Regulation on Technology Diffusion: The Case of Chlorine Manufacturing</u>
CLIM	49.2003	<i>Lori SNYDER, Robert STAVINS and Alexander F. WAGNER</i> : <u>Private Options to Use Public Goods. Exploiting Revealed Preferences to Estimate Environmental Benefits</u>
CTN	50.2003	<i>László Á. KÓCZY and Luc LAUWERS</i> (Ixi): <u>The Minimal Dominant Set is a Non-Empty Core-Extension</u>
CTN	51.2003	<i>Matthew O. JACKSON</i> (Ixi): <u>Allocation Rules for Network Games</u>
CTN	52.2003	<i>Ana MAULEON and Vincent VANNETELBOSCH</i> (Ixi): <u>Farsightedness and Cautiousness in Coalition Formation</u>
CTN	53.2003	<i>Fernando VEGA-REDONDO</i> (Ixi): <u>Building Up Social Capital in a Changing World: a network approach</u>
CTN	54.2003	<i>Matthew HAAG and Roger LAGUNOFF</i> (Ixi): <u>On the Size and Structure of Group Cooperation</u>
CTN	55.2003	<i>Taiji FURUSAWA and Hideo KONISHI</i> (Ixi): <u>Free Trade Networks</u>
CTN	56.2003	<i>Halis Murat YILDIZ</i> (Ixi): <u>National Versus International Mergers and Trade Liberalization</u>
CTN	57.2003	<i>Santiago RUBIO and Alistair ULPH</i> (Ixi): <u>An Infinite-Horizon Model of Dynamic Membership of International Environmental Agreements</u>
KNOW	58.2003	<i>Carole MAIGNAN, Dino PINELLI and Gianmarco I.P. OTTAVIANO</i> : <u>ICT, Clusters and Regional Cohesion: A Summary of Theoretical and Empirical Research</u>
KNOW	59.2003	<i>Giorgio BELLETTINI and Gianmarco I.P. OTTAVIANO</i> : <u>Special Interests and Technological Change</u>
ETA	60.2003	<i>Ronnie SCHÖB</i> : <u>The Double Dividend Hypothesis of Environmental Taxes: A Survey</u>
CLIM	61.2003	<i>Michael FINUS, Ekko van IERLAND and Robert DELLINK</i> : <u>Stability of Climate Coalitions in a Cartel Formation Game</u>
GG	62.2003	<i>Michael FINUS and Bianca RUNDSHAGEN</i> : <u>How the Rules of Coalition Formation Affect Stability of International Environmental Agreements</u>
SIEV	63.2003	<i>Alberto PETRUCCI</i> : <u>Taxing Land Rent in an Open Economy</u>
CLIM	64.2003	<i>Joseph E. ALDY, Scott BARRETT and Robert N. STAVINS</i> : <u>Thirteen Plus One: A Comparison of Global Climate Policy Architectures</u>
SIEV	65.2003	<i>Edi DEFRANCESCO</i> : <u>The Beginning of Organic Fish Farming in Italy</u>
SIEV	66.2003	<i>Klaus CONRAD</i> : <u>Price Competition and Product Differentiation when Consumers Care for the Environment</u>
SIEV	67.2003	<i>Paulo A.L.D. NUNES, Luca ROSSETTO, Arianne DE BLAEIJ</i> : <u>Monetary Value Assessment of Clam Fishing Management Practices in the Venice Lagoon: Results from a Stated Choice Exercise</u>
CLIM	68.2003	<i>ZhongXiang ZHANG</i> : <u>Open Trade with the U.S. Without Compromising Canada's Ability to Comply with its Kyoto Target</u>
KNOW	69.2003	<i>David FRANTZ</i> (Iix): <u>Lorenzo Market between Diversity and Mutation</u>
KNOW	70.2003	<i>Ercole SORI</i> (Iix): <u>Mapping Diversity in Social History</u>
KNOW	71.2003	<i>Ljiljana DERU SIMIC</i> (Ixi): <u>What is Specific about Art/Cultural Projects?</u>
KNOW	72.2003	<i>Natalya V. TARANOVA</i> (Ixi): <u>The Role of the City in Fostering Intergroup Communication in a Multicultural Environment: Saint-Petersburg's Case</u>
KNOW	73.2003	<i>Kristine CRANE</i> (Ixi): <u>The City as an Arena for the Expression of Multiple Identities in the Age of Globalisation and Migration</u>
KNOW	74.2003	<i>Kazuma MATOBA</i> (Ixi): <u>Glocal Dialogue- Transformation through Transcultural Communication</u>
