A general equilibrium assessment of the impact of a fall in tourism under alternative closure rules: the case of the Balearic Islands

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1. INTRODUCTION

One of the main economic trends of the second-half of the twentieth century has been the steady growth of tourism throughout the world. According to the World Tourism Organization (WTO), the number of international tourist arrivals jumped from 25.3 million in 1950 up to 687.3 million in 2000, and international tourism receipts went from just 2.1 billion dollars up to 473.4 billion in the same period. An estimate of the WTO places the share of tourism around 6% of world GDP in 1996.[1] Although the first years of XXI century have been deceptive by comparison with the past 50 years, the WTO expects the number of international tourists arrivals will continue increasing at a 4.1% average annual rate till 2020.

The Balearic Islands, a 4,992 square km. region with a coastal perimeter of 1,428 km., is today one of the main international tourists' resorts in Spain. In 1950, the islands were a rather isolated area inhabited by 422.1 thousand people whose per capita income was well below the national average and were visited by a handful (758) of curious travelers. By the turn of the XX century, however, the living standard of the 878.6 thousand inhabitants of the Balearic Islands Autonomous Community (CAIB) was among the highest in Spain and slightly above the EU-15 average. In the meanwhile, the number of international visitors reached an all time peak of 10,522 thousand in 1999, amounting to 22.5 per cent of total arrivals in Spain. Since then, the CAIB has lost considerable ground, both in absolute and relative terms and there

[1] Ayres, Ron , 2000.

is great concern on the fate of an industry deemed by everybody the engine of growth in the second half of the twentieth century. [2]

How would a permanent fall in tourism receipts affect the Balearic economy? The answer to this question depends on the kind of model used to simulate the effects. Dwyer, Forsyth and Spurr, 2003 and 2004, argue that the answers input-output (IO) models provide are wrong because they are based on extremely unrealistic assumptions and do not take into account income feedbacks, resource limitations and price adjustments. Their proposal is to employ extended linear models to account for income feedbacks,[3] or, even better, applied (or computable) general equilibrium (AGE or CGE) models to account for resource constraints, market imperfections and the influence of relative prices on agents' decisions.

Since Adams and Parmenter (1995) modelled the impact of tourism on the Australian economy using a multiregional AGE model, the technique has been used to provide quantitative estimates of tourism impacts in Australia (Skene, 1993, Madden and Thapa, 2000), the USA (Blake, Durbarry, Sinclair and Sugiyarto, 2001), Spain (Blake, 2000), the U.K. (Blake, Sinclair and Sugiyarto, 2003) and Indonesia (Sugiyarto, Blake and Sinclair, 2003). Zhou et al., 1997, also use a CGE model to quantify the effects of a 10% fall in tourism demand on the state of Hawaï and Dwyer, Forsyth, Spurr and Vanho, 2003, analyze with a two region model the impact of an increase in tourism' flows on New South Wales, Australia's largest state.

Although Dwyer, Forsyth and Spurr's criticism of IO and SAM models is essentially correct, AGE models can provide very unsound estimates of the effects of an external shock depending on the closure rules used.

In line with these developments, this paper presents a comparison of the effects of a 10% reduction in tourists' expenditures on the Balearic economy using an IO, a SAM and an AGE model. The choice of a 10% fall is fully justified in this case by recent trends in international

[2] The figures provided by the Institute of Tourism Studies, a research body under the Ministry of Industry, Transportation and Commerce, are 9,556 thousand international tourists for the CAIB and 52,145 thousand for Spain, in 2003. The absolute loss for the CAIB is 996 thousand tourists since 1999.
[3] See, Wagner, 1997.

tourists' flows into the CAIB. The AGE model is a static regional model calibrated to a 1997 SAM constructed by the authors.

Simulations results are obtained using five different closure rules. In the first two, investment is savings determined, the unemployment rate is endogenous, capital is fully utilized, but in one case the current account deficit is endogenous (exports are exogenous) and in the other is exogenous (exports are endogenous as in Blake, 2000). In the last three simulations aggregate investment is exogenously fixed. Under the Johansen's closure rule the tax rate on household income is endogenous and goods markets clear. In the Keynesian case, investment is fixed and the negative external shock raises unemployment. Finally, the last scenario considers the possibility that the shock may result in increased unemployment or unused capacity rates.

2. AN INPUT-OUTPUT PORTRAIT OF THE BALEARIC ECONOMY

In this section, we outline the main traits of the Balearic economy using the 1997 input-output table (IOT-97) constructed for the Economic and Treasury Department of the Autonomous Government.[4] The table distinguishes 54 production branches distributed as follows: 3 agricultural, 18 manufacturing, construction, 27 private services and 5 public services. Out of the 54 branches, we have selected 10 branches whose outputs are mainly tourist services and thereon we shall refer to them as "tourist branches".[5]

Table 1, in the Appendix, presents the IOT-97 aggregated to 5 major sectors: agriculture, manufacturing, construction, private services ad public services.

Total production, 4,193,397, is made up of domestic production, 3,133,403, imports from RES, 788,728, and imports from ROW, 88,544.[6] Although imports account only for

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[4] The tables were constructed by M. Payeras, F. Sastre, A. Sastre and E. Valle under the supervision of E. Aguiló and N. Juaneda, all members of the Economics and Bussiness Department of the Balearic Islands University.

[5] Four and five stars hotels; one to three stars hotels; tourist apartments; other lodging; travel agencies; bars and coffee shops; restaurants; musical bars, disco and other recreational and cultural services; renting of cars; and House renting. One could add to them, Air, sea and land transportation whose output is to a large extent tourist services.

[6] All figures are in million pesetas.

20.92% of total production, the average hides great differences among branches agricultural and manufacturing branches, on one side, and private and public services on the other. In the first group, it is remarkable the high import content of Chemical products (90.4%), Wine and liquors (82.4%) and Skins and leather (87.95 %), while the figure in services rarely goes over 5% and, in many cases is below 2%.

As to the composition of production, the most salient trait of the CAIB economy is the high share of private services (67.75%) and, in particular, the high weight of the 10 tourist branches (35.0%). Even more, five out of the six branches with the highest shares produce services, while only three branches whose share is above 1% produce manufactures. A similar picture emerges if one looks at value added instead of domestic production.

Another salient aspect of the CAIB economy is the low share of intermediate consumption (37.02%) and the high share of value added (62.98%) over domestic production. For Spain, these shares were 49.47 and 50.53 per cent, respectively in 1995. Since the share of intermediate consumption is generally over 50% in agricultural and manufacturing branches and below 30% in services, the high average share of value added simply reflects the pronounced service oriented character of the balearic economy.

When we look at the composition of added value, the picture is very similar, though a bit more extreme, than the one just described. The contribution of private services branches is now 72.8%, and 5 out of the 6 branches with the highest value added share are private services, whereas only 2 branches among the 28 whose contribution exceeds 1% of total value added produce manufactures. The ten tourist branches generate 39.31% of total value added and if we include transport activities the share goes up to 45.18%.

