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TOURISM AND ECONOMIC GROWTH: A PANEL DATA APPROACH

This article focuses on the importance of tourism by investigating the relationship between tourist arrivals and the tourism share in economic growth. The findings are consistent with the literature on tourism. Tourist arrivals have positive impact on economic growth. We also find that bilateral trade and investment output are determinants of economic growth. This paper specifies static and dynamic panel models for the period of 1995-2008 between Portugal and 20 partners. We apply the dynamic panel models to observe serial correlation and the endogeneity of some explanatory variables.

Keywords: *tourism; economic growth; Portugal; panel data.*

Нуно Карлос Леітао

ТУРИЗМ ТА ЕКОНОМІЧНЕ ЗРОСТАННЯ: ПІДХІД З ВИКОРИСТАННЯМ ПАНЕЛЬНИХ ДАНИХ

У статті підкреслена важливість туризму шляхом виявлення зв'язку між кількістю туристів та часткою туризму в економічному зростанні країни. Наші висновки в цілому узгоджуються з попередніми дослідженнями з цього питання. Кількість туристів позитивно впливає на економічне зростання, аналогічно з двохсторонньою торгівлею та інвестиціями. Використано статистичну та динамічну панельні моделі для періоду з 1995 по 2008 рр. для Португалії та її 20 країн-партнерів. Для виявлення порядкової кореляції та однорідності пояснюючих змінних використано динамічні панельні моделі.

Ключові слова: *туризм; економічне зростання; Португалія; панельні дані.*

Табл. 4. Форм. 3. Літ. 22.

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ТУРИЗМ И ЭКОНОМИЧЕСКИЙ РОСТ: ПОДХОД С ПРИМЕНЕНИЕМ ПАНЕЛЬНЫХ ДАННЫХ

В статье подчёркнута важность туризма через выявление связи между количеством туристов и долей туризма в экономическом росте страны. Наши выводы в целом согласуются с предыдущими исследованиями по вопросу. Количество туристов позитивно влияет на экономический рост, аналогично двусторонней торговле и инвестициям. В статье использованы статистическая и динамическая панельные модели для периода с 1995 по 2008 гг. для Португалии и ее 20 стран-партнеров. Для выявления порядковой корреляции и однородности объясняющих переменных применены динамические панельные модели.

Ключевые слова: *туризм; экономический рост; Португалия; панельные данные.*

Introduction. The growth and the importance of tourism is one of undeniable successes of the international economy over the last 50 years. In fact, the World Tourism Organisation (2000) states that international tourist arrivals increased to 1 bln by 2010 and will go further to 1.6 bln by 2020. International tourism, often neglected by policymakers, should be treated as export for a host country.

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Tourism is particularly relevant for Portugal. Prudent planning of the sector is critical. Capital costs are very high and investment decisions are consequential over a long period. Transaction costs decrease, and tourism contribute to the increased international trade.

There are good reasons for studying the tourism sector in Portugal. Firstly, Portugal is a small open economy, and needs to create competitive advantages. Secondly, the Portuguese tourism sector has been considered as a new paradigm for Portuguese economy. There are recent education programmes (BSc, MSc. and PhD) that study the structural changes in this sector. Thirdly, the econometric models have been used to test the link between tourism and economic growth (Balaguer and Cantavella-Jordá, 2002; Lee and Chang, 2008; Sequeira and Nunes, 2008, and Katircioglu, 2009).

This manuscript argues and provides evidence that tourism arrivals have a positive effect on economic growth.

How can tourism promote economic growth?

We present theoretical reasons to argue that tourism arrivals have a positive effect on economic growth.

We consider that tourism can influence economic growth in 2 ways. First, tourism specialization could explain the economic growth. Second, natural, historical and cultural resources could become an advantage in tourism cluster.

The mechanism of tourism link. According to Mckinnon (1964), international tourism arrivals promote the competitiveness between local sectors. Local enterprises can obtain advantages if they use economies of scales. On the other hand, resources (cultural, historical, and natural) can promote tourism.