KNOW	75.2003	<i>Catarina REIS OLIVEIRA</i> (Ixi): <u>Immigrants' Entrepreneurial Opportunities: The Case of the Chinese in Portugal</u>
KNOW	76.2003	<i>Sandra WALLMAN</i> (Ixi): <u>The Diversity of Diversity - towards a typology of urban systems</u>
KNOW	77.2003	<i>Richard PEARCE</i> (Ixi): <u>A Biologist's View of Individual Cultural Identity for the Study of Cities</u>
KNOW	78.2003	<i>Vincent MERK</i> (Ixi): <u>Communication Across Cultures: from Cultural Awareness to Reconciliation of the Dilemmas</u>
KNOW	79.2003	<i>Giorgio BELLETTINI, Carlotta BERTI CERONI and Gianmarco I.P. OTTAVIANO</i> : <u>Child Labor and Resistance to Change</u>
ETA	80.2003	<i>Michele MORETTO, Paolo M. PANTEGHINI and Carlo SCARPA</i> : <u>Investment Size and Firm's Value under Profit Sharing Regulation</u>



IEM	81.2003	<i>Alessandro LANZA, Matteo MANERA and Massimo GIOVANNINI: <u>Oil and Product Dynamics in International Petroleum Markets</u></i>
CLIM	82.2003	<i>Y. Hossein FARZIN and Jinhua ZHAO: <u>Pollution Abatement Investment When Firms Lobby Against Environmental Regulation</u></i>
CLIM	83.2003	<i>Giuseppe DI VITA: <u>Is the Discount Rate Relevant in Explaining the Environmental Kuznets Curve?</u></i>
CLIM	84.2003	<i>Reyer GERLAGH and Wietze LISE: <u>Induced Technological Change Under Carbon Taxes</u></i>
NRM	85.2003	<i>Rinaldo BRAU, Alessandro LANZA and Francesco PIGLIARU: <u>How Fast are the Tourism Countries Growing? The cross-country evidence</u></i>
KNOW	86.2003	<i>Elena BELLINI, Gianmarco I.P. OTTAVIANO and Dino PINELLI: <u>The ICT Revolution: opportunities and risks for the Mezzogiorno</u></i>
SIEV	87.2003	<i>Lucas BRETSCGHER and Sjak SMULDERS: <u>Sustainability and Substitution of Exhaustible Natural Resources. How resource prices affect long-term R&amp;D investments</u></i>
CLIM	88.2003	<i>Johan EYCKMANS and Michael FINUS: <u>New Roads to International Environmental Agreements: The Case of Global Warming</u></i>
CLIM	89.2003	<i>Marzio GALEOTTI: <u>Economic Development and Environmental Protection</u></i>
CLIM	90.2003	<i>Marzio GALEOTTI: <u>Environment and Economic Growth: Is Technical Change the Key to Decoupling?</u></i>
CLIM	91.2003	<i>Marzio GALEOTTI and Barbara BUCHNER: <u>Climate Policy and Economic Growth in Developing Countries</u></i>
IEM	92.2003	<i>A. MARKANDYA, A. GOLUB and E. STRUKOVA: <u>The Influence of Climate Change Considerations on Energy Policy: The Case of Russia</u></i>
ETA	93.2003	<i>Andrea BELTRATTI: <u>Socially Responsible Investment in General Equilibrium</u></i>
CTN	94.2003	<i>Parkash CHANDER: <u>The <math>\gamma</math>-Core and Coalition Formation</u></i>
IEM	95.2003	<i>Matteo MANERA and Angelo MARZULLO: <u>Modelling the Load Curve of Aggregate Electricity Consumption Using Principal Components</u></i>
IEM	96.2003	<i>Alessandro LANZA, Matteo MANERA, Margherita GRASSO and Massimo GIOVANNINI: <u>Long-run Models of Oil Stock Prices</u></i>
CTN	97.2003	<i>Steven J. BRAMS, Michael A. JONES, and D. Marc KILGOUR: <u>Forming Stable Coalitions: The Process Matters</u></i>
KNOW	98.2003	<i>John CROWLEY, Marie-Cecile NAVES (Ixxiii): <u>Anti-Racist Policies in France. From Ideological and Historical Schemes to Socio-Political Realities</u></i>
KNOW	99.2003	<i>Richard THOMPSON FORD (Ixxiii): <u>Cultural Rights and Civic Virtue</u></i>