The average share of wages (49.01%) and gross surplus (53.17%) on value added at market prices are lower and higher, respectively, than those recorded for the Spanish economy in 1995. In the 10 tourist branches, the share of wages is relatively low accounting for only 23.8% of the total bill and 51.84% of the total gross surplus, figures and superior to its global contribution (39.31%) to the generation of added value. Little changes if we include transportation branches (31.0% of total wages and 56.4% of total surplus).

From the viepoint of final uses (3,033,566), the most remarkable aspect is the high contribution of nonresident consumption (953,179) to final demand, somewhat lower than resident consumption (1,285,595), but far greater than public consumption (200,644), gross capital formation (448,703) and exports to RES (90,862) and ROW (90,862).

In sum, the IOT depicts the CAIB as a relatively open economy specialized in producing private services for tourists, while the supply of nonservice branches is to a large extent provided by imports. These features explain both the large value added content of domestic production and the relatively low average share of wages in value added. From the viewpoint of demand, it strikes the high share of nonresident consumption in final demand and its heavy concentration on private services and, particularly, in those produced by the 10 tourist branches. Obviously, the peculiar structure of the CAIB economy makes it highly sensitive to a fall in nonresidents demand.

3. INPUT-OUTPUT AND SAM ESTIMATES OF A 10% FALL IN NONRESIDENTS CONSUMPTION

The recent fall of international tourist arrivals to the CAIB, turns what could be an interesting academic exercise into an interesting policy issue. In the next three sections, we attempt to answer the following question: What would be the consequences of a 10% permanent fall in tourist demand on the Balearic economy? In this section we present the results obtained with a rather standard IO model and a SAM model.[7] For the purpose of comparing the results, the 54 input-output sectors have been aggregated to 24 sectors.

3.1 Input-output results

Since the IOT distinguishes flows by its origin, domestic and imported from RES and ROW, our point of departure is the identity between domestic supply of commodity i, $\mathbf{Y}_i^d$, and its intermediate and final uses,

[7] A thorough analysis of input-output results can be found in Polo and Valle, 2002.

(1) $$\mathbf{Y_i^d} \equiv \sum_{=1}^{N} \mathbf{Y_{ij}^d} + \mathbf{C_{Ri}^d} + \mathbf{C_{NRi}^d} + \mathbf{C_{gi}^d} + \mathbf{I_i^d} + \mathbf{X_{RESi}^d} + \mathbf{X_{ROWi}^d}$$

where $\mathbf{Y}_{ij}^{d}$ is the intermediate flow from branch i to branch j, $\mathbf{C}_{Ri}^{d}$, $\mathbf{C}_{NRi}^{d}$ and $\mathbf{C}_{gi}^{d}$ are consumption by residents, nonresidents and government, respectively, $\mathbf{I}_i^I$ is gross capital formation, and $\mathbf{X}_{RESi}^{d}$y $\mathbf{X}_{ROWi}^{d}$ are exports to RES and ROW. Defining domestic intermediate coefficients in the usual way

$$\mathbf{a_{ij}^d} \equiv \frac{\mathbf{Y_{ij}^d}}{\mathbf{Y_j^d}}$$

the identity (1) between resources and uses can be written in matrix notation as

$$\mathbf{y^d} \equiv \mathbf{A^d y^d} + \mathbf{x^d}$$

where y^d is the domestic production vector, A^d domestic intermediate coefficients matrix and x^d the final demand vector of domestic products. Assuming as usual that A^d is constant, the domestic productions vector that satisfies any given domestic final demand vector x^d is given by

(2) $$\mathbf{y^d} = \left(\mathbf{I} - \mathbf{A^d}\right)^{-1} \mathbf{x^d} = \mathbf{M^d x}^d$$

where $\mathbf{M^d} = \left(\mathbf{I} - \mathbf{A^d}\right)^{-1}$ is the domestic Leontief inverse.

Of course, it is also possible to ignore the origin of intermediate flows and supply. In this case, the total intermediate coefficients are obtained using total intermediate consumption flows, Y_{ij}, and total resources, Y_j

$$\mathbf{a_{ij}} \equiv \frac{\mathbf{Y_{ij}}}{\mathbf{Y_j}} = \frac{\mathbf{Y_{ij}^d} + \mathbf{Y_{ij}^{RES}} + \mathbf{Y_{ij}^{ROW}}}{\mathbf{Y_j^d} + \mathbf{Y_j^{RES}} + + \mathbf{Y_j^{ROW}}}$$

where Y_{ij}^{RES} $\left(Y_{ij}^{ROW}\right)$ are sector j intermediate imports of product i from RES (ROW) and Y_j^{RES} $\left(Y_j^{ROW}\right)$ total imports of j from RES (ROW). The vector of total production that satisfies any given total final demand vector is now

(3) $$\mathbf{y} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{x} = \mathbf{M}\mathbf{x}$$

where A is the matrix of total intermediate coefficients, x the total final demand vector and $M = (I - A)^{-1}$ the total Leontief inverse. Clearly, equation (2) is more appropriate to isolate the effects of a demand shock on the domestic economy, while equation (3) is more suitable to compare input-output results with those obtained with a SAM model where transactions are not distinguished by origin.

We have already pointed out the high share of nonresident consumption (31.42%) on final demand and the concentration of this demand on the 10 branches providing tourists' services (83.62%). Therefore, a permanent 10% fall in nonresident consumption is bound to have a great direct impact on tourists' oriented sectors and a much lesser indirect effect on other branches. The results in the TIO(d) column in Table 2 confirm the anticipated asymmetry. The non-weighted average fall in production is just 425%, but there is a great variability among sectors. On one side, there are the five tourist branches where production falls are very close to 10% -Four and five stars hotels, 9.93%, Tourist apartments, 9.87%, One-to-three stars hotels, 9.85%,Other lodging, 9.83%, and Car renting, 9.58%- and another 4 tourist branches -Travel agencies, Bars and coffee shops, Restaurants, Disco bars, nightclubs and other recreational and cultural services- and tourist related sectors - Air transport and Land transport services- where losses lie in the 4 -8 per cent interval. On the other side, production falls by less than 2% in Agriculture, almost all manufacturing branches, Construction and private services.

3.2 SAM results

The main difference between a SAM and an IO model is that changes in production after a demand shock do affect incomes, consumption and savings. In order to specify a SAM model of the Balearic economy, we have extended the IO table into a regional accounting matrix that provides information on income sources and uses for all agents, factors, products and other auxiliary accounts. The SAM of the Balearic economy for 1997 (SAMBE-97) is a 72x72 square balanced matrix (a numerical aggregate version in Table 5). In addition to the 54 productive branches of the IO table, it includes two primary factors (labour and capital), a representative consumer, a business sector, two accounts for central and regional governments, the capital account, one foreign sector and one nonresident consumer, and some auxiliary accounts for transfers and key taxes.

