The **Contribution of Tourism to Growth**: Lessons from the Azores and Madeira

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Abstract | The Azores and Madeira are two regions of Portugal, both considered as ultra-peripheral regions of the European Union. The islands were granted a considerable level of autonomy in 1976 and have, since, devised their own development policies. In the last twenty years, tourism has played a completely different role in these islands. In both cases, development strategies were, to a great extent, based on activities that were traditionally strong in the islands and exhibited good competitive conditions. The Azores opted for the development of activities in agriculture, while Madeira opted for a strategy of tourism development. The purpose of the current paper is to establish a comparison of the economic growth that occurred in each of these regions and to try to explore the correlations that might be made between the results obtained and the strategic options made. The comparison is based on the statistics that characterize the main economic sectors in each region, namely in what regards contributions to employment, GDP and exports. The results of a simple econometric model of GDP and employment impacts are also presented.

Keywords | Azores, Madeira, Tourism, Economic Growth.

Resumo | Os Açores e a Madeira são duas regiões portuguesas e consideradas como ultraperiféricas no âmbito da União Europeia. Estas regiões obtiveram um nível considerável de autonomia em 1976 e têm, desde então, delineado as suas próprias políticas de desenvolvimento. Nos últimos vinte anos o turismo desempenhou um papel muito diferente nestas ilhas. Contudo, em ambos os casos as estratégias de desenvolvimento assentaram na exploração de actividades onde as regiões tinham condições apropriadas. Os Açores optaram pelo desenvolvimento de actividades ligadas à agricultura, enquanto que a Madeira optou por uma estratégia ligada ao turismo. Este trabalho tem como objectivo comparar do processo de crescimento económico verificado naquelas duas regiões e tentar estabelecer uma relação entre este e as opções seguidas. Esta comparação é feita com base em estatísticas que caracterizam os principais sectores em cada região, nomeadamente através da sua contribuição para o emprego, PIB e exportações. Os resultados de um modelo econométrico que avalia o impacto no PIB são também apresentados e discutidos.

Palavras-chave | Açores, Madeira, Turismo, Crescimento Económico.

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1. Introduction

The Azores and Madeira are two archipelagos of Portugal off the cost of the Iberian Peninsula. Even though the political setting of the two regions is very similar, there are some striking differences that have significantly influenced their development.

While Madeira is composed of two islands, one of them very small and not too far from the main one, the Azores comprises nine islands of diverse size and considerably dispersed. In addition, being located further south in the North Atlantic Ocean, Madeira has a more moderate climate that makes it more agreeable for certain dominant types of tourism.

After 1976, the two regions were given political and administrative autonomy within Portugal. This meant they would become responsible for devising their own development strategy and disposing of their own financial resources and of those made available by the central government, the EU and other international entities.

Development strategies were, from the outset, different in the two archipelagos due, in part, to the different geographical conditions and to the dispersion of the territory. While Madeira was able to concentrate most of its resources in one island, the Azores had to disperse its resources among the nine islands, starting with basic accessibilities such as ports and airports.

Aside from the infrastructure that had to be built to a minimum acceptable level, a considerable amount of attention was directed towards traditional activities such as agriculture and fisheries, to a great extent helped by the attention the EU devoted to these sectors. Tourism was not a priority in any of the EU policies towards these regions. The tendency was to support those activities for which there were already EU funds.

Agriculture and fishing policies of the EU helped consolidate a strong tendency of these sectors in the Azores leading to a strong specialization in milk production. In 2002, the Azores produced close to 30% of all milk produced in Portugal, with only 2,4% of the population and 2,4% of the national land area. There is still a strong tendency for growth. Madeira, on the other hand, used agricultural policy merely for the maintenance of some jobs in a transition period where agriculture was being reduced to a very marginal role. In this region, most investments were directed to major infrastructure that now supports a very strong tourism sector.

Since the turn of the nineteenth century, tourism has been a significant growth sector in Madeira, something that did not occur in the Azores.

In the turn of the twentieth century, the Azores has an economy characterized by a strong primary sector and a growing but still feeble tourism sector while Madeira has a strong tourism sector and a fading agriculture, in spite of the EU programs to support it.

In both cases, agriculture has been constrained by EU policy. In the case of Madeira there is the problem of the banana market, in the case of the Azores the problem regards the milk market. EU policy has been directed towards improving competitiveness but has not had a long-term impact in that regard. Growth, particularly in milk production, has, in addition, been constrained by binding quotas.

These policies have set the background for the development of the two autonomous regions of Portugal. Tourism has been one of the development vectors of both regions but started off in a different footing and has developed differently in each one of them.

The purpose of this paper is to draw on some statistics and on some econometric exercises to characterize the role that tourism now plays in each one of these economies and to lay out some thoughts about the process of tourism growth in these regions in the past and in the future. Section 2 will look at the contribution of tourism and various other sectors to the formation of GDP and employment, reviewing also the supply and demand in this sector. Section 3 will look at the results of some econometric analyses in each of the regions. Section 4 will present some concluding remarks and thoughts on the development of this sector in the Azores and in Madeira.

2. Tourism in the Azorean and Madeiran economies

2.1. Supply and demand

Tourism has registered a very significant growth in the last decade in the Azores. Supply has been steadily increasing, as has demand. The greatest proportion of tourists in the Azores (about 70%) was, until the turn of the century, still Portuguese.

Supply started to increase at a very fast pace as of 2001. In 2002, however, the number of beds still stood at about 5 500. The number of tourists has almost tripled since the mid 1980's. A significant number of new projects are underway and should further increase capacity. One big challenge in this region will be to assure that demand is enough to guarantee the minimum necessary level of occupancy to keep the sector attractive for investors.

In Madeira, tourism has, for a long time, been considered a strategic sector for the region's development. Contrary to what happens in the Azores, in Madeira tourism is reaching its maximum bed capacity. In fact, looking at Table 1, one can identify striking differences when comparing with the Azores.