KNOW	100.2003	<i>Alaknanda PATEL (Ixxiii): <u>Cultural Diversity and Conflict in Multicultural Cities</u></i>
KNOW	101.2003	<i>David MAY (Ixxiii): <u>The Struggle of Becoming Established in a Deprived Inner-City Neighbourhood</u></i>
KNOW	102.2003	<i>Sébastien ARCAND, Danielle JUTEAU, Sirma BILGE, and Francine LEMIRE (Ixxiii) : <u>Municipal Reform on the Island of Montreal: Tensions Between Two Majority Groups in a Multicultural City</u></i>
CLIM	103.2003	<i>Barbara BUCHNER and Carlo CARRARO: <u>China and the Evolution of the Present Climate Regime</u></i>
CLIM	104.2003	<i>Barbara BUCHNER and Carlo CARRARO: <u>Emissions Trading Regimes and Incentives to Participate in International Climate Agreements</u></i>
CLIM	105.2003	<i>Anil MARKANDYA and Dirk T.G. RÜBBELKE: <u>Ancillary Benefits of Climate Policy</u></i>
NRM	106.2003	<i>Anne Sophie CRÉPIN (Ixiv): <u>Management Challenges for Multiple-Species Boreal Forests</u></i>
NRM	107.2003	<i>Anne Sophie CRÉPIN (Ixiv): <u>Threshold Effects in Coral Reef Fisheries</u></i>
SIEV	108.2003	<i>Sara ANIYAR (Ixiv): <u>Estimating the Value of Oil Capital in a Small Open Economy: The Venezuela's Example</u></i>
SIEV	109.2003	<i>Kenneth ARROW, Partha DASGUPTA and Karl-Göran MÄLER(Ixiv): <u>Evaluating Projects and Assessing Sustainable Development in Imperfect Economies</u></i>
NRM	110.2003	<i>Anastasios XEPAPADEAS and Catarina ROSETA-PALMA(Ixiv): <u>Instabilities and Robust Control in Fisheries</u></i>
NRM	111.2003	<i>Charles PERRINGS and Brian WALKER (Ixiv): <u>Conservation and Optimal Use of Rangelands</u></i>
ETA	112.2003	<i>Jack GOODY (Ixiv): <u>Globalisation, Population and Ecology</u></i>
CTN	113.2003	<i>Carlo CARRARO, Carmen MARCHIORI and Sonia OREFFICE: <u>Endogenous Minimum Participation in International Environmental Treaties</u></i>
CTN	114.2003	<i>Guillaume HAERINGER and Myrna WOODERS: <u>Decentralized Job Matching</u></i>
CTN	115.2003	<i>Hideo KONISHI and M. Utku UNVER: <u>Credible Group Stability in Multi-Partner Matching Problems</u></i>
CTN	116.2003	<i>Somdeb LAHIRI: <u>Stable Matchings for the Room-Mates Problem</u></i>
CTN	117.2003	<i>Somdeb LAHIRI: <u>Stable Matchings for a Generalized Marriage Problem</u></i>
CTN	118.2003	<i>Marita LAUKKANEN: <u>Transboundary Fisheries Management under Implementation Uncertainty</u></i>
CTN	119.2003	<i>Edward CARTWRIGHT and Myrna WOODERS: <u>Social Conformity and Bounded Rationality in Arbitrary Games with Incomplete Information: Some First Results</u></i>
CTN	120.2003	<i>Gianluigi VERNASCA: <u>Dynamic Price Competition with Price Adjustment Costs and Product Differentiation</u></i>
CTN	121.2003	<i>Myrna WOODERS, Edward CARTWRIGHT and Reinhard SELTEN: <u>Social Conformity in Games with Many Players</u></i>
CTN	122.2003	<i>Edward CARTWRIGHT and Myrna WOODERS: <u>On Equilibrium in Pure Strategies in Games with Many Players</u></i>
CTN	123.2003	<i>Edward CARTWRIGHT and Myrna WOODERS: <u>Conformity and Bounded Rationality in Games with Many Players</u></i>
	<b>1000</b>	<b>Carlo CARRARO, Alessandro LANZA and Valeria PAPPONETTI: <u>One Thousand Working Papers</u></b>

**NOTE DI LAVORO PUBLISHED IN 2004**

IEM	1.2004	<i>Anil MARKANDYA, Suzette PEDROSO and Alexander GOLUB: <u>Empirical Analysis of National Income and So<sub>2</sub> Emissions in Selected European Countries</u></i>