For any partition of the set of accounts $\{1,2,...N\}$ into an endogenous subset $\{1,2,..., M\}$ and exogenous one $\{M+1, M+2,...M+N\}$, the observed $M \times 1$ income vector y_m of the first M endogenous accounts can be written as

(4) $$\mathbf{y_m} \equiv \mathbf{A_{mm}} \mathbf{y_m} + \mathbf{A_{mn}} \mathbf{y_m},$$

where the a_{ij} element of the $M \times M$ $(M \times N)$ matrix A_{mm} (A_{mn}) is the share of the income flow from account j to account i over j's income, and y_n is the $N \times 1$ income vector of the subset of exogenous accounts. Assuming that the coefficients of the matrices A_{mm} and A_{mn} are independent of the level of income of the accounts, identity (4) can be used to calculate the income vector of the endogenous accounts for any given income vector y_n of the exogenous accounts

$$\mathbf{y_m} = (\mathbf{I} - \mathbf{A_{mm}})^{-1} \mathbf{A_{mn}} \mathbf{y_n} = (\mathbf{I} - \mathbf{A_{mm}})^{-1} \mathbf{x} = \mathbf{M_n} \mathbf{x},$$

where $M_n = (I - A_{mm})^{-1}$ is an $N \times N$ matrix of multipliers, and $x = A_{mn} y_n$ is the vector of exogenous income directed to the endogenous accounts.

The results reported in the SAM column in Table 2 take as endogenous the following accounts: the productive activities, the 2 primary factors, the resident consumer, the business sector and the capital account. After a 10% reduction in nonresident demand, the non-weighted average cut 6.20%, almost a 50% larger than the figure obtained with the IO model (4.25%). Although production cuts in the 5 major tourist branches are very similar (between 9 and 10 per cent), there is a substantial reduction in labor (5.18%) and capital (6.08%) income that, in turn, reduces consumer (5.97%) and business (4.5%) income. The income contraction magnifies the impact on the remaining tourist branches and other private productive sectors of the economy. This is illustrated in table 3, which shows a summary comparison with the IO simulation.

There might be some doubts as to whether the differences between the two simulations are due to differences in the definition of the intermediate coefficients (domestic in the IO and total in the SAM simulation) or to the endogeneization of some accounts (labor and capital services, family and business income and capital account). The third column in Table 2 TIO(t) provides the results obtained with the IO model using the total coefficient matrix $\boldsymbol{A}$ and equation (3). As we can see, the non-weighted average cut, 4.25%, is identical to the 4.25% obtained with the domestic coefficient matrix A^d and equation (2). Therefore, we can conclude that differences between the results in the columns TIO (d) and SAM in Table 2 are mainly due to the income contraction process, not to the definition of intermediate coefficients used. Of course, there are sectors -mainly those manufacturing branches where intermediate imports are substantial- which suffer more severe output cuts when the total coefficients are used; but for most sectors the figures in the TIO (d) and TIO (t) columns are very similar.

4. AGE RESULTS OF A 10% FALL IN NONRESIDENTS CONSUMPTION

In the second part of this section we present the results of simulating a 10% fall in nonresidents consumption using a standard static AGE model of the Balearic economy. In the following subsection, we briefly describe the main characteristics of the model and closure rules.

4.1 An AGE model of the Balearic economy

Our starting point is a standard static general equilibrium model alike to those used by Polo and Sancho (1993a and 1993b), Kehoe, Polo and Sancho (1995) and Fernández and Polo (2004) to analyze commercial and fiscal policy issues for the Spanish economy. All these models share the feature that investment is determined by domestic and foreign savings, a very common closure rule in the AGE literature. This is also the closure rule employed by Zhou et al. (1997) to quantify the effects of a fall in tourism demand on the Hawaiian economy. Although this closure rule may be appropriate to analyze fiscal issues, it skyrockets investment when the economy is hit by a negative demand shock, such as a fall in tourism. Blacke, 2000, avoids this awkward result by letting exports increase to keep constant the current account balance. Another possibility is to lower tax rates to let consumption increase to fill the demand gap by the external shock. Here, we use a more sensible closure rule. We introduce a restriction on relative prices capital and labor may not be fully used.

4.1.1 Agents and commodities. In this model, there are 24 producers, 1 representative resident consumer, 2 governments and the rest of the world.[8] Each representative firm produces one commodity using labor, capital and distributed commodities, which in turn are produced using domestic products and equivalent imports. There are two primary factors, labor and capital, two public goods provided by the local and central governments and one investment good.

4.1.2 Production technology and firms behavior. Production technology is represented by a simple nested constant returns to scale production function. At the first level, the production of commodity $\boldsymbol{i}$, $\boldsymbol{Y_i}$, is a CES aggregate of domestic production, $\boldsymbol{Y_{dj}}$, and equivalent imports, $\boldsymbol{Y_{rj}}$

$$\boldsymbol{Y_i} = f_i(d_i \boldsymbol{Y_{di}}^{r_i} + (1-d_i)\boldsymbol{Y_{ri}}^{r_i})^{1/r_i}$$

where f_i, is a scale parameter, d_i a distributive parameter and $r_i < 1$ the parameter that determines the degree of substitution between domestic and the imported products. In the second level, the domestic production is obtained combining aggregate products and value added in fixed proportions

$$\boldsymbol{Y_{di}} = \min\left(\frac{\boldsymbol{X_{1i}}}{\boldsymbol{a_{1i}}}, \frac{\boldsymbol{X_{2i}}}{\boldsymbol{a_{2i}}}, \ldots, \frac{\boldsymbol{X_{Ni}}}{\boldsymbol{a_{Ni}}}, \frac{\boldsymbol{V_i}}{\boldsymbol{v_i}}\right)$$

where $\boldsymbol{X_{ji}}$ is the quantity of commodity $\boldsymbol{j}$ used in the production of $\boldsymbol{i}$, $\boldsymbol{a_{ji}}$ the corresponding technical coefficient, $\boldsymbol{V_i}$ the value added and $\boldsymbol{vi}$ the unitary requirement of value added. Finally, value added is Cobb-Douglass combination of labor and capital services

$$\boldsymbol{V_i} = g_i \boldsymbol{L_i}^{b_i} \boldsymbol{K_i}^{1-b_i}$$

[8] In this imports and exports to RES and ROW have been aggregated.

where g_i is the scale parameter and b_i the distribution parameter.

