Artigo submetido a 20 de Abril de 2018; versão final aceite a 30 de Dezembro de 2018
Paper submitted on April 20, 2018; final version aceptet on Dezember 30, 2018

How Regional Governance Constrains Regional Development. Evidences From an Econometric Base Model For the Azores

Como a Governança Regional Limita o Desenvolvimento Regional. Evidências De um Modelo Base Econométrico Para os Açores

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Abstract/ Resumo

Regional growth depends on the progress of the basic activities. Nevertheless, these basic activities involve not only exports but also all the inflows of money associated with public and private transferences and service of the debt. The aim of this paper is to analyze the relevant growth factors in the economy of the Azores, during the current century, including the prolonged crisis that resulted from the financial collapse in 2008 and the break of Portuguese public finances in 2012. To achieve this we estimate an econometric model with data from 2001 until 2016 that relates total employment to the main exports, the external financial support for the Azores Economy and the public debt of the previous year as a proxy to the debt service. We conclude that the exports of milk, the number of hosts and the public transferences have a strong positive role on employment whereas public debt has a strong negative effect on employment in the next year. We show that the liberalization of air transport decided by the national government and the end of constrains in the production of milk decided by the European Union had a major effect in the economy of the Azores but the increase in governmental debt is strongly destroying the employment created.

O crescimento das economias regionais depende da dinâmica das atividades básicas. As atividades básicas envolvem não apenas as exportações, mas também todas as entradas e saídas de dinheiro associadas a transferências públicas e privadas, aos empréstimos e aos serviço da dívida. O objetivo deste artigo é analisar os fatores de crescimento relevantes da economia dos Açores de 2001 a 2016, incluindo a crise prolongada que resultou do colapso financeiro de 2008 e da quebra das finanças públicas portuguesas em 2012. Para alcançar este objetivo, estima-se um modelo econométrico da base que relaciona o emprego total com as principais exportações, o apoio financeiro externo à Economia dos Açores e a dívida pública do ano anterior como proxy para o serviço da dívida. Os resultados indicam que as exportações de leite, o número de hóspedes e as transferências públicas têm um papel fortemente positivo no emprego, enquanto a dívida pública tem um forte efeito negativo sobre o emprego no próximo ano. Mostramos que a liberalização do transporte aéreo decidida pelo governo nacional e o fim dos constrangimentos na produção de leite decididos pela União Europeia tiveram um efeito importante na economia dos Açores, mas o aumento da dívida pública está a destruir fortemente o emprego criado.

Keywords: Regional Development, Economic Development, Economic Base Model, Policy Failures, Intergovernmental Relations, Azores

Palavras-chave: Desenvolvimento Regional, Desenvolvimento Económico, Modelo da Base Económica, Falhas de Política, Relações Intergovernamentais, Açores

*JEL Codes***:** R580, O130, H770

Código JEL: O15, P48, R11, Z32

1. INTRODUCTION

The Economic Base Model is a typical Keynesian demand model for the short term that assumes that: regional performance depends on the growth of the basic or export activities (Hoyt, 1939, 1954; North, 1955; Tiebout, 1956; Krikelas, 1992). The main simplifying assumption are that prices are fixed and exogenous, there are no limiting supply restrictions and, within an open economy, people migrate from places where there is unemployment to places where there is demand for employment. The Economic Base Model is an easy way to look at a small price taker economy that used to advise effective employment policies (Galambos and Schreiber 1978; Berck and Hoffmann, 2002; Quintero, 2007). It is in fact a simplified input-output model with induced multiplier effects (Quintero, 2007) often used as an operational model to support economic growth policies at regional level or, using modern jargon, place based policies (Barca, 2009).

Most of the literature on the Economic Base Model fails to look into the specificities of each region with a replicable methodology. Nevertheless recent papers on regional resilience use economic base-model structures to assess regional performance during the crises highlighting the role of structural factors (Martin 2012, 2016; Fingleton et al. 2012, Psycharis et al. 2014, and Mazzola et al. 2018.