The data shows how supply has increased and also how the origin of the tourists has changed. The majority is now from Northern Europe for Madeira and from mainland Portugal for the Azores. For Madeira, in 1998, for example, about 80% of tourists were of foreign origin, whereas in 1976 this percentage was 69. The economy of Madeira is, as such, very sensitive to the economic conditions and individual preferences in Northern Europe. In the case of the Azores the main concern comes from economic fluctuations in the national economy.

Looking at some indicators on the impact of tourism, one can refer that in the Azores the number of tourists has equalled the population in 2002 while in Madeira it is more then three times the number of residents, implying a much stronger impact.

Given the surface area of the two archipelagos one concludes that there are 33 beds per square kilometre in Madeira and 2.6 in the Azores, densities that are completely different. Finally, comparing the stress on the land area, we have 109 visitors per square kilometre in the Azores and 1 039 in Madeira.

2.2. Contribution to GDP

The break-up of value added generated in Portugal and in each of the two Portuguese regions, between 1995 and 1999, is presented in Table 2. Letters, as indicated in Table 2, represent sectors of the economy. The structure of value added is presented in Table 3.

Table 1 | Tourists and beds – Azores and Madeira

Year	Beds		Tourists		% Foreign	
	Madeira	Azores	Madeira	Azores	Madeira	Azores
1976	10 140	–	265 582	–	0,69	–
1988	12 145	2 700	442 303	102 358	0,79	0,30
1990	13 419	3 283	520 515	127 220	0,78	0,28
1995	17 492	3 628	649 132	159 309	0,81	0,24
1996	18 151	3 627	565 707	163 114	0,79	0,23
1997	18 522	3 660	586 427	160 630	0,79	0,26
1998	19 055	3 914	634 024	166 511	0,79	0,26
1999	20 035	3 960	698 744	203 362	0,79	0,25
2000	22 606	3 929	745 088	205 696	0,77	0,28
2001	24 454	4 894	842 705	214 714	0,76	0,39
2002	–	5 715	824 654	254 296	0,76	0,31

Source: Serviço Regional de Estatística dos Açores and Direcção Regional de Estatística da Madeira – Estatísticas do Turismo; Authors' calculations.

Table 2 | Value added by sector – Portugal, Azores and Madeira, 1995-1999 (million euros)

Sectors	1995			1996			1997			1998			1999		
	Total	Azores	Madeira	Total	Azores	Madeira	Total	Azores	Madeira	Total	Azores	Madeira	Total	Azores	Madeira
A	3 475	118	55	3 541	134	53	3 193	125	55	3 201	131	56	3 205	154	57
B	334	26	15	341	27	15	348	26	17	376	33	18	381	36	16
C	367	4	4	321	4	4	377	6	4	378	7	4	381	7	5
D	14 447	94	91	15 603	99	103	16 505	107	105	17 166	126	120	17 764	130	127
E	2 460	23	37	2 559	26	40	2 528	28	45	2 779	33	53	2 802	34	45
F	4 867	104	182	5 274	104	183	6 152	120	200	6 814	134	261	7 283	135	279
G	10 970	145	207	11 470	152	221	12 459	158	234	13 353	174	256	13 856	191	273
H	1 935	19	147	2 026	20	155	2 302	24	187	2 666	26	205	2 856	27	220
I	4 674	148	176	4 973	155	180	5 417	161	194	6 025	178	225	6 305	199	213
J	4 473	67	115	4 476	62	111	5 296	71	172	5 821	66	238	6 029	67	247
K	8 993	129	323	9 513	137	342	10 533	143	401	11 427	142	400	12 652	149	448
L	6 254	215	219	6 700	237	244	7 192	251	261	7 822	264	290	8 621	292	319
M	4 725	81	69	5 122	87	75	5 593	95	83	6 052	101	88	6 614	111	97
N	3 736	99	87	4 008	104	93	4 276	101	98	4 782	111	106	5 297	123	120
O	1 850	36	49	2 131	42	54	2 397	42	70	2 511	41	56	2 866	60	72
P	418	12	9	481	14	11	536	15	12	546	15	12	574	16	12
Sub-total	73 978	1 320	1 785	78 539	1 404	1 884	85 104	1 473	2 138	91 719	1 582	2 388	97 486	1 731	2 550
Banks	-3 688	-66	-89	-3 695	-66	-89	-4 312	-75	-108	-4 563	-79	-119	-4 676	-83	-122
Total	70 292	1 254	1 696	74 844	1 337	1 797	80 791	1 397	2 030	87 158	1 503	2 271	92 813	1 649	2 426

Source: INE – Contas Regionais.

A-17 CAE Rev2: A – Agriculture, cattle breeding, hunting and lumbering; B – Fishing; C – Mining; D – Manufacturing; E – Production and distribution of electricity, gas and water; F – Construction; G – Retail and wholesale commerce and repair; H – Lodging and restaurants; I – Transport warehousing and communications; J – Financial activities; K – Real estate, renting and other services to business; L – Public administration, defense and mandatory social services; M – Education; N – Health and welfare; O – Other collective services; P – Domestic services.