Firms maximize profits. Therefore, they minimize production costs and set prices equal to minimum average cost. At the lowest level in the nesting, a firm solves the following minimization problem

$$\text{(5)} \qquad \min\ w\left(1+t_i^{ss}\right)L_i + rK_i \quad \textbf{s. t.} \quad V_i = g_i L_i^{b_i} K_i^{1-b_i}$$

where w and r are the labor and capital prices, respectively, t_i^{cs} is the employers' payroll tax rate. The price of value added that maximizes profits is the minimum average cost:

$$P_{vi}^{*} = w(1+t_i^{ss})\frac{L_i^{*}}{Y_i} + r\frac{K_i^{*}}{Y_i}$$

where L_i^{*} y K_i^{*} are the solution to problem (5). In the second level of the nest, the intermediate demands and value added that minimize production costs are given by

$$X_{ji}^{*} = a_{ji}Y_{di}\ ,\ V_i^{*} = v_i Y_{di}\,,$$

and the price of the domestic good that maximizes profit is

$$p_{di}^{*} = \left(\sum_{i=1}^{N} p_j^{*} a_{ji} + p_{vi}^{*} v_i\right)(1+t_i^{p})$$

where t_i^{p} is the net effective production tax rate on domestic commodity i and p_i^{*} the price of commodity i. Finally, the firm minimizes the cost of producing good i

$$\text{(6)} \qquad p_{di}^{*}Y_{di} + p_r^{*}Y_{ri} \quad \textbf{s. t.} \quad Y_i = f_i\left(d_i Y_{di}^{r_{ij}} + (1-d_i)Y_{ri}^{r_i}\right)^{1/r_i}$$

where p_r^{*} is a price index of aggregate commodities

$$p_r^{*} = \sum_{j=1}^{N} p_j^{*} z_j$$

and z_i is commodity i export share on total exports.[9] Finally, the price that maximizes profits is

$$p_i^{*} = p_{di}^{*}\frac{Y_{di}^{*}}{Y_i} + p_r^{*}\frac{Y_{ri}^{*}}{Y_i}$$

[9] An alternative is to assume that import prices are exogenously fixed.

where Y^*_{di} e Y^*_{ri} are the solution to problem (6).

4.1.3 Resident consumer welfare and behavior. The representative family values present and future consumption with a Cobb-Douglas indicator

$$U = C_1^{a_1} C_2^{a_2} ... C_2^{a_N} S^{a_s}$$

where $C_i^{a_i}$ is the consumption of product i, the a 's are nonnegative parameters that add up to 1. Consumer gross income, GI is obtained from the sale of capital in the local economy, $\overline{K}$, or the rest of the world, $\overline{K}^r$, and labor services in the local economy, $\overline{L}$, or the rest of the world, $\overline{L}^r$, unemployment compensation, and transfers TR provided by the government:

$$GI = r\left(\overline{K} + \overline{K}^r\right) + w(1-u)\overline{L} + w\overline{L}^r + w\,v\,u\overline{L} + p_c\left(TRN_h^c + TRN_h^a + TRN_h^r\right)$$

where u is the unemployment rate, m the fraction of the wage rate paid to unemployed, and TRN the net transfers accruing to the consumer from the Central and the Autonomous Governments and the rest of the world, respectively, valued with a consumption price index

$$p_c^* = \sum_{j=1}^{N} p_j^* s_i$$

where s_j is the share of commodity j in total consumption. Disposable income DI equals GI minus personal taxes paid to the Central and Local Governments

$$DI = \left(1 - t_c^r - t_a^r\right) GI$$

where t_c^r and t_a^r are the respective income effective tax rates.

Present and future consumption demands are the solution to the maximization problem

$$\max C_{h1}^{a_{h1}} C_{h2}^{a_{h2}} .. S_h^{a_{hs}} \quad \text{s.t.} \quad DI \geq \sum_{j=1}^{N} p_j C_j + p_s S_h$$

where p_s is a price index of investment goods

$$p_s = \sum_{j=1}^{N} q_j p_j$$

where q_j is the share of commodity j in total investment.

4.1.4 Central and Autonomous Governments. There are two levels of Government, Central and Local. The Central Government (CG) collects taxes from the local economy and provides unemployment and other current transfers to the Local Government. Although the provision of most public services have been transferred to the Local Government (LG) in the recent past, the CG still provides public services today and makes public investments. The Central Government budget is

$$R_p + R_{ss} + R_r = wmu\overline{L} + p_c TRN_h^c + p_c TRN_a^c + p_j C_{gj}^c + p_s I_g^c + B^{sc}$$

where R_p are production tax revenues, R_{ss} social security contributions, R_r direct personal and business tax revenues ,and, TRN_c^r net transfers from the rest of the world. Revenues are used to finance unemployment compensation and other transfers to the consumer, consumption and investment expenditures. The difference between revenues and expenditures is the central Government budget surplus, B^{sc}, that is transferred to the ROW.

The LG collects income and property taxes, transfers and capital income and uses it to buy all sorts of commodities used to produce public services, accumulate capital or provide transfers to the consumer

$$R_r^a + p_c\left(TRN_a^c + TRN_a^r\right) = p_c\left(TRN_h^a\right) + p_j C_{gj}^a + p_s I_g^a + B^{sl}$$

The behavior of the LG can be interpreted as maximizing a Leontief indicator of public consumption and investment:

$$U_g = \min\left(\frac{C_g}{c_g}, \frac{I_g}{i_g}\right)$$

where c_g and i_g are the shares of public consumption and investment in 1997. In the simulations, consumption and investment expenditures are hold constant and since prices, revenues and some expenditures are endogenous so is the budget surplus.

4.1.5 Foreign Sector. The foreign sector uses revenues obtained from imports, income payments and unemployment compensation to non-residents, to finance exports, income payments and net transfers to residents. Since prices and imports are endogenous, the current account balance is endogenous when the level of exports and transfers is exogenously fixed. In symbols,

$$\sum_{j=1}^{N} p_r Y_{rj} + r\overline{K}^{nr} + w(1-u)\overline{L}^{nr} + wmu\overline{L}^{nr} + B^{sc} + B^{r} =$$
$$\sum_{j=1}^{N} p_r \left(X_j + C_j^{nr}\right) + w\overline{L}^{r} + r\overline{K}^{r} + p_c\left(TRN_h^r + TRN_a^r\right)$$

where and B^r is the current account surplus, being positive when total income accruing to the foreign sector is less than its outlays.

4.1.6 Factor markets. In the absence of any restrictions on factor prices, labor and capital demanded by producers must equal available supplies in equilibrium. In our model, we include two alternative constraints on prices that result in labor unemployment, in the first case, and in both, labor unemployment and unused capacity, in the second case.