Tourism arrivals and economic growth. In general, the literature of economic growth focuses on the determinants, such as tourism arrivals, physical investments, government consumption output, international trade, and human capital.

Following Katircioglu (2009), Lee and Chang (2008), and Sequeira and Nunes (2008), we consider that economic growth is equal to:

$$GDP = f(TA, TRADE, IY, ICP), \quad (1)$$

where $\delta f / \delta TA > 0; \delta f / \delta TRADE > 0; \delta f / \delta IY > 0; \delta f / ICP < 0$

and GDP is income per capita; TA – tourist arrivals; IY – investment ouput; ICP – consumer prices.

Empirical studies. In this section, we present a survey of the empirical studies on the problem. Recent studies have established a link between tourism and economic growth. In other words, tourist activity contributes to economic growth. This idea confronts the endogenous growth models, which are based on assumptions as to the intensity in R&D, economies of scale and high levels of technology.

However, it should be noted that countries could be abundant in certain features such as beaches, museums and other cultural and religious goods that are durable. So we can introduce the component of the effects of bilateral trade (Leitão 2010, Brau et al. 2003, Sequeira and Nunes, 2008).

There is a number of empirical studies that evaluate the relationship between tourism and economic growth. We decided to refer the most recent like Temple et al.

(2001), Brau et al. (2003), Eugenio-Martin et al. (2003), Sequeira and Nunes (2008), Lee and Chang (2008), and Katircioglu (2009).

The study by Temple et al. (2001) applied the GMM system estimator (Blundell and Bond, 1998). The authors showed that it is important to solve the endogeneity and serial correlation in the relationship between tourism and economic growth.

Brau et al. (2003) show that tourism is correlated with human capital, geographical distance, and cultural proximity.

Eugenio-Martin et al. (2003) specify a dynamic panel (GMM-DIF, from Arellano and Bond,1991). The authors concluded that there is a positive correlation between tourism per capita and economic growth in Latin America countries.

Sequeira and Nunes (2008) utilize the dynamic panel data (GMM-System, from Blundell and Bond, 1998) to explain the relationship between tourism and economic growth. The study demonstrates that tourism is a determinant of economic growth.

Lee and Chang (2008), and Katircioglu (2009) consider the impact of tourism activity on economic growth with cointegration techniques. These studies reinforce the idea that tourism activity can influence the economic growth.

Methodology and research design. This study uses static and dynamic panels. In the static panel we estimated by means of Pooled OLS, Fixed Effects (FE) and Random Effects (RE) the F-statistic tests and the null hypothesis of the same specific effects for all individuals. If we accept the null hypothesis, we could use the OLS estimator. The Hausman test can decide which model is better: random effects (RE) or fixed effects (FE). The static panel data have some problems in serial correlation, heteroskedasticity and endogeneity of some explanatory variables. The estimator GMM-system (GMM-SYS) permits the researchers to solve the problems of serial correlation, heteroskedasticity and endogeneity for some explanatory variables. These econometric problems were resolved by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998, 2000), who developed the first-differenced GMM (GMM-DIF) estimator and the GMM system (GMM-SYS) estimator. The GMM-SYS estimator is a system containing both first-differenced and levels equations. The GMM-SYS estimator is an alternative to the standard first-differenced GMM estimator.

To estimate the dynamic model, we applied the methodology of Blundell and Bond (1998, 2000), and Windmeijer (2005) to small sample correction to correct the standard errors of Blundell and Bond (1998, 2000). The GMM system estimator that we report was computed using DPD for OX (Doornik et al., 2002).

The GMM system estimator is consistent if there is no second-order serial correlation in the residuals (m2 statistics). The dynamic panel data model is valid if the estimator is consistent and the instruments are valid.

Hypothesis

H1: There is a positive impact on real gross domestic product in the long run.

Barro (1991), Barro and Sali-Martin (1995) defend the idea that lagged real gross domestic product (GDPt-1) analyses the convergence between countries.

H2: Tourist arrivals promote economic growth.