Table 3 | Structure of value added by sector – Portugal, Azores and Madeira, 1995-1999 (percentages)

Sectors	1995			1996			1997			1998			1999		
	Total	Azores	Madeira	Total	Azores	Madeira	Total	Azores	Madeira	Total	Azores	Madeira	Total	Azores	Madeira
A	4,9	9,4	3,2	4,7	10,0	2,9	4,0	8,9	2,7	3,7	8,7	2,5	3,5	9,3	2,3
B	0,5	2,1	0,9	0,5	2,0	0,8	0,4	1,9	0,8	0,4	2,2	0,8	0,4	2,2	0,7
C	0,5	0,3	0,2	0,4	0,3	0,2	0,5	0,4	0,2	0,4	0,5	0,2	0,4	0,4	0,2
D	20,6	7,5	5,4	20,8	7,4	5,7	20,4	7,7	5,2	19,7	8,4	5,3	19,1	7,9	5,2
E	3,5	1,8	2,2	3,4	1,9	2,2	3,1	2,0	2,2	3,2	2,2	2,3	3,0	2,1	1,9
F	6,9	8,3	10,7	7,0	7,8	10,2	7,6	8,6	9,9	7,8	8,9	11,5	7,8	8,2	11,5
G	15,6	11,6	12,2	15,3	11,4	12,3	15,4	11,3	11,5	15,3	11,6	11,3	14,9	11,6	11,3
H	2,8	1,5	8,7	2,7	1,5	8,6	2,8	1,7	9,2	3,1	1,7	9,0	3,1	1,6	9,1
I	6,6	11,8	10,4	6,6	11,6	10,0	6,7	11,5	9,6	6,9	11,8	9,9	6,8	12,1	8,8
J	6,4	5,3	6,8	6,0	4,6	6,2	6,6	5,1	8,5	6,7	4,4	10,5	6,5	4,1	10,2
K	12,8	10,3	19,0	12,7	10,2	19,0	13,0	10,2	19,8	13,1	9,4	17,6	13,6	9,0	18,5
L	8,9	17,1	12,9	9,0	17,7	13,6	8,9	18,0	12,9	9,0	17,6	12,8	9,3	17,7	13,1
M	6,7	6,5	4,1	6,8	6,5	4,2	6,9	6,8	4,1	6,9	6,7	3,9	7,1	6,7	4,0
N	5,3	7,9	5,1	5,4	7,8	5,2	5,3	7,2	4,8	5,5	7,4	4,7	5,7	7,5	4,9
O	2,6	2,9	2,9	2,8	3,1	3,0	3,0	3,0	3,4	2,9	2,7	2,5	3,1	3,6	3,0
P	0,6	1,0	0,5	0,6	1,0	0,6	0,7	1,1	0,6	0,6	1,0	0,5	0,6	1,0	0,5

Source: INE – Contas Regionais.

A-17 CAE Rev2: A – Agriculture, cattle breeding, hunting and lumbering; B – Fishing; C – Mining; D – Manufacturing; E – Production and distribution of electricity, gas and water; F – Construction; G – Retail and wholesale commerce and repair; H – Lodging and restaurants; I – Transport warehousing and communications; J – Financial activities; K – Real estate, renting and other services to business; L – Public administration, defense and mandatory social services; M – Education; N – Health and welfare; O – Other collective services; P – Domestic services.

From these tables we can infer which sectors are more important nationally and in each of the two regions. Manufacturing gets the biggest share in the country as a whole, followed by commercial activities and real estate, renting and other services to businesses; the public sector gets the biggest single share in the Azores, followed by transport and communications and commercial activities; in Madeira the biggest portion goes to real estate, renting and other services to business followed by public administration and construction and retail at about the same level. The contribution of financial

services and of real estate and services to businesses is particularly high in Madeira (28,7% vs. 13,1% in the Azores and 19,1% in Portugal). In the Azores, agriculture has a much higher contribution than in Madeira or in the country (9,3% vs. 3,5% for the country and 2,3% for Madeira). Lodging and restaurants are particularly important in Madeira, whereas transportation and telecommunications are particularly high in the Azores, probably due to the fact that travel between the islands absorbs a considerable amount of resources.

In 1999, tourism, approximated by the activity of lodging and restaurants, had a contribution to value added of about 9,1% in Madeira, while in the Azores this value was less then a fifth at about 1,6%.

Looking at the contribution of the regions for the national value added we notice, from Table 4, that the Azores contribute more than proportionally in agriculture, fishing, public services and transport and communications. Madeira contributes more in lodging and restaurants, fishing, financial services, construction and public administration.

Table 5 presents a break-up of value added by major sector groupings, for the Azores and for Madeira. The primary sector accounts for 11,4% in the Azores and 3,1% in Madeira. The secondary sector accounts for a little more than 17% in both regions. The tertiary represents 71,3% in the Azores and 79,3% in Madeira. This highlights the differences in specialization in each archipelago. The Azores has a considerably greater weight in the primary sector, whereas Madeira concentrates on the tertiary. Tourism, financial services and real estate and business services make the big difference in Madeira.

Table 4 | Weight of value added by sector on the total – Azores and Madeira, 1995-1999 (percentages)

Sectors	1995		1996		1997		1998		1999	
	Azores	Madeira	Azores	Madeira	Azores	Madeira	Azores	Madeira	Azores	Madeira
A	3,4	1,6	3,8	1,5	3,9	1,7	4,1	1,7	4,8	1,8
B	7,8	4,5	7,9	4,4	7,5	4,9	8,8	4,8	9,4	4,2
C	1,1	1,1	1,2	1,2	1,6	1,1	1,9	1,1	1,8	1,3
D	0,7	0,6	0,6	0,7	0,6	0,6	0,7	0,7	0,7	0,7
E	0,9	1,5	1,0	1,6	1,1	1,8	1,2	1,9	1,2	1,6
F	2,1	3,7	2,0	3,5	2,0	3,3	2,0	3,8	1,9	3,8
G	1,3	1,9	1,3	1,9	1,3	1,9	1,3	1,9	1,4	2,0
H	1,0	7,6	1,0	7,7	1,0	8,1	1,0	7,7	0,9	7,7
I	3,2	3,8	3,1	3,6	3,0	3,6	3,0	3,7	3,2	3,4
J	1,5	2,6	1,4	2,5	1,3	3,2	1,1	4,1	1,1	4,1
K	1,4	3,6	1,4	3,6	1,4	3,8	1,2	3,5	1,2	3,5
L	3,4	3,5	3,5	3,6	3,5	3,6	3,4	3,7	3,4	3,7
M	1,7	1,5	1,7	1,5	1,7	1,5	1,7	1,5	1,7	1,5
N	2,6	2,3	2,6	2,3	2,4	2,3	2,3	2,2	2,3	2,3
O	1,9	2,6	2,0	2,5	1,8	2,9	1,6	2,2	2,1	2,5
P	2,9	2,2	2,9	2,3	2,8	2,2	2,7	2,2	2,8	2,1
Total	1,8	2,4	1,8	2,4	1,7	2,5	1,7	2,6	1,8	2,6

Source: INE – Contas Regionais; Authors' calculations.