1. Fully employed capital and labor unemployment: the model includes the equation

$$\frac{\mathbf{w}}{\mathbf{p_c}} = k(1-u)^{\frac{1}{ß_u}}, \quad b_u > 0 \tag{7}$$

where w/p_c is the real wage, u the unemployment rate, k a scale parameter and b_u an elasticity parameter. Equation (7) can be interpreted as a positively sloping labor supply schedule. For large (small) values of b_u, the effective labor supplied is very sensitive (insensitive) to changes in the real wage.[10] Figure 1 shows the effective supply schedule for three values (large, medium and small) of b_u. Since commodity prices are ultimately determined by factor prices, equation (7) can be interpreted as a restriction on the wage expressed in capital units w/r .[11]

2. Unused capital capacity and labor unemployment: a straightforward generalization of (7) is

[10] The effective labor supply is measured by the number of employed persons since no hours series is available for the Balearic economy and the labor supply by active population. The 1997 unemployment rate was 11.0%.

[11] In a one commodity simple model it can be easily checked that equation (7) is equivalent to setting a constraint on the price of labor in capital units $\frac{w}{r} = k(1-u)^{\frac{1}{b_u^{'}}}$ for some $b_u^{'}$.

(8) $$\frac{\mathbf{w}}{\mathbf{p_c}} = k(1-u)^{\frac{1}{b_u}}(1-uc)^{-\frac{1}{b_{uc}}}$$

where uc is unused capital capacity and b_{uc} a positive parameter. In this case, the restriction on factor prices may result in both labor unemployment and unused capacity. Alternatively, one can assume that the real return to capital varies inversely with unused capacity

(9) $$\frac{\mathbf{r}}{\mathbf{p_c}} = k(1-uc)^{\frac{1}{b_{cu}}}, \quad b_{uc} > 0 .$$

Then, dividing (7)by (9)

(10) $$\frac{\mathbf{w}}{\mathbf{r}} = k(1-u)^{\frac{1}{b_u}}(1-uc)^{-\frac{1}{b_{uc}}} .$$

Simulation results obtained with (10) instead of (8) for the same values of $b_u^{'}$ and $b_{uc}^{'}$ are so close that do not affect the conclusions.

Equation (8) or (10) is included in the model when investment is fixed and neither of the two factor markets clear. The effects on the unemployment and unused capacity rates depend on the value of two parameters b_u and b_{uc}. The larger the values of b_{uc} for a given value of b_u, the greater the adjustment of the unused capacity rate; and, as the value of b_u increases the impact on unused capacity falls. Notice that equation (10) indicates that the capacity utilization rate increases with the real return to capital; in the same way that equation (7) assumes that the employment rate increases with the real wage. Since statistical offices in many countries provide information on both, employment and capacity utilization rates, there is no justification for including just one of them in a model.

4.1.7 Equilibrium. The equilibrium conditions depend on the way we model factor markets and the closure rules chosen. As a starting point, we include in the model equation (7) and assume that all transfers, public consumption and investment, and exports are exogenous. Moreover, we assume that domestic and foreign savings determine the level of aggregate investment.

4.1.8 Calibration of the model. The 1997 SAM of the Balearic economy is the database employed to specify the scale and distribution parameters that appear in the production and utility functions as well as the tax rates on labor, production, consumption and household income. As usual, we exploit the convention of choosing commodity units so that all prices are one in 1997 and the assumption that all flows in the SAM satisfy the equilibrium conditions. For the elasticity of substitution between domestic production and equivalent imports we use the GTAP values[12]. As for the elasticity of the real wage to unemployment, the central value used, 1.2, is derived from an econometric Phillips curve estimated by Andrés et al. for Spain. For the elasticity of the real wage to unused capacity, we choose 1 as the central value and carry out a sensitivity analysis.

4.2. AGE effects of a 10% reduction in NRC

In this subsection, we present the impact of a 10% fall in NRC in five alternative scenarios. First, the level of aggregate investment is determined by domestic and foreign savings, the standard closure rule used in many AGE fiscal models. Next, following Blake, the local economy is cushioned against the external shock by assuming that the current account surplus is constant and the level of aggregate exports is endogenous. The other three simulations assume aggregate investment is fixed. In the Keynesian case, the fall in aggregate demand leads to increased unemployment. Johansen's closure rule assumes that the income tax rate paid by the household is adjusted endogenously to boosts disposable income and consumption and keep constant the unemployment rate.[13] In both instances, the capital market clears. In the last simulation, investment is fixed and both the unemployment rate and the unused capacity rate are endogenous.

4.2.1 Macroeconomic variables. Table 6 summarizes the effects on macroeconomic variables of a 10% fall in NRC. The first column indicates the benchmark values and the next five columns the results of the five simulations.

[12] Jomini et al, 1991.
[13] See Rattso, 1992.

In the savings driven investment case (Table 6, second column), a 10% reduction in NRC demand is counterbalanced by an investment boom that increases 5.5 percentage points the share of private investment on GDP. Actually, the reallocation of resources into capital goods producing sectors reduces the unemployment rate (0.54 percentage points) and increases slightly GDP (0.31%). Under Blake's closure rule, the external shock is balanced off by a sharp expansion of other exports whose share of GDP goes up more than 12 points (Table 6, third column). The reallocation of resources in this case reduces even more the unemployment rate (0.84 points) and boosts GDP a bit more too (0.43%). In both scenarios, changes in the budget surplus/GDP ratio of both the LG and the GG are negligible.

The aggregate results of these simulations provide no clue whatsoever on the future whereabouts of the economy. It would be really hard to convince entrepreneurs and politicians in a tourist oriented economy, such as the Balearic Islands, that after a sharp fall in tourists' demand one can calmly sit down and wait for the unavoidable investment boom. Blake's closure rule, on the other hand, avoids this conclusion by keeping constant the current account surplus, but to do so it engineers an equally unrealistic exports boom to compensate the fall in NRC. At most, the quantitative estimates of these simulations have a normative character, focusing our attention towards the extraordinary investment or export efforts needed to counteract the external shock.

In the remaining scenarios investment is exogenously fixed. This is hardly a good assumption since investment should be an endogenous variable in any sensible model. Nevertheless, we consider these fixed investment scenarios more plausible that the two we have just discussed.[14] When the household income tax rate is adjusted to keep the unemployment rate as its benchmark value (Table 6, Johansen's column), the share of residents' consumption in GDP goes up 5.5 percentage points and the overall change in real GDP is negligible. The tax reduction, however, turns the benchmark LG budget surplus (1.15) into a sizable deficit (-2.64)

[14] As already indicated, Zhou et al., 1997,and Dwyer et al., 2003, also fix investment, at least in the short-run.

and the initial CG budget surplus (4.14%) falls almost 4 percentage points (0.24%). The results when unemployment is endogenous and the real wage-unemployment equation (20) is included in the model are almost identical to the ones reported, except for the fact that unemployment decreases slightly in this case. At any rate, it is highly unlikely that the CG would cut down taxes to stimulate domestic demand in the amount required to counteract the negative external shock.