In this exercise, we look at the case of one region highlighting that, beyond exports, regional policy instruments like public transferences and debt service might have a major influence in regional economic performance. Notice that the idea is not to analyse the economic structure of the Island already done in the Interisland Input-Output Model of the Azores (Haddad et. al., 2015) and used to evaluate ex-ante changes in exports and public transferences. The aim is to show ex-post evidences of the impacts of policies that strongly influenced employment: the end of the milk quota, the liberalization of air transportation, changes in public transferences and in public debt. The exercise we propose in is to estimate an econometric model for the Azores islands that using data from 2001 to 2016 tries to explain the evolution of employment. Because the period comprises the crises that began in 2008, and persisted for several years, we use explanatory variables that can adequately capture the fluctuations of the economy under crisis namely exports, public transferences and public debt.

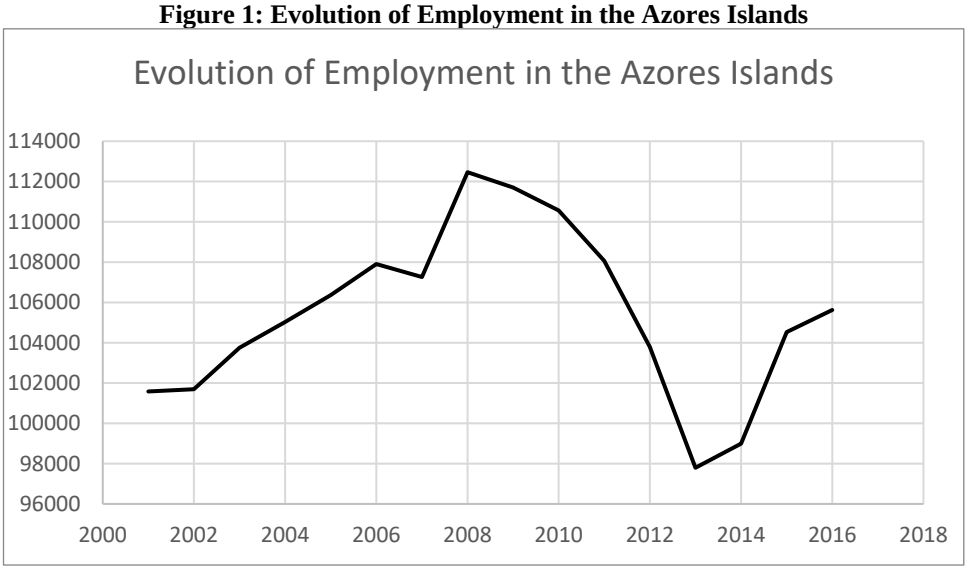
In what follows, in section 2 we provide a brief description of the data we use. In section 3 we present the various variations of the model, including economic variables, dummies for the crisis years and financial variables to try to capture the fluctuations in crisis years. Section 4 provides a discussion of the results while section 5 presents the main conclusions.

2. DATA

Regional economies depend on their basic activities (Batista, 2001; Costa et al. 2009). In the Azores, the basic activities are the exports from agriculture and agro food industries, mainly related to the Dairy Value Chain and Tourism and Public Transferences (Haddad et al, 2015) and Regional Public Debt since the recent crises brought an increase in public debt and associated debt service.

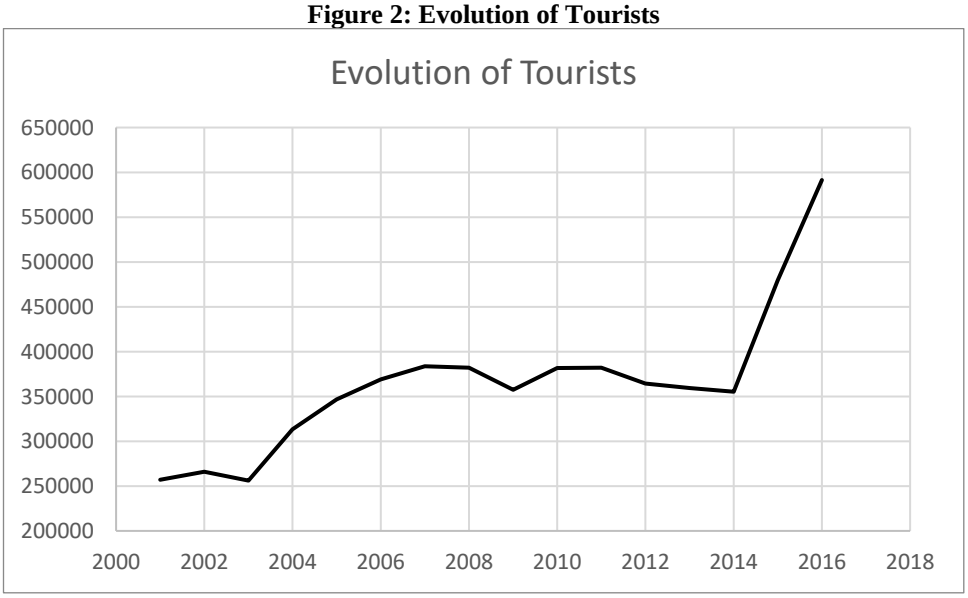
The evolution of employment in the Azores Islands increased from 2001 to 2008, decreased strongly from 2008 to 2013, and began to recover from 2014 onwards (Figure 1). The main driver of job creation towards 2010 was the construction sector, which fell abruptly after that date and until 2013. The recovery, as of 2014 has to do mostly with agriculture and tourism. The public sector also increased its employment contribution in non-tradable activities.