ETA	2.2004	<i>Masahisa FUJITA and Shlomo WEBER: <u>Strategic Immigration Policies and Welfare in Heterogeneous Countries</u></i>
PRA	3.2004	<i>Adolfo DI CARLUCCIO, Giovanni FERRI, Cecilia FRALE and Ottavio RICCHI: <u>Do Privatizations Boost Household Shareholding? Evidence from Italy</u></i>
ETA	4.2004	<i>Victor GINSBURGH and Shlomo WEBER: <u>Languages Disenfranchisement in the European Union</u></i>
ETA	5.2004	<i>Romano PIRAS: <u>Growth, Congestion of Public Goods, and Second-Best Optimal Policy</u></i>
CCMP	6.2004	<i>Herman R.J. VOLLEBERGH: <u>Lessons from the Polder: Is Dutch CO<sub>2</sub>-Taxation Optimal</u></i>
PRA	7.2004	<i>Sandro BRUSCO, Giuseppe LOPOMO and S. VISWANATHAN (I xv): <u>Merger Mechanisms</u></i>
PRA	8.2004	<i>Wolfgang AUSSENEGG, Pegaret PICHLER and Alex STOMPER (I xv): <u>IPO Pricing with Bookbuilding, and a When-Issued Market</u></i>
PRA	9.2004	<i>Pegaret PICHLER and Alex STOMPER (I xv): <u>Primary Market Design: Direct Mechanisms and Markets</u></i>
PRA	10.2004	<i>Florian ENGLMAIER, Pablo GUILLEN, Loreto LLORENTE, Sander ONDERSTAL and Rupert SAUSGRUBER (I xv): <u>The Chopstick Auction: A Study of the Exposure Problem in Multi-Unit Auctions</u></i>
PRA	11.2004	<i>Bjarne BRENDSTRUP and Harry J. PAARSCH (I xv): <u>Nonparametric Identification and Estimation of Multi-Unit, Sequential, Oral, Ascending-Price Auctions With Asymmetric Bidders</u></i>
PRA	12.2004	<i>Ohad KADAN (I xv): <u>Equilibrium in the Two Player, k-Double Auction with Affiliated Private Values</u></i>
PRA	13.2004	<i>Maarten C.W. JANSSEN (I xv): <u>Auctions as Coordination Devices</u></i>
PRA	14.2004	<i>Gadi FIBICH, Arieh GAVIOUS and Aner SELA (I xv): <u>All-Pay Auctions with Weakly Risk-Averse Buyers</u></i>
PRA	15.2004	<i>Orly SADE, Charles SCHNITZLEIN and Jaime F. ZENDER (I xv): <u>Competition and Cooperation in Divisible Good Auctions: An Experimental Examination</u></i>
PRA	16.2004	<i>Marta STRYSZOWSKA (I xv): <u>Late and Multiple Bidding in Competing Second Price Internet Auctions</u></i>
CCMP	17.2004	<i>Slim Ben YOUSSEF: <u>R&amp;D in Cleaner Technology and International Trade</u></i>
NRM	18.2004	<i>Angelo ANTOCI, Simone BORGHESI and Paolo RUSSU (I xvi): <u>Biodiversity and Economic Growth: Stabilization Versus Preservation of the Ecological Dynamics</u></i>
SIEV	19.2004	<i>Anna ALBERINI, Paolo ROSATO, Alberto LONGO and Valentina ZANATTA: <u>Information and Willingness to Pay in a Contingent Valuation Study: The Value of S. Erasmo in the Lagoon of Venice</u></i>
NRM	20.2004	<i>Guido CANDELA and Roberto CELLINI (I xvii): <u>Investment in Tourism Market: A Dynamic Model of Differentiated Oligopoly</u></i>
NRM	21.2004	<i>Jacqueline M. HAMILTON (I xvii): <u>Climate and the Destination Choice of German Tourists</u></i>
NRM	22.2004	<i>Javier Rey-MAQUIEIRA PALMER, Javier LOZANO IBÁÑEZ and Carlos Mario GÓMEZ GÓMEZ (I xvii): <u>Land, Environmental Externalities and Tourism Development</u></i>
NRM	23.2004	<i>Pius ODUNGA and Henk FOLMER (I xvii): <u>Profiling Tourists for Balanced Utilization of Tourism-Based Resources in Kenya</u></i>
NRM	24.2004	<i>Jean-Jacques NOWAK, Mondher SAHLI and Pasquale M. SGRO (I xvii): <u>Tourism, Trade and Domestic Welfare</u></i>

- (lix) This paper was presented at the ENGIME Workshop on “Mapping Diversity”, Leuven, May 16-17, 2002