In the Keynesian case (Table 6, Keynesian column) investment is fixed, the unemployment rate is endogenous but the real wage is independent of the unemployment rate. In this case, the 10% fall in NRC demand raises almost 8 percentage points the unemployment rate and cuts down GDP by 4.4%.[15] In the absence of a compensatory increase in domestic demand (the investment boom in the first scenario and the tax induced domestic consumption increase in Johansen's case) or external demand (other exports in Blake's case), equilibrium production levels adjust downwards to absorb the fall in NRC demands. Of course, the fall in demand and production reduces government revenues and cuts down the LG and (CG) budget surplus ratio to GDP from 1.15 (4.14) to 0.86 (1.86).

Investment is also fixed in the last case characterized by the possibility of adjusting the unemployment rate or the capacity used (Table 6, U-UC column). The numbers reported are those obtained with $b_u = 1.2$ and $b_{uc} = 1.0$ that we can take as a central case, leaving aside for the moment the sensitivity analysis. The GDP fall (5.07%) is even larger than in the Keynesian case. The reason is quite simple: the unemployment rate goes up 4.48 points, while it increases almost 8 p.p. in the Keynesian case, therefore unemployed compensation is larger in the latter case and so residents consumption demand. The effect of lower unemployment compensation payments and larger social security contributions show up in a larger CG surplus. In other respects -private consumption and investment shares, current account share-, the two simulations give quite similar results.

[15] 4.4% is more than 4 times the largest fall registered by Spanish GDP since 1950.

4.2.2 Sector specific effects. Table 7 provides detailed results by individual sectors. As usual, benchmark values are 1 and the figures reported provide immediately the rate of change. In all simulations, the brunt of the adjustment falls upon the nine tourists' sectors (from 4-5 star hotels until Car renting). Actually the impact under the savings-investment and Blake's closure rules are very similar on all of them. The effects on the other sectors vary considerably since capital goods producing sectors do not always coincide with the major exporting sectors. In the saving-investment simulation, production in the Construction and Machinery sectors increase by 19.2 and 11.7 percent respectively. Blake's closure rule has a positive effect on most all sectors, although Machinery (53.5%), Sea Transport (48.7%), Transport related activities (27.1%), Light Manufacturing (19.1%) and Agriculture (18.6%) register the largest gains.

Under Johansen's closure rule there are three tourists oriented sectors whose production falls much less (Bars and coffees shops and Disco Bars and nightclubs) o even goes up (Restaurants). This isn't highly surprising since the services of theses sectors are used by both residents and nonresidents, and residents disposable income goes up when taxes are lowered. Production expands in most non-tourist sectors and remains constant in the rest.

The Keynesian and unused capacity scenarios give very similar results. Production falls in those tourists sectors sensible to domestic demand (Bars and coffees shops, Disco Bars and nightclubs and Restaurants) even more than in the previous simulations. The main difference, however, is in the performance of the non-tourist sectors whose production levels go down quite considerably. This is true even in the capital-goods producing sectors even though investment is kept fixed in theses simulations.

5. CONCLUSIONS

Tourism expansion and economic growth have gone hand by hand in the Balearic Islands since 1960. This rosy picture has recently been troubled by a 9.2% fall in international tourists' arrivals in 1999-2003. This paper has analyzed the impact of a 10% reduction of non-residents consumption on the economy of the islands simulating the shock with three different models: a standard IO model, a SAM model and an AGE model.

IO and SAM models have been much criticized recently for not taking into account resource constraints and imposing unnecessary restrictive assumptions on technology and behaviour. However, resource constraints may not be binding when the models are used to analyze a negative external shock in a regional model. Moreover, many AGE models end up imposing restrictions on investment when they are used to analyze external shocks to avoid unlikely investment or export booms.

In the case of a fall in tourism demand, the results presented suggests that the impacts on activity levels are very similar whether on uses an IO, a SAM or an AGE model where investment is exogenously fixed. Actually, these results lie between the results of the IO model (Table 3, columns TIO(d) and TIO(t)) and those of the SAM model (Table 3, column SAM). A big open question is whether is sensible to keep investment fixed in an AGE model and how can be made endogenous.

The fact that an AGE model does not provide far different results than other models for some variables does not mean that it is not worth to devise it and use it. It is really important to have a well defined model that captures the essential features of the economy, states precisely the behaviour of economic agents, models fiscal policy and takes into account the general interdependencies in production, income generation and distribution and expenditure.

Table 1. IOT-97 aggregated to 5 major sectors

		Agriculture	Manufacturing	Construction	Private Services	Public Services	Intermediate Uses	Resident Consumption	Nonresident Consumption	Public Consumption	Gross Capital Formation	Exports RES	Exports ROW	Final Demand
Agriculture	BAL	3.043,130	23.120,350	20,869	5.237,180	85,260	31.506,789	12.232,430	973,770	0,000	210,630	11.140,976	121,000	24.678,806
	RES	913,350	9.128,121	6,290	12.403,985	454,599	22.906,346	28.276,750	1.719,550	0,000	281,670	0,000	0,000	30.277,970
	ROW	126,920	810,690	0,000	1.815,420	0,000	2.753,030	204,580	152,480	0,000	0,000	0,000	0,000	357,060
	TOT	4.083,400	33.059,160	27,159	19.456,585	539,869	57.166,173	40.713,760	2.845,800	0,000	492,300	11.140,976	121,000	55.313,836
Manufacturing	BAL	4.381,503	26.112,470	41.520,073	63.547,072	6.261,980	141.823,098	145.375,636	18.230,640	0,000	9.470,470	24.914,815	28.050,460	226.042,021
	RES	8.769,284	95.119,171	40.893,082	144.759,255	14.621,867	304.162,660	273.545,971	29.573,660	0,000	40.559,030	0,000	57.335,000	401.013,661
	ROW	166,770	5.298,566	2.747,843	13.663,255	20,160	21.896,594	28.087,477	3.704,680	0,000	24.581,400	0,000	0,000	56.373,557
	TOT	13.317,557	126.530,198	85.160,998	221.969,589	20.903,993	467.882,335	447.009,100	51.508,980	0,000	74.610,910	24.914,815	85.385,460	683.429,265
Construction	BAL	394,000	1.828,243	274,800	45.827,837	7.961,573	56.286,453	26.395,592	891,500	0,000	323.493,220	0,000	0,000	350.780,312
	RES	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
	ROW	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
	TOT	394,000	1.828,243	274,800	45.827,837	7.961,573	56.286,453	26.395,592	891,500	0,000	323.493,220	0,000	0,000	350.780,312
Private Services	BAL	5.152,528	46.744,460	90.847,247	378.223,646	29.246,131	550.214,013	751.896,270	892.372,145	0,000	49.775,761	18.427,380	5.355,140	1.717.826,696
	RES	273,489	2.689,670	1.882,830	17.105,939	2.066,175	24.018,103	13.207,818	4.635,080	0,000	330,320	0,000	0,000	18.173,218
	ROW	9,190	298,462	802,450	3.254,909	0,000	4.365,010	3.560,966	502,060	0,000	0,000	0,000	0,000	4.063,026
	TOT	5.435,207	49.732,590	93.532,527	398.584,488	31.312,307	578.597,116	768.665,055	897.509,285	0,000	50.106,081	18.427,380	5.355,140	1.740.062,941
Public Services	BAL	0,000	0,000	0,000	0,000	0,000	0,000	2.811,850	423,600	200.644,100	0,000	0,000	0,000	203.879,550
	RES	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
	ROW	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
	TOT	0,000	0,000	0,000	0,000	0,000	0,000	2.811,850	423,600	200.644,100	0,000	0,000	0,000	203.879,550
Intermediate consumption	BAL	12.971,161	97.805,522	132.662,989	492.835,736	43.554,944	779.830,352	938.711,777	912.891,655	200.644,100	382.950,081	54.483,171	33.526,600	2.523.207,385
	RES	9.956,123	106.936,962	42.782,202	174.269,179	17.142,642	351.087,109	315.030,539	35.928,290	0,000	41.171,020	0,000	57.335,000	449.464,849
	ROW	302,880	6.407,718	3.550,293	18.733,583	20,160	29.014,634	31.853,023	4.359,220	0,000	24.581,400	0,000	0,000	60.793,643
	TOT	**23.230,164**	**211.150,192**	**178.995,484**	**685.838,500**	**60.717,741**	**1.159.932,077**	**1.285.595,357**	**953.179,165**	**200.644,100**	**448.702,511**	**54.483,171**	**90.861,600**	**3.033.465,904**