Figure 1: Evolution of Employment in the Azores Islands



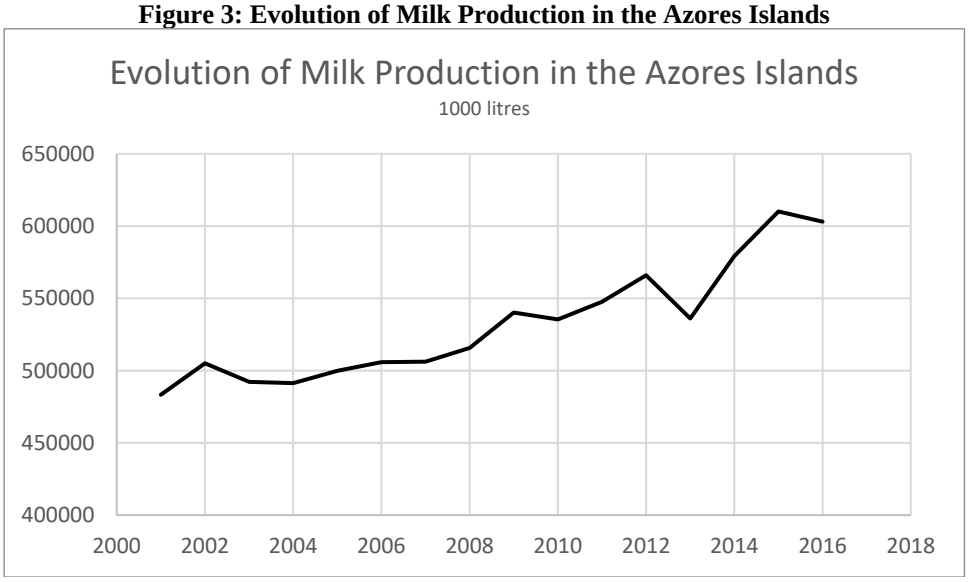
The number of tourists grew along the beginning of the century, using strong subsidization, and then stagnated from 2006 until 2014. In 2015, tourism grew sharply, after the liberalization of air transport to the main islands (Figure 2).

Figure 2: Evolution of Tourists



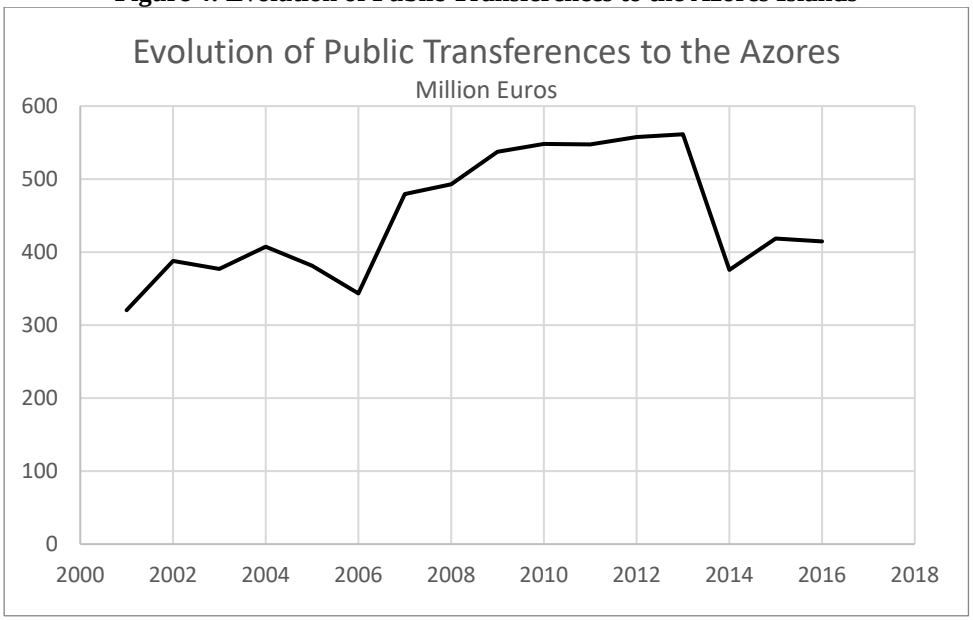
Milk production, most of it directed to exports (Haddad et. Al, 2015) was constrained by a quota until 2015. As the abolition approached, production tended to grow because production in mainland Portugal did not reached the limits (Figure 3).