A-17 CAE Rev2: A – Agriculture, cattle breeding, hunting and lumbering; B – Fishing; C – Mining; D – Manufacturing; E – Production and distribution of electricity, gas and water; F – Construction; G – Retail and wholesale commerce and repair; H – Lodging and restaurants; I – Transport warehousing and communications; J – Financial activities; K – Real estate, renting and other services to business; L – Public administration, defense and mandatory social services; M – Education; N – Health and welfare; O – Other collective services; P – Domestic services.

Table 5 | Value added shares by major sectors – Madeira and Azores, 1995-1999

Sectors		1995	1996	1997	1998	1999
Madeira:	Primary	4,1	3,8	3,6	3,3	3,1
	Secondary	17,4	17,3	16,4	18,2	17,7
	Tertiary	78,5	78,9	80,1	78,6	79,3
Azores:	Primary	11,2	11,8	10,7	10,8	11,4
	Secondary	16,7	16,3	17,3	18,5	17,3
	Tertiary	72,0	71,9	72,0	70,7	71,3

Source: INE – Contas Regionais; Authors' calculations.

2.3. Contribution to employment

In the last half of the 20th century, the weight of the primary sector in the Azores dropped from more then 60 to 16% of employment; the secondary went from 17 to 26,6% and the tertiary from 23 to 57%. The tendency for the reduction of the weight of the primary sector in employment will tend to continue in the same way that the weight of services will tend to rise.

According to the national statistics office, INE, this tendency holds for both the Azores and Madeira. Resorting to its statistics, Table 6 presents the employment levels, by sector, for Portugal, the Azores and Madeira. Table 7 presents the structure of employment by sector. Table 8 presents the same information aggregated by the three major groupings of the sectors.

From these tables it is clear that the structural pattern of the value added generated is reproduced in employment. The Azores has a considerably greater portion of employment in agriculture and the public sector, whereas Madeira shows greater weight in construction (associated to a strong boom in this sector), agriculture and the public sector. In Madeira, employment in hotels and restaurants also assumes a greater proportion than in the rest of the country and the Azores. Financial services, on the other hand, do not have an expression compatible to the weight this sector represents in value added. This is clearly associated to the characteristics of the International Business Center that operates with special tax treatment. The evolution of the share of agricultural employment in the Azores appears, in these statistics, with a stronger weight than what is detected through other statistical sources. Overall, however, these statistics reproduce the structure of employment in these islands.

2.4. Contribution to exports

The main export partners of the Azores, understood as third countries, are Italy, the United States and Canada, Spain, Germany, France, Holland and United Kingdom. The EU countries represent the set of countries with which the Azores maintain the most direct commercial activities.

Table 6 | Employment by sector – Portugal, Azores and Madeira, 1995-1999 (thousands)

Sectors	1995			1996			1997			1998			1999		
	Total	Azores	Madeira	Total	Azores	Madeira	Total	Azores	Madeira	Total	Azores	Madeira	Total	Azores	Madeira
A	524.5	21	20.9	533.2	21.1	20.7	530.3	20.6	20	507.6	23.6	18.3	488.2	25.7	16.9
B	23.1	3.3	1.1	22.5	2.9	1.1	22	3	1	21.3	3.2	1.1	20.4	3	1
C	14.5	0,3	0.3	14.5	0.2	0.3	15.9	0.3	0.2	15.7	0.3	0.2	16	0.3	0.2
D	963	9.7	13.5	974.4	9.8	13.3	976.3	9.4	13.5	983.9	9.5	14	978.4	9.7	13.7
E	31.9	1	1.1	31.2	1	1.1	31.2	1	1.1	30.5	1.2	1.1	30.5	1.6	1.1
F	389.8	8.8	15	398.2	8.4	14.7	418.7	8.4	14.5	461	9.9	17.2	482.7	10.1	17.4
G	669.8	12	13.6	665	11.9	13.4	665.7	11.7	13.1	699.2	12.5	14.5	720.3	13.3	14.4
H	195.2	2	7.1	201.2	2.2	7.3	211.8	2.3	7.9	229.4	2.7	8.2	238.5	2.9	8.6
I	149.3	3.8	4.4	148	3.8	4.4	150.5	3.6	4.4	155.3	3.6	4.2	159.9	3.8	4.2
J	117.3	2.2	1.3	120	2.2	1.3	117.4	2	1.3	112.4	1.8	1.3	114.2	1.8	1.3
K	263.2	2.8	5.2	271	2.9	5.2	285.3	3.2	6.5	299	3.3	6.7	318.7	3.6	6.9
L	364.8	13.2	12.9	366	13.5	13.7	361.8	13.2	13.5	374.9	13.4	14.4	383.8	13.8	14.7
M	268.1	4.7	3.9	277.2	4.8	4	286.2	4.9	4.4	295.2	4.9	4.5	305.6	5.2	4.8
N	225.3	6.7	5.2	231.6	6.8	5.3	234.6	5.9	5.2	243.3	6	5.2	254.1	6.2	5.5
O	160.5	3.7	4.2	167.8	3.8	4.5	178.1	3.7	5.2	185.4	3.8	5.7	192	4.5	6.8
P	123.6	3.6	2.8	132.9	3.9	3	140.5	3.9	3.1	136.2	3.7	2.9	136	3.7	2.9
Total	4 483.9	98.8	112.5	4 554.7	99.2	113.3	4 626.3	97.1	114.9	4 750.3	103.4	119.5	4 839.3	109.2	120.4

Source: INE – Contas Regionais.