	Agriculture	Manufacturing	Construction	Private Services	Public Services	TOTAL
Wages and salaries	9.293,000	63.584,532	81.194,180	500.707,703	117.229,346	772.008,762
Social contributions	1.762,200	18.958,815	22.106,300	126.450,145	25.932,461	195.209,921
Net operating surplus	19.581,100	51.165,717	85.377,359	712.790,584	0,000	868.914,758
Consumption of fixed capital	4.823,300	18.168,000	22.856,997	134.592,770	0,000	180.441,067
Taxes on production	241,880	1.472,139	1.235,200	13.547,453	0,000	16.496,672
Subsidies	3.986,600	4.599,700	76,000	50.937,119	0,000	59.599,419
Added value	**31.714,880**	**148.749,503**	**212.694,036**	**1.437.151,536**	**143.161,807**	**1.973.471,760**
Production value	**54.945,044**	**359.899,695**	**391.689,520**	**2.122.990,036**	**203.879,548**	**3.133.403,842**
Imports RES	52.058,157	696.994,762	0,000	39.675,410	0,000	788.728,329
Imports ROW	3.045,023	77.531,153	0,000	7.968,030	0,000	88.544,206
Total Imports	**55.103,181**	**774.525,914**	**0,000**	**47.643,440**	**0,000**	**877.272,535**
VAT	2.431,790	16.885,991	15.377,244	148.026,591	0,000	182.721,615
Total Resources	**112.480,014**	**1.151.311,600**	**407.066,764**	**2.318.660,067**	**203.879,548**	**4.193.397,992**

Table 2. Summary changes of a 10% fall in nonresidents consumption			
24 production branches			
	TIO (d)	SAM	TIO (t)
Nonweighted average sectorial gross output	-4.25	-6.20	-4.25
Total gross output	-3.58	-5.52	-3.21
Total value added	-3.68	-6.01	-3.62
Total employment	-3.16	-5.58	-3.12

Table 3. Production activity levels			
	TIO(d)	SAM	TIO(t)
Agriculture	0.98130	0.94662	0.97496
Energy	0.97094	0.94402	0.97525
Chemical industry	0.98546	0.95079	0.97850
Machinery	0.99302	0.96573	0.99453
Food products	0.97846	0.93884	0.97128
Light manufacturing	0.98661	0.95125	0.98626
Construction	0.99376	0.95354	0.99392
Trade	0.98287	0.94521	0.98338
4-5 star hotels	0.90068	0.90135	0.90170
1-3 star hotels	0.90155	0.90208	0.90317
Tourists' apartments	0.90132	0.90321	0.90525
Inn's and other lodging	0.90172	0.90327	0.90586
Travel agencies	0.92665	0.91567	0.92656
Bars and coffee shops	0.94360	0.92291	0.94410
Restaurants	0.96010	0.93160	0.96021
Disco bars, nightclubs, etc.	0.95077	0.92692	0.95199
Car renting	0.90424	0.90405	0.90746
Land transport	0.96010	0.93308	0.95927
Sea transport	0.98322	0.95948	0.98245
Aerial transport	0.95296	0.93372	0.95320
Related transport activities	0.96189	0.94246	0.96049
Private services	0.97959	0.94255	0.98004
Real Estate	0.97945	0.95019	0.98075
Public services	0.99979	0.99913	0.99979

Table 5. SAMBE-97

	Agriculture	Manufacturing	Construction	Private Services	Public Services	Labor	Capital	Resident Consumer	Business	Nonresident Consumer	Central Government	Local Government
Agriculture	4.083,400	33.059,160	27,159	19.456,585	539,869			40.713,760		2.845,800		
Manufacturing	13.317,557	126.530,198	85.160,998	221.969,589	20.903,993			447.009,100		51.508,980		
Construction	394,000	1.828,243	274,800	45.827,837	7.961,573			26.395,592		891,500		
Private Services	5.435,207	49.732,590	93.532,527	398.584,488	31.312,307			768.665,055		897.509,285		
Public Services								2.811,850		423,600	110.368,280	90.275,820
Labor	9.293,000	63.584,532	81.194,180	500.707,703	117.229,346							
Capital	24.404,400	69.333,717	108.234,356	847.383,354								
Resident Consumer						735.409,760	546.540,410		113.138,490			
Business							580.775,400	58.332,769				
Nonresident Consumer												
Central Government												
Local Government								63,512	111,301			
Capital Account								16.457,593	491.980,378		119.290,250	40.980,685
Foreign Sector	55.103,181	774.525,914		47.643,440		45.011,000	17.382,000	87.938,097				
Transfers Central Gov.											219.135,440	
Transfers Local Gov.												6.969,233
Taxes on personal income								107.521,566				
Taxes on business income									33.878,000			
Other direct taxes								45.744,587				
VAT	2.431,790	16.885,991	15.377,244	148.026,591								
Taxes on production	241,880	1.472,139	1.235,200	13.547,453								
Subsidies											46.883,235	12.716,184
Social Contributions	1.762,200	18.958,815	22.106,300	126.450,145	25.932,461			11490,569				
	116.466,614	1.155.911,300	407.142,764	2.369.597,186	203.879,548	780.420,760	1.144.697,810	1.613.144,050	639.108,169	953.179,165	495.677,205	150.941,922