Figure 3: Evolution of Milk Production in the Azores Islands



National and European Public Transferences, although subject to great variations - grew from 2001 until 2013 and dropped sharply in 2014 keeping more or less the same level since then. National and European Public Transferences, although subject to some variations, were on a growth trajectory between 2000 and 2016. Major changes in the national budget transfers were introduced in 2007 and reverted in 2014 due to the VAT revenue regime. Until 2007 the Azores received VAT revenues on a per capita basis, which implied an implicit subsidy. As of 2007 and until 2013, transfers were increased but VAT was the value collected. As of 2014, VAT is again on a per capita basis but weighted by the tax rate variation to the national level.

Figure 4: Evolution of Public Transferences to the Azores Islands



Fish landings, most of it directed to exports (Haddad et. al. 2015) increased from 2001 to 2010 with great variations and decreased strongly from 2010 until 2016. Fish landings can be broken into two major categories: coastal and deep-sea species and tuna. Whereas there is some regularity in the landings of species of the first category, catches of tuna have been irregular.

Figure 5: Evolution of Fish Catches in Azores Islands

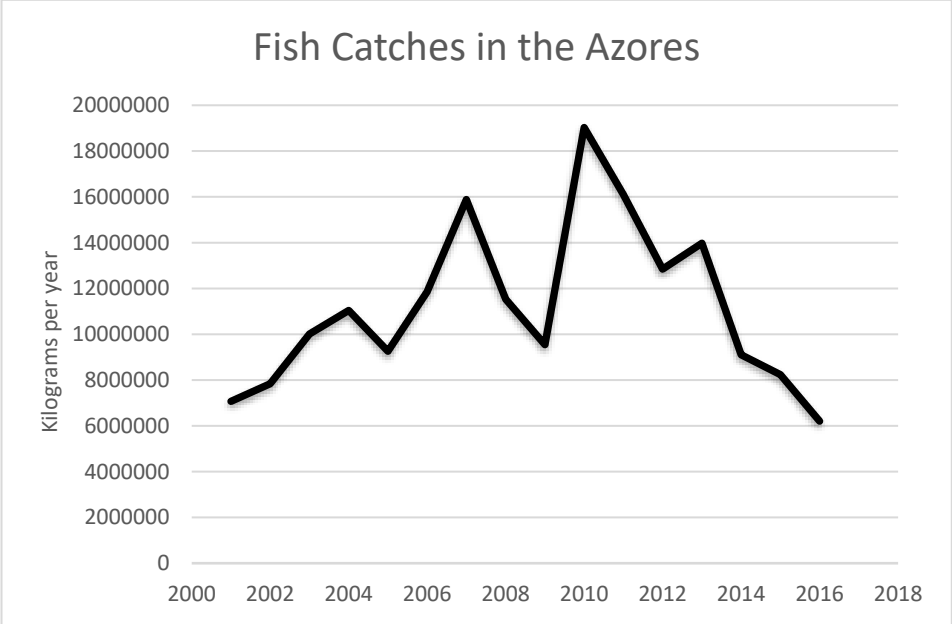
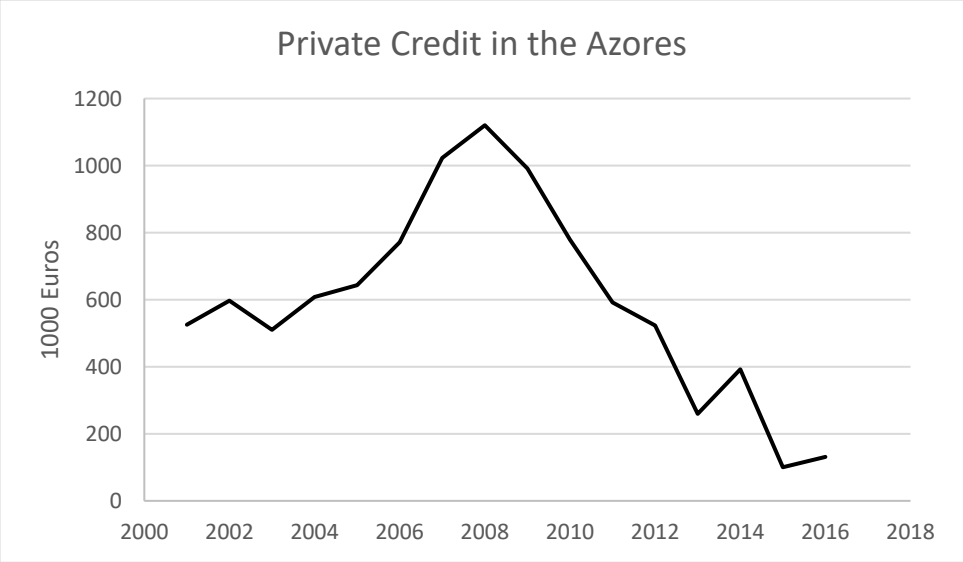