According to the literature the expected sign for tourist arrivals is positive in the model of economic growth (Durbarry (2004), and Sequeira and Nunes (2008)).

H3: International trade stimulates economic growth.

The dominant paradigm attributes a positive sign. Edwards (1998) demonstrates that this permission is not consensual. Sequeira and Nunes (2008) found a negative correlation between international trade (openness of trade) and economic growth.

***H4*:** High inflation rates reduce the economic growth.

Levine et al. (2000) found a negative sign.

***H5*:** There is a positive relationship between physical capital investment and economic growth.

***H6*:** The government consumption output is negatively correlated with economic growth.

Data collection analysis. Data on tourism are from Tourism Satellite Account between Portugal and its 20 partners (see Table 1) for the period between 1995 and 2008. Other variables are taken from World Development Indicators by the World Bank.

Table 1. **Countries by tourist arrivals in Portugal for the period between 1995-2008**

Austria
Belgium
Canada
Czech Republic
Denmark
Spain
Germany
France
Finland
Greece
Hungary
Ireland
Italy
Luxembourg
Netherlands
Poland
United Kingdom
United States
Sweden
Brazil

Source: Tourism Satellite Account

Model Specification

$$GDP_{it} = \beta_0 + \beta_1 X_{it} + \delta t + \eta_i + \varepsilon_{it}, \quad (2)$$

where GDP_{it} is per capita GDP at constant prices, X is a set of explanatory variables. All variables are in their logarithm forms; η_i is the unobserved time-invariant specific effect; β_t captures a common deterministic trend; ε_{it} is a random disturbance assumed to be normal, and identical distributed (IID) with $E(\varepsilon_{it})=0$; $Var(\varepsilon_{it}) = \sigma^2 > 0$.

The model can be rewritten in the following dynamic representation:

$$GDP_{it} = GDP_{it-1} + \beta_1 X_{it} - \rho\beta_1 X_{it-1} + \delta t + \eta_i + \varepsilon_{it}. \quad (3)$$

Empirical results. In Table 2 we can observe the results of the descriptive statistics of the variables used in this study.

Table 2. **Descritive statistics**

Variables	Mean	Std Dev	Minimum	Maximum
LogGDP	4.23	0.07	4.12	4.36
LogTA	5.74	0.61	4.45	6.89
LogTRADE	7.73	2.71	1.21	9.62
LogIY	10.34	0.11	10.24	10.57
LogICP	0.001	0.03	-0.15	0.095

In table 3, we see the results with static panel data (OLS, Fixed Effects, and Random Effects estimators).

Table 3. **Static panel data: tourism and growth**

Dependent variable: LogGDP				
Independent Variables	OLS	Fixed Effects	Random Effects	Expected Sign
LogTA	0.400 (0.808)	0.167(11.5)***	0.314 (0.170)	(+)
LogTRADE	0.118 (0.115)	0.138(2.83)***	0.440 (0.421)	(+)
Log (I/Y)	0.508 (24.82)***	0.540(17.8)***	0.509 (20.360)***	(+)
LogICP	-0.016 (-0.1671)	-0.151(-0.650)	-0.031 (-0.364)	(-)
C	-1.049 (-4.915)***		-1.037 (-3.993)***	
Adj. R^2	0.40	0.66	0.38	
LM (χ^2)			28.184***	
Hausman (χ^2)			33.67***	
Observations	205	205	205	

T-s, T-statistics (heretoskedasticity corrected) are in round brackets.***-statistically significant, at 1% level, respectively. The LM test has χ^2 distribution and tests the null hypothesis of non-correlation between non-observable individual effects and explanatory variables. The Hausman test has χ^2 distribution and tests the null hypothesis of non-correlation between non-observable individual effects and explanatory variables, as against the alternative hypothesis of correlation between non-observable individual effects and explanatory variables.

Our analysis evaluates the signs of the coefficients and their significances. With Fixed Effects estimator the explanatory power is Adj. $R^2 = 0.66$. All explanatory variables are significant (LogTOUR, LogTRADE, LogIY at 1% level), with the exception of consumer prices.