Table 5. SAMBE-97

	Capital Account	Foreign Sector	Transfers Central Gov.	Transfers Local Gov.	Taxes on personal income	Taxes on business income	Other direct taxes	VAT	Taxes on production	Subsidies	Social Contributions	
Agriculture	492,300	11.261,976								3.986,600		116.466,610
Manufacturing	74.610,910	110.300,275								4.599,700		1.155.911,300
Construction	323.493,220									76,000		407.142,765
Private Services	50.106,081	23.782,520								50.937,119		2.369.597,180
Public Services												203.879,550
Labor		8.412,000										780.420,762
Capital		95.342,000										1.144.697,827
Resident Consumer		42.977,338	169.218,000	5.860,052								1.613.144,050
Business												639.108,169
Nonresident Consumer		953.179,165										953.179,165
Central Government				135,278	55.745,150	33.878,000		182.721,615	16.496,672		206.700,490	495.677,205
Local Government		3.328,662	49.917,444		51.776,416		45.744,587					150.941,922
Capital Account												668.708,906
Foreign Sector	220.006,401			973,903								1.248.583,936
Transfers Central Gov.												219.135,440
Transfers Local Gov.												6.969,233
Taxes on personal income												107.521,566
Taxes on business income												33.878,000
Other direct taxes												45.744,587
VAT												182.721,615
Taxes on production												16.496,672
Subsidies												59.599,419
Social Contributions												206.700,490
	668.708,912	1.248.583,936	219.135,444	6.969,233	107.521,566	33.878,000	45.744,587	182.721,615	16.496,672	59.599,419	206.700,490	

Figure 1. Effective supply schedule for different values of b_u

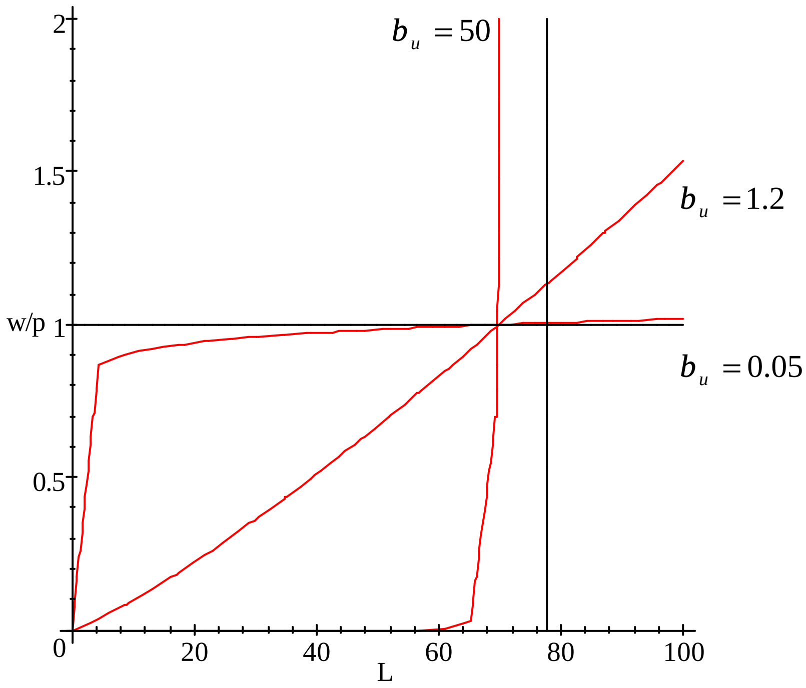

Table 6 . Macroeconomic indicators

	1997 Benchmark	Savings-Investment $b'_u = 1.2$	Blake $b'_u = 1.2$	Johansen t^r endogenous	Keynesian u endogenous	U-UC $b'_u = 1.2$ $b'_{uc} = 1.0$
Private Savings/GDP	23.49	23.43	23.41	25.66	23.85	23.78
Private consumption/GDP	59.62	59.48	59.43	65.13	60.56	60.37
Private investment/GDP	18.67	24.16	18.53	18.68	19.64	19.68
NRC/GDP	44.21	39.65	39.59	39.79	41.43	41.88
Other exports/GDP	6.74	6.72	19.05	6.75	7.12	7.11
Imports/GDP	40.69	41.46	48.05	41.80	41.22	41.17
CA surplus/GDP	5.97	0.40	5.99	4.34	5.07	5.13
LG budget surplus/GDP	1.15	1.13	1.10	-2.64	0.86	1.02
CG budget surplus/GDP	4.14	4.33	4.40	0.24	1.86	2.61
Unemployment rate	11.00	10.46	10.16	11.00	18.88	15.48
Unused capacity rate	20.00	-	-	-	-	24.02
Real GDP change	-	0.31	0.43	-0.02	-4.44	-5.07

Table 7. Production activity levels

	Savings-Investment $b'_u = 1.2$	Blake $b'_u = 1.2$	Johansen	Keynesian	U-UC $b'_u = 1.2$ $b'_{uc} = 1.0$
Agriculture	0.97690	1.18639	1.03051	0.95903	0.95078
Energy	0.99426	1.02388	1.03241	0.95470	0.95088
Chemical industry	1.00709	1.05570	1.02207	0.96277	0.96004
Machinery	1.11682	1.53527	1.01294	0.98581	0.98622
Food products	0.97238	1.02947	1.03282	0.94825	0.94481
Light manufacturing	1.00017	1.19141	1.04893	0.96040	0.95886
Construction	1.19196	1.03796	1.00481	0.99166	0.98947
Trade	1.02927	0.99787	1.04330	0.96641	0.95820
4-5 star hotels	0.90196	0.90220	0.90311	0.90133	0.90112
1-3 star hotels	0.90360	0.90362	0.90580	0.90251	0.90208
Tourists' apartments	0.90544	0.90564	0.91001	0.90420	0.90330
Inn's and other lodging	0.90605	0.90603	0.91121	0.90453	0.90365
Travel agencies	0.93072	0.95765	0.94647	0.91721	0.91773
Bars and coffee shops	0.94467	0.94553	0.98455	0.93102	0.92703
Restaurants	0.96171	0.96334	1.01445	0.94167	0.93700
Disco bars, nightclubs, etc.	0.95245	0.95270	0.99984	0.93742	0.93191
Car renting	0.90816	0.90803	0.91386	0.90572	0.90480
Land transport	0.99268	0.97579	0.99862	0.94636	0.94240
Sea transport	1.04006	1.48695	1.00780	0.97320	0.97125
Aerial transport	0.95821	1.04097	0.99269	0.93278	0.93560
Related transport activities	0.97817	1.27096	0.99208	0.94756	0.94671
Private services	1.02126	1.02036	1.03611	0.95764	0.95750
Real Estate	0.98949	0.99439	1.05098	0.99165	0.95482
Public services	0.99975	0.99973	1.00104	0.99875	0.99917

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