- (lx) This paper was presented at the EuroConference on “Auctions and Market Design: Theory, Evidence and Applications”, organised by the Fondazione Eni Enrico Mattei, Milan, September 26-28, 2002
- (lxi) This paper was presented at the Eighth Meeting of the Coalition Theory Network organised by the GREQAM, Aix-en-Provence, France, January 24-25, 2003
- (lxii) This paper was presented at the ENGIME Workshop on “Communication across Cultures in Multicultural Cities”, The Hague, November 7-8, 2002
- (lxiii) This paper was presented at the ENGIME Workshop on “Social dynamics and conflicts in multicultural cities”, Milan, March 20-21, 2003
- (lxiv) This paper was presented at the International Conference on “Theoretical Topics in Ecological Economics”, organised by the Abdus Salam International Centre for Theoretical Physics - ICTP, the Beijer International Institute of Ecological Economics, and Fondazione Eni Enrico Mattei – FEEM Trieste, February 10-21, 2003
- (lxv) This paper was presented at the EuroConference on “Auctions and Market Design: Theory, Evidence and Applications” organised by Fondazione Eni Enrico Mattei and sponsored by the EU, Milan, September 25-27, 2003
- (lxvi) This paper has been presented at the 4th BioEcon Workshop on “Economic Analysis of Policies for Biodiversity Conservation” organised on behalf of the BIOECON Network by Fondazione Eni Enrico Mattei, Venice International University (VIU) and University College London (UCL), Venice, August 28-29, 2003
- (lxvii) This paper has been presented at the international conference on “Tourism and Sustainable Economic Development – Macro and Micro Economic Issues” jointly organised by CRENoS (Università di Cagliari e Sassari, Italy) and Fondazione Eni Enrico Mattei, and supported by the World Bank, Sardinia, September 19-20, 2003

#### 2003 SERIES

<b>CLIM</b>	<i>Climate Change Modelling and Policy</i> (Editor: Marzio Galeotti )
<b>GG</b>	<i>Global Governance</i> (Editor: Carlo Carraro)
<b>SIEV</b>	<i>Sustainability Indicators and Environmental Valuation</i> (Editor: Anna Alberini)
<b>NRM</b>	<i>Natural Resources Management</i> (Editor: Carlo Giupponi)
<b>KNOW</b>	<i>Knowledge, Technology, Human Capital</i> (Editor: Gianmarco Ottaviano)
<b>IEM</b>	<i>International Energy Markets</i> (Editor: Anil Markandya)
<b>CSR</b>	<i>Corporate Social Responsibility and Management</i> (Editor: Sabina Ratti)
<b>PRIV</b>	<i>Privatisation, Regulation, Antitrust</i> (Editor: Bernardo Bortolotti)
<b>ETA</b>	<i>Economic Theory and Applications</i> (Editor: Carlo Carraro)
<b>CTN</b>	<i>Coalition Theory Network</i>

#### 2004 SERIES

<b>CCMP</b>	<i>Climate Change Modelling and Policy</i> (Editor: Marzio Galeotti )
<b>GG</b>	<i>Global Governance</i> (Editor: Carlo Carraro)
<b>SIEV</b>	<i>Sustainability Indicators and Environmental Valuation</i> (Editor: Anna Alberini)
<b>NRM</b>	<i>Natural Resources Management</i> (Editor: Carlo Giupponi)
<b>KTHC</b>	<i>Knowledge, Technology, Human Capital</i> (Editor: Gianmarco Ottaviano)
<b>IEM</b>	<i>International Energy Markets</i> (Editor: Anil Markandya)
<b>CSR</b>	<i>Corporate Social Responsibility and Management</i> (Editor: Sabina Ratti)
<b>PRA</b>	<i>Privatisation, Regulation, Antitrust</i> (Editor: Bernardo Bortolotti)
<b>ETA</b>	<i>Economic Theory and Applications</i> (Editor: Carlo Carraro)
<b>CTN</b>	<i>Coalition Theory Network</i>