The variable of tourist arrivals (LogTA) is statistically significant with an expected sign. As in Durbarry (2004), and Sequeira and Nunes (2008) we also find a positive sign. This result demonstrates that tourism is an important vehicle in promoting the economic growth.

As expected, the variable LogTRADE (openness) has a significant and positive effect on economic growth (Eliat and Einav, 2004, Phakdisoth and Kim, 2007, and Leitão, 2010).

The coefficient of investment-output ratio Log (I/Y) is used to measure the physical capital investment. We find a positive sign. Sequeira and Nunes (2008) also found a positive sign. The variable of consumer price has no significance.

It is usual in the growth literature to apply the GMM-System (Blundell and Bond 1998, 2000). The validity of instruments is tested using a Sargan test of over-identifying restrictions and serial correlation. First-order and second-order serial correlation in the first-differenced residuals is tested using m1 and m2 statistics (Arellano, Bond, 1991). The GMM system estimator is consistent if there is no second-order serial correlation in the residuals (m2 statistics). The dynamic panel data is valid if the estimator is con-

sistent. We used the criterion of Windmeijer (2005) small sample correction to have consistent stand errors.

As shown in Table 4, the equation presents consistent estimates; with no serial correlation for the GMM-SYS estimator (m1, m2, and statistics). The specification Sargan test shows that there are no problems with the validity of the instruments used for both equations. The instruments used in levels are LogGDP(3,6), LogTA(3,6), LogIY (3,6) for first differences. For levels equations, the instruments are used in first differences, all variables lagged $_{t-2}$.

Other results relating to tourism and economic growth:

i) Lagged dependent variable (LogGDPt-1): a positive sign was expected and the results confirm this. According to Barro and Sala-i-Martin (1999), there is convergence between partners;

ii) Tourist arrivals (LogTA): the expected sign is positive, which is confirmed by the estimation;

iii) Physical investment (logI/Y): the expected sign is positive, and the coefficient of this variable is significant with correct sign;

iv) ICP (consumer price): the expected sign is negative, and the coefficient of this variable is negative.

Table 4. **Dynamic panel data: tourism and growth**

Dependent variable: LogGDP		
Independent Variables	GMM-System	Expected Sign
$LogGDP_{t-1}$	0.995 (26.6)***	(+)
LogTA	0.066 (2.17)**	(+)
LogTRADE	0.075 (0.052)	(+)
Log (I/Y)	0.033 (1.91)*	(+)
LogICP	-0.086 (-7.09)***	(-)
C	0.339 (5.29)***	
M1	-1.458 [0.145]	
M2	1.069 [0.285]	
Sargan Test	16.99 [1.000]	
Observations	178	

The null hypothesis that each coefficient is equal to zero is tested using a second-step robust standard error. T-statistics (heteroskedasticity corrected) are in round brackets. ***/**/*-statistically significant, at the 1%,5%, and 10% level, respectively. P-values are in brackets. Year dummies are included in all specifications (this is equivalent to transformation the variables into each period). M1 and M2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation (based on the efficient two-step GMM estimator). Sargan test is a test of over-identifying restrictions, asymptotically distributed under the null instruments' validity.

Conclusion. The main objective of this study was to analyze if tourism promotes economic growth. The article examined the link between tourist arrivals and economic growth over the period of 1995-2008, using a dynamic panel data analysis (GMM-system estimator).

The variable (LogDGDP) is used to evaluate the convergence between partners. The regression shows that Portugal and partners converge within. Lagged dependent variable ($LogGDP_{t-1}$) has a positive sign. This result is in accordance with the economic growth literature.

The variable consumer price (LogICP) is in accordance with the dominant paradigm, when we use the dynamic panel data, i.e, there is a negative relationship between ICP and economic growth.

The variable (LogIY) used to analyze the physical capital is in accordance with the literature.

The literature attributes a positive sign to bilateral trade, i.e. growth increases with bilateral trade. Our findings support this hypothesis.

The study has however some limitations. In the future, we need to include other control variables as economic freedom, and cultural similarity (language, border).

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