Figure 6: Evolution of Private Credit in the Azores Islands



Private Credit decreased strongly after the financial crises of 2008 and recent developments in the touristic industry or the expansion of milk production do not seem to have strong association with the dynamics of private credit.

3. MODELS

The exercise explores three variants of the Economic Base Model. The first variant uses the traditional economic variables and tries to capture the crisis period with dummy variables. The second variant uses other economic and financial explanatory variables. In a third version, there is the disaggregation of some explanatory variables into detailed components.

3.1 Model with economic and dummy variables

The model is a simple linear relationship. Total Employment (E) is a proxy for the economic performance of the region and used as dependent variable.

(1) $E = \alpha + \beta m.M + \beta t.H ++ \beta f.F + \beta tp.T + \beta d.Di + \varepsilon$

The explanatory variables are Milk production (M) representing the exports from Agriculture and Agrofood Industries and take into account that most of the production is exported. The number of Tourists (H) related to tourism. Fish landings (F) to fish exports; public transferences (T) explain the impact of fiscal redistribution within Portugal and Europe that generate income multiplier effects; and (Di) dummy control variables for the years of the crisis (i) (2011-2016).

Table 1 presents the results of the model considered in formula (1). The variants of the model (1.1, 1.2 and 1.3) facilitate the analysis of the robustness of the estimated parameters. Model 1.1 includes only the number of tourists (H), milk production (M) and fish landings (F). Model 1.2 enlarges the model to the evolution of unilateral public transferences (T). Model 1.3 adds dummies (Di) for the years of the financial crises 2011-2016.

Table 1: Results of the Model with Economic Variables

	Model 1.1			Model 1.2			Model 1.3		
	Sig.	0,177		Sig.	0,206		Sig.	0,014	
	DW	1,313		DW	1,515		DW	3,171	
	Rsquare	0,342		Rsquare	0,391		Rsquare	0,945	
	β	p	VIF	B	p	VIF	β	p	VIF
Constant	124769	0,000		128711	0,000		64670	0,069	
Milk	-0,071	0,108	2,695	-0,088	0,075	3,233	0,043	0,556	37,103
Hosts	0,040	0,063	2,659	0,042	0,058	2,685	0,052	0,029	10,032
Fish	0,334	0,255	1,023	0,026	0,965	2,402	-0,271	0,312	3,823
Transferences				17,932	0,366	2,559	15,250	0,396	9,688
2011							-3627	0,182	1,750
2012							-8810	0,033	2,884
2013							-13021	0,002	1,392
2014							-11938	0,087	10,049
2015							-15010	0,081	15,127
2016							-19868	0,038	16,118

Results of Model 1.1 and 1.2, besides having very low R-square and bad overall significance, the sign of the impact of milk production in employment is contrary to what we would expect, and the significances of the coefficients of Fish landings (F) and Unilateral Public Transfers (T) are very low. The inclusion of dummy control variables for the crisis years (Di) in Model 1.3 increase the R-square and the overall robustness of the model but with the indication of high autocorrelation of the residuals. Furthermore, besides some dummy coefficients for the years of the crisis, the only significant coefficients are associated to the number of tourists and the constant term. The consideration of more explanatory variables increase the Variance Inflation Factor (FIV) of the respective coefficients with more relevance for the Coefficient of the Variable Milk although in the Model 1.3 the coefficient get the expected positive signal.