A-17 CAE Rev2: A – Agriculture, cattle breeding, hunting and lumbering; B – Fishing; C – Mining; D – Manufacturing; E – Production and distribution of electricity, gas and water; F – Construction; G – Retail and wholesale commerce and repair; H – Lodging and restaurants; I – Transport warehousing and communications; J – Financial activities; K – Real estate, renting and other services to business; L – Public administration, defense and mandatory social services; M – Education; N – Health and welfare; O – Other collective services; P – Domestic services.

Table 7 | Structure of employment – Portugal, Azores and Madeira, 1995-1999

Sectors	1995			1996			1997			1998			1999		
	Total	Azores	Madeira	Total	Azores	Madeira	Total	Azores	Madeira	Total	Azores	Madeira	Total	Azores	Madeira
A	11,7	18,7	18,6	11,7	21,3	18,3	11,5	21,2	17,4	10,7	22,8	15,3	10,1	23,5	14,0
B	0,5	2,9	1,0	0,5	2,9	1,0	0,5	3,1	0,9	0,4	3,1	0,9	0,4	2,7	0,8
C	0,3	0,3	0,3	0,3	0,2	0,3	0,3	0,3	0,2	0,3	0,3	0,2	0,3	0,3	0,2
D	21,5	8,6	12,0	21,4	9,9	11,7	21,1	9,7	11,7	20,7	9,2	11,7	20,2	8,9	11,4
E	0,7	0,9	1,0	0,7	1,0	1,0	0,7	1,0	1,0	0,6	1,2	0,9	0,6	1,5	0,9
F	8,7	7,8	13,3	8,7	8,5	13,0	9,1	8,7	12,6	9,7	9,6	14,4	10,0	9,2	14,5
G	14,9	10,7	12,1	14,6	12,0	11,8	14,4	12,0	11,4	14,7	12,1	12,1	14,9	12,2	12,0
H	4,4	1,8	6,3	4,4	2,2	6,4	4,6	2,4	6,9	4,8	2,6	6,9	4,9	2,7	7,1
I	3,3	3,4	3,9	3,2	3,8	3,9	3,3	3,7	3,8	3,3	3,5	3,5	3,3	3,5	3,5
J	2,6	2,0	1,2	2,6	2,2	1,1	2,5	2,1	1,1	2,4	1,7	1,1	2,4	1,6	1,1
K	5,9	2,5	4,6	5,9	2,9	4,6	6,2	3,3	5,7	6,3	3,2	5,6	6,6	3,3	5,7
L	8,1	11,7	11,5	8,0	13,6	12,1	7,8	13,6	11,7	7,9	13,0	12,1	7,9	12,6	12,2
M	6,0	4,2	3,5	6,1	4,8	3,5	6,2	5,0	3,8	6,2	4,7	3,8	6,3	4,8	4,0
N	5,0	6,0	4,6	5,1	6,9	4,7	5,1	6,1	4,5	5,1	5,8	4,4	5,3	5,7	4,6
O	3,6	3,3	3,7	3,7	3,8	4,0	3,8	3,8	4,5	3,9	3,7	4,8	4,0	4,1	5,6
P	2,8	3,2	2,5	2,9	3,9	2,6	3,0	4,0	2,7	2,9	3,6	2,4	2,8	3,4	2,4

Source: INE – Contas Regionais; Authors' calculations.

A-17 CAE Rev2: A – Agriculture, cattle breeding, hunting and lumbering; B – Fishing; C – Mining; D – Manufacturing; E – Production and distribution of electricity, gas and water; F – Construction; G – Retail and wholesale commerce and repair; H – Lodging and restaurants; I – Transport warehousing and communications; J – Financial activities; K – Real estate, renting and other services to business; L – Public administration, defense and mandatory social services; M – Education; N – Health and welfare; O – Other collective services; P – Domestic services.

Table 8 | Employment structure by sector groups – Madeira and Azores

Sectors		1995	1996	1997	1998	1999
Madeira:	Primary	19,8	19,5	18,5	19,0	15,0
	Secondary	26,3	25,7	25,3	26,2	26,7
	Tertiary	53,9	54,8	56,2	54,8	58,2
Azores:	Primary	24,9	24,4	24,6	26,2	26,6
	Secondary	19,7	19,4	19,4	19,9	19,6
	Tertiary	55,4	56,3	56,0	53,9	53,8

Source: INE – Contas Regionais; Authors' calculations.

Among the products that are exported, the most significant are canned tuna, fresh fish, dairy products, clothing and fuel supplied to ships.

Food products register the greatest weight in exports representing 43,5% in 1982, 65,3% in 1990 and 63,7% in 2000. Canned and fresh fish are, clearly, the most exported products in absolute terms and within this category of products. Mineral fuels, lubricants and other similar products, supplied to ships and planes, are the second most important export category, representing 39% in 1982, 14,5% in 1990 and 14,6% in 2000. Clothing assumes a significant weight in 1982 and in 2000, with about 7% of exports. This is, essentially, the result of the operation of one factory that works for a company in the United States.

During the 1980s, exports represented between 10 and 15% of GDP for the Azores. During the 1990s this percentage was reduced greatly and was, toward the end of this decade, about 5% of GDP. This decrease is not necessarily evidence that less is being sold out of the Azores. It only means that less is being sent to third countries. Most of what the Azores sells to other regions goes to the Portuguese mainland and to Madeira. No reliable recent statistics exist, to our knowledge, about these transactions. Most of the dairy production of the Azores, the major source of external demand, goes to mainland Portugal.

Exports in the Azores have never represented more then 53,1% of imports. The average weight of exports on imports is around 44% (Figure 1).

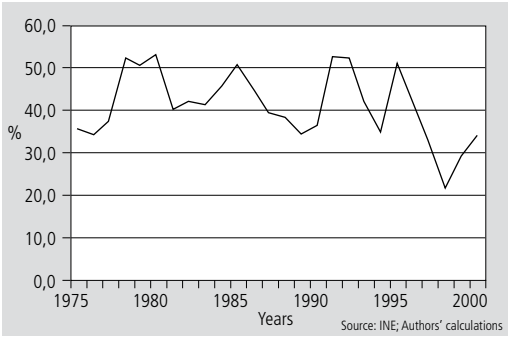

Figure 1 | Azorean exports as a % of imports.

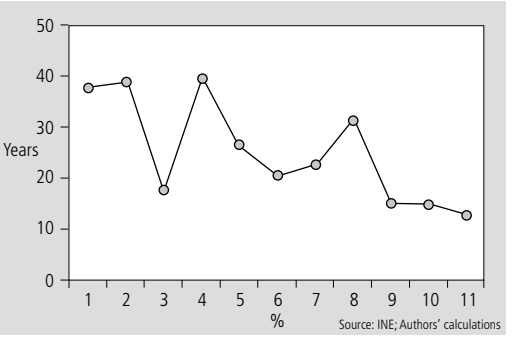

Figure 2 | Madeiran exports as a % of imports.

The main destinations of Azorean exports are Italy (mostly canned tuna) with 40% of the total, and the United States and Canada due to the *mercado da saudade* (market composed by emigrants from the Azores) which involves a selection of a varied set of products that are demanded as a remembrance of the home land. No single product is of special significance.

The main export partners of Madeira, also understood as third countries, are the U.K., France, and Spain. The EU countries represent the set of countries with which Madeira maintains the most direct commercial activities.

Among the products that are exported, the most significant are fuel supplied to ships and planes (a re-export), products from the food and drink industry, wickerwork, and embroideries.

In Madeira, food products register a weight of 3,25% of exports, in 2001. Most exports (67,7%), however, as in the case of the Azores, are mineral fuels, lubricants and other similar products, supplied to ships and planes.

Exports are a decreasing portion of imports in Madeira as can be seen from Figure 2. This approach, of course, does not take into account what is traded with the rest of Portugal and does not take into account the external demand that is associated to tourism.

During the second half of the 1990's, imports and exports have represented about 4% and less then 1% of GDP, respectively. This is an indication of the strong integration of Madeira's economy in the national economy. It is also an indication that there isn't much direct trade with third countries.

The weight of tourism in exports might give us some indication as to the importance of this sector in explaining external demand. It might also be taken as an indicator of the competitiveness of this sector. In the case of Madeira and the Azores, given that there are no statistics on the "exports" to the mainland this exercise becomes a bit more difficult.

Table 9 presents some calculations taking into account only an estimate of receipts from foreigners and the value of exports to third countries. It also presents some indicators comparing receipts in the Azores and in Madeira and the total volume of exports in each region.

The Azores has gained a considerable amount of ground over Madeira in value of exports. This difference would probably be even more accentuated if we considered trade with the rest of the country. Looking at tourism receipts, however, the difference is striking. On average, for the last few years the receipts in the Azores are no more than 15% of the value for Madeira. This difference comes both from the volume of tourism and from the quality, which are greater in Madeira.

Comparing the receipts from tourism of foreign tourists[1] with the total value of exports, we find that,

[1] For the estimation of the value of receipts from foreigners we assumed that the expenditures per capita were equal to those of national tourists. This is a simplifying assumption that seems to be reasonable as a first estimate.

Table 9 | Weight of tourism in exports: Azores and Madeira

Year	Foreign receipts/exports		Tot. receipts Azores/ Tot. receipts Madeira	Tot. exports Azores/ Tot. exports Madeira
	Azores	Madeira		
1984	0,06	1,19	0,10	0,70
1985	0,06	1,40	0,11	0,89
1986	0,07	1,72	0,10	0,91
1987	0,09	1,92	0,11	0,89
1988	0,12	2,16	0,13	0,86
1989	0,11	2,29	0,12	0,95
1990	0,10	2,60	0,14	1,35
1991	0,08	3,08	0,13	1,59
1992	0,09	3,90	0,15	1,99
1993	0,11	2,77	0,16	1,21
1994	0,14	4,94	0,14	1,47
1995	0,13	6,58	0,14	2,04
1996	0,13	4,75	0,13	1,39
1997	0,19	4,70	0,14	1,12
1998	0,22	7,27	0,15	1,61
1999	0,24	8,88	0,14	1,67
2000	0,22	9,24	0,14	2,14
2001	0,39	8,07	0,16	1,42

Source: INE – Contas Regionais; Authors' calculations.

as would be expected, the weight is far greater in Madeira than in the Azores. In 2001 receipts from tourism were 39% of exports while in Madeira they were 8,07%. This difference already existed in the 1980's. Revenues from tourism in Madeira have been consistently more than twenty times greater than in the Azores.

Given the above analysis, it is evident that tourism should be much more important for determining aggregate demand in Madeira then in the Azores.

3. Estimated impacts of tourism on GDP and employment[2]

Measuring the impact of certain indicators on the degree to which objectives have been reached is an essential exercise to, on the one hand, estimate the efficiency of an instrument and, on the other, isolate the contribution of different policies towards a certain objective.

This is particularly interesting in the case of ultra peripheral regions where it has become increasingly evident that an instrument is necessary that can separate the contribution of instruments implemented by different policy agents, namely the EU, the national governments or the regional governments.