3.2 Model with Economic and Financial Variables

The Model with Economic and Financial Variables includes a few other explanatory variables to substitute the dummy variables for the years of the crisis. The Public Debt (Pud) and the Change in Public Debt (CPud), the Private Credit (Ci) and the Change in Private Credit (CCi)

(2) $E = \alpha + \beta m.M + \beta t.H + + \beta f.F + \beta t.T + \beta ud.Pud + \beta cud.CPud + \beta i.Ci + \beta ci.CCi + \varepsilon$

Model 2.1 is a transformation of Model 1.2 where there is a different treatment of public transferences because after 2007 there as a different way to compute them but the results are not much better. Model 2.2 adds the Public Debt of the last year to represent the impact of the interests paid to the lenders. Finally, Model 2.3 considers the private credit of last year.

Table 2: Results of the Model with Economic and Financial Variables

	Model 2.1			Model 2.2			Model 2.3		
	Sig.	0,395		Sig.	0,001		Sig.	0,002	
	DW	1,540		DW	2,564		DW	2,433	
	Rsquare	0,336		Rsquare	0,889		Rsquare	0,895	
	B	P	VIF	B	P	VIF	B	P	VIF
Constant	135097	0,002		47135	0,043		43654	0,074	
Milk	-0,096	0,118	4,606	0,124	0,018	13,335	0,116	0,036	14,376
Hosts	0,041	0,078	2,755	0,048	0,001	2,790	0,044	0,005	3,727
Fish	0,005	0,991	2,491	0,217	0,327	2,556	0,188	0,418	2,655
Transferences	11,618	0,728	6,828	15,030	0,332	6,837	18,743	0,277	7,715
TransDum2007	3,151	0,811	9,671	-4,886	0,430	10,138	-7,983	0,324	15,690
Debt (t-1)				-97,845	0,000	8,256	-77,853	0,047	35,887
Private Credit							3,837	0,517	11,733

Results of the Models with Economic and Financial Variables (Table 2) are quite interesting. On the one land, they show the importance of Public Debt of the previous year (Model 2.2) and an improvement in the explanatory capacity of the model. On the other hand, results indicate that whereas Public Debt has a negative impact on employment, Private Credit might have a positive impact. Finally is was possible to exclude all the dummies of the years of the crisis and begin to obtain robust models with expected signs for most of the exogenous variables. The next models disaggregate Public Transferences in National and European Transferences. The inclusion of the dummy variable on public transferences after 2007, to consider changes in the accountancy criteria, and the elimination of time dummies, improved greatly the estimates, namely in terms of VIF indicators for the variable Milk.

3.3 Model with Disaggregated Transferences

The Model with Disaggregated Economic and Financial Variables disaggregates the Fish Catches and Unilateral Public Transferences that did not show significant coefficients in Models 2. This new set of models disaggregate Catches (Fi) into the various taxa (pelagic, demersal, mollusks and crustaceous) and Unilateral Public Transferences separating those that come from Mainland Portugal (Tp) and the ones that come from Europe (Te). This new exercise does not includes the private credit as explanatory variables.

(3) $E = \alpha + \beta m.M + \beta t.H + \beta fi.Fi + \beta tp.Tp + \beta te.Te + \beta ud.Pud + \beta cud.CPud + \varepsilon$