Evaluating the impact of policies in favour of the UPRs is currently, mostly, a qualitative exercise in that it is not easy to separate the impact of policies undertaken by the different policy agents or policy decision levels. It is equally difficult to compare the economic impact of agricultural policy versus policies in favour of fisheries or of any other sector, including tourism.

The exercise that follows is a first step, even if very small, in the direction of surpassing this limitation for the Azores and Madeira. More work will be necessary before we can evaluate, with a reasonable level of certainty and detail, what will be the impact of different policies applied in the UPRs.

3.1. Model specification

In this section we present an econometric model that seeks to measure the impact of tourism on macro-economic variables such as GDP or employment. Measurement of the impact on national product or employment can be done through, among others, input-output techniques or through economic models like the export base model or through econometric models.

[2] This section strongly relies on the work done in the context of a study for the Regional Government of the Azores with the following reference: Fortuna, Mário, José C. Vieira, Pedro T. Pereira, Tomaz Dentinho and Rolando L. Gonçalves, 2003, Etude D'Evaluation des Mesures Adoptées par L'Union Européenne pour L'Application du nº2 de L'Article 299 du Traité Émanant de la Communauté Européenne dans les Régions Autonomes des Açores et Madère, Região Autónoma dos Açores, Ponta Delgada.

In a more recent approach to analysing regional impacts of different policies, Hewings (2003)[3] links in-output and social accounts models with econometric models.

Given the complexity of the input-output models or the economic base models, and given the scarce amount of available statistics, we opted for the development of a regional econometric model. Econometric models have been developed for analysis and prediction of a set of variables associated to restricted geographical areas (regions).[4]

Glickman's model (1971)[5] for the Philadelphia metropolitan area is still, for many cases, the prototype for econometric modelling of small economies. This model, consisting of 26 equations, uses annual data and is block recursive. It was improved in its version for Los Angeles, developed by Hall and Licari (1974)[6] leaving it as a totally simultaneous model. Other versions of this type of model can be, for example, found in Ballard and Glickman (1977)[7], Duobinis (1981)[8], Rubin and Erickson (1980)[9] and Baird (1983)[10].

One should stress, at the outset, that in spite of the wide recognition of the usefulness of regional econometric models, they also face some considerable problems. In the first place, one should note the scarcity of regional statistics. Secondly, the modelling of the relations between variables at the regional level seems to still require some more development. Finally, there are, at times, limitations of estimation techniques.

The model that is now presented includes only two equations that try to explain GDP and employment. The equations are block recursive, which makes it easier to, recursively, estimate each equation using Ordinary Least Squares (OLS).

It is assumed that employment is explained by a function of the following type

$$\ln E_{(t)} = \beta_0 + \beta_1 \ln Y_{(t)} + u_t \qquad (1)$$

where

E is employment,

Y is GDP,

u is the disturbance term and

β are parameters to be estimated.

This generalized function for employment corresponds to an inverse production function (labour demand function).[11]

For GDP, it is assumed that the following type of equation explains changes

$$\ln Y_{(t)} = \gamma_0 + \gamma_1 \ln G_{(t)} + \gamma_2 \ln TU_{(t)} + \\ + \gamma_3 \ln PEC_{(t)} + \gamma_4 \ln Y_{C(t)} + \nu_t \qquad (2)$$

where

G – indicates public expenditures,

TU – corresponds to an indicator of tourism activity (such as the number of tourists or the number of days of stay),

PEC – is a measure of primary sector activity, like the amount of milk deposited for processing

[3] Hewings, Geoffrey, 2003, Economic Impact Analysis: Economic Base and Input-output Models, Class notes for the Summer Seminar at Universidade Técnica de Lisboa, Lisbon, 22-24 July.

[4] These models start from a rationale similar to the economic export base models. In particular, one analyses the impact on GDP coming from the economic sectors that are the main source of exports (tourism and dairy), and the transfers and aid coming from the outside, including those from the EU.

[5] Glickman, N., 1971, An Econometric Forecasting Model for the Philadelphia Region, *Journal of Regional Science*, Vol. 11, pp. 15-32.

[6] Hall, O. P. and Licari, J. A., 1974, Building Small Region Econometric Models: extension of Glickman's Structure to Los Angels, *Journal of Regional Science*, Vol. 14, pp. 337-353.

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[10] Baird, C., 1983, A Multiregional Econometric Model of Ohio, *Journal of Regional Science*, Vol. 23, pp. 501-515.

[11] In accordance with economic theory, the employment level should depend on the level of output and the price of inputs (namely salaries). This approach, however, would introduce a greater complexity to the model. Furthermore, we assume a simple production function of the type $Y=\alpha_0 E^{\alpha}{}_1$. We have also estimated an extended demand function of the type $\ln E_{(t)} = \beta_0 + \beta_1 \ln Y_{(t)} + \ln T_{(t)} + u_t$, where T is a trend meant to capture the effect of the stock capital in the economy but the obtained coefficients were very unlikely.

(only relevant in the Azores),

Y_C – indicates national GDP.

Equation (2) gives us the sensitivity (elasticity) of GDP of the region to elements such as the variation in public expenditures, in tourist activities, in milk production or in the growth of the national economy.