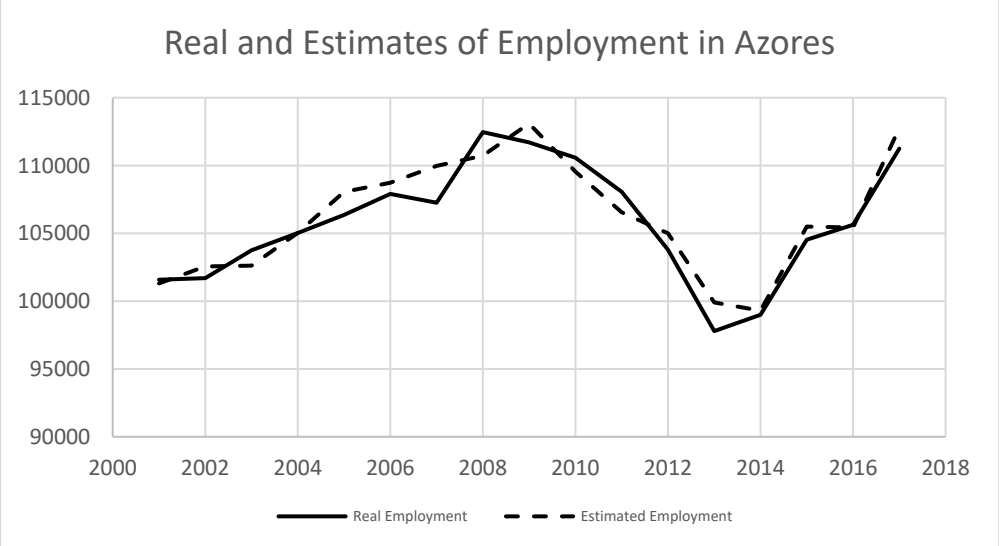
Table 3: Results of the Model with Disaggregated Economic and Financial Variables

	Model 3.1			Model 3.2			Model 3.3		
	Sig.	0,002		Sig.	0,000		Sig.	0,000	
	DW	2,350		DW	2,391		DW	2,425	
	Rsquare	0,904	VIF	Rsquare	0,904	VIF	Rsquare	0,903	VIF
	β	P		β	P		β	P	
Constant	41575	0,073		41880	0,055		42582	0,038	
Milk	0,118	0,024	13,496	0,119	0,016	13,387	0,115	0,009	11,585
Hosts	0,040	0,009	4,500	0,041	0,002	3,037	0,041	0,001	2,899
Fish	0,057	0,227	3,736	0,063	0,791	3,556			
Mainland T.	64,286	0,217	46,778	61,309	0,139	32,546	67,500	0,041	20,837
Mainland TD7	-23,988	0,222	40,999	-22,967	0,155	30,704	-24,407	0,0093	26,811
European T	-2,005	0,826	2,074						
Debt (t-1)	-80,448	0,009	19,276	-81,981	0,001	12,672	-79,563	0,000	9,545

Model 3.1 introduces the disaggregation of the Unilateral Public Transferences, Model 3.2 removes the non-significant variable related to European Transferences, and Model 3.3, removes the non-significant variable related to Fish Catch. Along the series of Models 3. The VIF per variable decrease as expected with the removal of variables with lower explanatory capacity.

The Economic Base Model structure holds for the economy of the Azores where the basic sectors are the production, transformation and commercialization of milk, tourism and public transferences from Mainland Portugal. Model 3.3 shows some quite interesting results (Table 3). Ten thousand litres of Milk produced in the Azores generates more than one direct, indirect and induced jobs. On the other hand, one hundred hosts sustain 4,1 direct, indirect and induced jobs. Furthermore, one million euros of unilateral transferences from the State supported 67,5 direct, indirect and induced jobs with the computation of public transferences done before 2007 and 43,2 jobs with the computation of public transferences after 2007. Finally, each million euros of public debt destroys 79,5 jobs in the next year.

Figure 6: Real and Estimated Employment (Model 3.3)



4. DISCUSSION

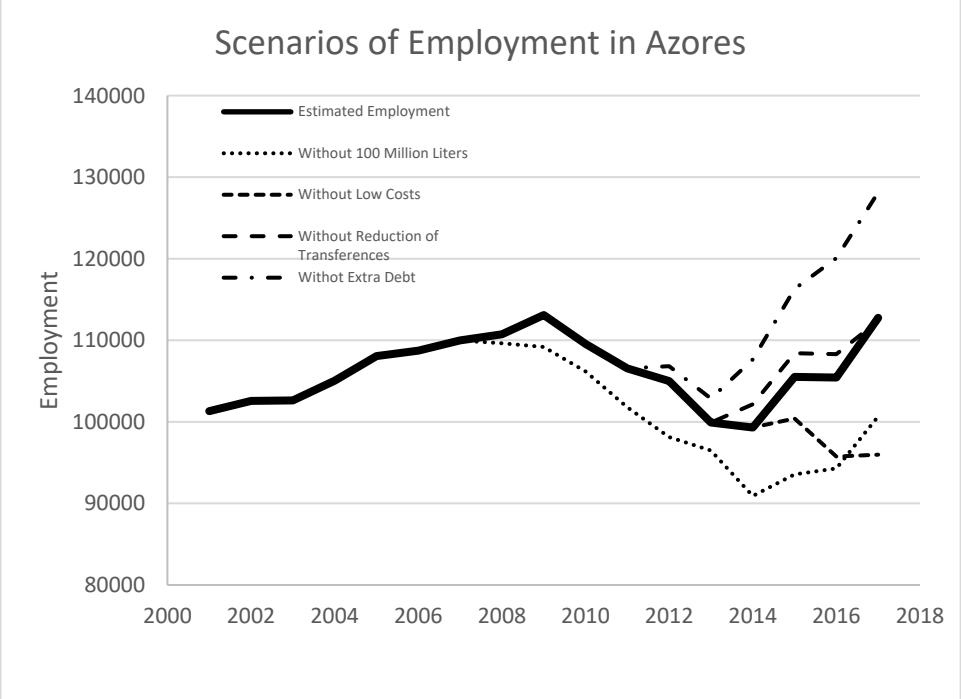
The Economic Base Models estimated above can provide good estimates of the evolution of employment in the economy even in the very turbulent economic environment of the deep crises that affected Portugal and the Azores. Export and financial variables prove to be very useful in explaining what creates and destroys jobs in the Azores. According to the model, one hundred tourists generate about 4,4 jobs and each additional 10.000 liters of milk creates around 1,1 jobs.

From 2008 until 2015, the reduction of Milk produced in the Mainland allowed the expansion of the milk produced in the Azores within the national quota. After the end of the milk quota in 2015, the expansion of production to the natural capacity of the Azores islands allowed the increase in milk production by more 30 million liters. From 2008 until 2015, the increase in the exports of dairy products associated with milk created more 12089 employments.

On the other hand, the introduction of low-cost companies in air transport is associated to an increase of about 236.000 tourists between 2015 and 2016, creating 16782 new jobs. This conclusion provides evidence that effective development policies may relate more to the elimination of institutional restrictions rather than to the composition of the perfect mix of productive factors somehow implicit in the construction of place-based policies (Barca, 2009).

Public transfers also play a big role on employment. One million euros of transfers directly affects 17 jobs. This means that a reduction of 100 million euros implies a loss of 16882 jobs. Finally, according to the estimated model, public debt has a strong negative impact on employment. The coefficient suggests that for each additional 100 million euros of debt 7950 jobs are lost. Notwithstanding this evidence, Public debt has systematically increased in the Azores.

Figure 7: Impact of Policies on Employment (Scenarios on Model 3.3)



5. CONCLUSIONS

Economic theory, former studies (Haddad et. al. 2015) and general perception demonstrated that the drivers of the Azorean economy are agriculture, agro-industries, fisheries and tourism. In study, we explained the evolution of employment in relation to milk production, strong lined to dairy exports, fishing and fish canning, and tourism. In the case of the Azores, it is important to consider transfers received from the EU and from the central government that can

amount to around 50% of the regional budget and are bigger than the value added of any other export sector. Model 3.3 turned out to be the one that explained better the evolution of employment as a function of dairy exports, with a proxy of milk production, tourism, evaluated by the number of hosts, unilateral transferences from the Central Government and negatively influenced by public debt.

Using the results obtained one could evaluate ex-post the impact of various policies implemented recently. The announcement and effective elimination of the milk quota allowed an increase in total production of 32 million liters of milk equivalent to 3685 jobs. The liberalization of air transportation generated a strong dynamic increase in tourism of about 236.000 tourists between 2015 and 2016 for a job impact of about 16882.

Without the increase in the production of milk quota and without the liberalization of air transportation the effects of the crisis in the Azores would have been substantially greater and an estimated 28678 jobs would have been lost. But the increase in the debt to compensate the decrease in of unilateral transferences is destroying jobs, 7956 jobs are destroyed for each increase in the debt of one hundred million euros.

The model captures the reaction of the economy to various policies implemented in the latter part of the period studied. The model provides confirmation of the thesis that regional governments, as happens with national ones, can refrain development because their expenditures based on debt cannot generate income to pay the service of the debt. Actually, regional development policies can be more effective with the elimination of institutional restrictions that still constrain many sectors in the economy such as maritime transportation, electricity provision and interisland flights rather than with guide incentives that stimulate dependencies, inefficiencies and debt.

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