Elasticities

Given the previous equations, the impacts (elasticity) of the variation in tourism on GDP and employment are given by:

$$\frac{\partial \ln Y}{\partial \ln TU} = \gamma_2 \quad \text{(Impact on GDP) (3)}$$

$$\frac{\partial \ln E}{\ln \ln Y} \frac{\partial \ln Y}{\partial \ln TU} = \beta_1 \gamma_2 \quad \text{(Impact on employment) (4)}$$

The impacts of dairy production, on the other hand, are given by

$$\frac{\partial \ln Y}{\partial \ln PEC} = \gamma_3 \quad \text{(Impact on GDP) (5)}$$

$$\frac{\partial \ln E}{\ln \ln Y} \frac{\partial \ln Y}{\partial \ln PEC} = \beta_1 \gamma_3 \quad \text{(Impact on employment) (6)}$$

The impact of transfers (reflected through increases in public expenditures) can be evaluated through the parameters associated to G and are the following:

$$\frac{\partial \ln Y}{\partial \ln G} = \gamma_1 \quad \text{(Impact on GDP) (7)}$$

$$\frac{\partial \ln E}{\partial \ln Y} \frac{\partial \ln Y}{\partial \ln G} = \beta_1 \gamma_1 \quad \text{(Impact on employment) (8)}$$

Absolute Variations

With the previous equations one can estimate the following absolute impacts on GDP

$$dY = \left(\gamma_2 \frac{Y}{TU}\right) \times dTU$$

(Impact of the increment in tourism) (9)

$$dY = \left(\gamma_3 \frac{Y}{PEC}\right) \times dPEC$$

(Impact of the increment in dairy)(10)

$$dY = \left(\gamma_1 \frac{Y}{G}\right) \times dG$$

(Impact of the increment in public expenditure)(11)

A similar exercise can be undertaken for employment. Given the impacts from equations (9) to (11), then

$$dE = \left(\beta_1 \frac{E}{Y}\right) \times dY \quad \text{(Impact on employment) (12)}$$

(E/Y) indicates employment per unit of GDP (measured, for example, in millions of euros), that is, the inverse of the average labour productivity.

3.2. Estimation results

It is important to stress that the lack of adequate data imposes some limitations on the estimation of this model[12]. Given this alert, the results on estimation of the impacts on GDP are presented in Table 10.

As we can observe, public expenditure, tourism and the evolution of the national economy have a positive impact on the GDP of the region[13]. The evolution of the national economy has a strong influence on Madeira's economy. According to the results, a 1% increase in the national GDP causes a 1,12% increase in Madeira's GDP. On the other hand, a 1% increase in public expenditures or a 1% increase in the number of stays in hotels cause a 0,167% and 0,271% change in regional GDP, respectively[14]. A dummy variable representing the years after 1992 was included to take into account

[12] In particular we point the lack of long statistical series for GDP and for some other key variables.

[13] The number of stays in hotels measures tourism activity. The number of guests was also tested as an alternative but the coefficient, even though with a positive sign, was not significantly different from zero at the 5% significance level.

[14] The variable ln $G_{(t-1)}$ was also included in the equation but was not statistically significant.

a structural change in the statistical series due to changes in methodology undertaken by the statistical offices. On average the change caused a 34% change on the level of GDP. It is assumed that no change was, however, introduced in the tendencies of the variables.

The values for the Azores, relative to the impacts on GDP, reveal that public expenditures and the national GDP have a positive impact on the region's GDP. In particular, a 1% change in public expenditures contributes 0,12% to the regional GDP. Similarly, a 1% increase in the national economy contributes 0,80% to the region's GDP (a value that is lower than the one estimated for Madeira). Surprisingly, even though the coefficients are positive, as expected, the volume of milk produced and tourism do not have a significant impact on GDP in the Azores. This leads to a suspicion that the model specification is not totally adequate or that the series are not correctly measured.

Table 10 | Estimation of equation (2) (Dependent variable lnY)

	Parameter	t-statistic
1. Madeira		
Constant	-2,55	-7,77
Year ≥ 1993	0,342	14,8
ln (public expenditures)	0,167	3,73
ln (n.º of stays in hotels)	0,271	2,53
ln (national GDP)	1,12	8,64
Adjusted R^2	0,968	
s.e.	0,039	
F	300	
N	17	
2. Azores		
Constant	0,108	0,440
Year ≥ 1990	0,373	14,03
ln (public expenditures)	0,123	1,98
ln (n.º of stays in hotels)	0,039	0,538
ln (volume of milk produced)	0,014	0,082
ln (national GDP)	0,804	7,01
Adjusted R^2	0,999	
s.e.	0,021	
F	2 533	
N	16	

In what regards the employment equation, the lack of a long series of the volume of employment led us to estimate it using long series of the Portuguese economy. From estimation of the equation we got an R^2 of 0.809 and $\hat{\beta}_1 = 0.212$ (t = 11.7). This means that a 1% increase in GDP is translated into a 0,21% change in the level of employment. Using this parameter in equation (4) yields that a 1% increase in hotel stays is translated into a 0,06% increase in employment in Madeira and 0,008% in the Azores (in this case not statistically different from zero).

4. Conclusions

Tourism is a very important activity in both of Portugal's ultra-peripheral island regions. It is, however, at a completely different stage in each one of them and, as such, has a different contribution to GDP and to employment.

In Madeira, with close to 30 thousand beds, the sector is now reaching the point of maturity with what is considered the maximum capacity of the islands. The contribution to development is very significant. There is now, however, the question of how much more the sector can grow and contribute to the overall development of the archipelago. Given that it has been assumed that volume of supply should not increase, the way to continue the contribution of the sector will have to be through increments in quality and through the retention of more value added in the islands.

In any event, in Madeira, tourism assumes a much more important role in the generation of employment and of GDP than in most other parts of the country. Comparing with other exports, tourism is of great importance since it is many times that value, implying a strong component of external demand.

In the Azores, tourism is far from reaching any value that can be considered an upper bound. Even though the population of these islands is the same as that of Madeira the land area is several times bigger, allowing for a lot more supply without great impact on the landscape. The Azores seems to retain less value from tourism when compared to Madeira. This might be explained by the lack of maturity in providing the complete set of services that tourists demand. There is, however, plenty of room for improvement in the Azores, making this a sector with a lot of good prospects. Additionally, due to its landscape and to its geographical location, the Azores can be directed to specific market segments such as golf and nature tourism, directed at both the European and North American markets. The importance of tourism in the Azores comes partly from the diversification potential that it provides for the future, partly from the GDP and employment it can generate.

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