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DOES THE INTERNATIONAL TOURISM INDUSTRY RELAX SOVEREIGN CREDIT RATINGS: THE CASE OF COUNTRIES MOST RELIANT ON TOURISM

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Abstract

Sustainable tourism plays a dominant role in the economic well-being of some of the world's countries, especially small ones. Tourism earnings account for a significant proportion of their GDP, and they have an overwhelming reliance on tourism as a source of service exports. The general trends in tourism earnings and volatilities in country risk ratings often go hand in hand, especially for small touristic countries in that region. The research presented in this paper provides a comparative assessment of the international country risk ratings and highlights the importance of their tourism earnings and tourism export. This study employs the ordered response and Poisson count panel data model for a sample of twenty-two countries most reliant on tourism, including Mediterranean countries. The aim of this study is to investigate whether the tourism determinants of sovereign credit ratings for those countries vary between different rating agencies (Standard & Poor's, Moody's and Fitch's). The key finding is that an increase in tourism earnings as a proportion of GDP and as the main export share in the total country export impairs the sovereign risk rating and turns out to be robust across the different methodologies.

Keywords: *tourism earnings, sovereign credit ratings, Mediterranean countries, world's countries, ordered response panel model*

JEL codes: *G24, C33, Z32*

1. INTRODUCTION

Upon casual inspection of any business periodical, one will find that, at any point of time, there are many different nominal interest rates, which may change over time in reaction to changes in the supply or demand for loanable funds and changes in inflationary expectations (or risk perception). International country risk is also known as sovereign credit risk, where different types of borrowers (or related projects) have different probabilities of being able to service their debt (make scheduled interest payments). The ability of some countries, particularly small ones that are susceptible to adverse macroeconomic shocks and are considered to have high risk, to repay the foreign principal of the debt is the main focus of this paper. The production structure of countries experiencing tourism take-off and development is becoming more sophisticated but remains a tourism-based

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monoculture; therefore, such countries are especially vulnerable. The other economic sectors remain indirectly dependent on tourist demand, which can be more or less volatile in the current competitive environment. The Global Financial Crisis (2008-2013) marked the beginning of a new period of economic instability in some of these EU countries (archetypical examples are Greece and Croatia), although not all of them have been affected, and they are not the only countries characterised by a sharp and costly initial contraction and a subsequent prolonged period of subdued economic activity. Tourism is essentially a service industry. The recent economic crisis has pointed to numerous weaknesses in the economic model pursued by many economies based on the promotion of the service sector (Stojčić, Bezić and Galović, 2016).

Some small tourism countries (STC's) are EU member countries with small populations and narrow productive capacities, and a consistent inflow of foreign direct investment (FDI) in addition to tourism is necessary to facilitate economic growth. The rest of the countries of this kind located outside Europe, share similar problems. As EU members, such economies have access to international capital markets, which facilitates the smoothing of their private consumption over time and provides a better credit rating when they are discredited, as in the time of the Global Financial Crisis, when their population was saddled with substantial debts. These countries faced or still face a strong probability of default on debt. In the long term, tremendous uncertainty exists in these countries, and yet there are institutional lenders that seek the long-term perspective (for example, pension funds that require the planning of exact financial obligations well into the future, which is complicated by the worsening demographic situation).

This paper explores whether tourism earnings and tourism export can help to reduce sovereign risk rating as artificial risk categories commonly established by various credit agencies. Given that one of the roles of sovereign risk rating is to mirror external repayment risk, the assumption is that a country will be able to service its external debt by those transactions. The efforts in this paper narrow the scope of the study to the most prominent ratings, Standard & Poor's (S&P), Moody's and Fitch, and link their assessment of country credit risk with countries in which tourism as a form of economic activity has traditionally persisted because of their favourable climate, landscape and very rich cultural heritage. This study will apply the ordered and Poisson response panel data model to a sample of Mediterranean countries plus other countries that are most reliant on their tourism industry for GDP (in the world) to research links among tourism earnings/export, tourism volatility and sovereign risk rating.

The purpose of this article is to explore the effect of earnings from international tourist spending on the sovereign risk rating of the host economy. The possible contribution to the existing literature is twofold. First, the statistical interference of tourism earnings and exports on the sovereign risk rating has received limited attention, even in the recent research considering the small island tourism economies and country risk ratings, as in (Hoti, McAleer, and Shareef 2007). In this paper systematic evidence is provided of this effect using a broad panel of 22 world countries for the period 1997–2016. Second, different methodological and model approaches are explored to gain understanding of the interaction effect stemming from STCs to address issues concerning tourism earnings and credit risk rating.

The remainder of this paper is organised as follows. Section 2 discusses the literature review. Next, Section 3 addresses theoretical preliminaries underlying the link between tourism and sovereign risk rating. Section 4 introduces the methodology and estimates and describes the datasets and the key variables used in the regressions and in Section 5 the core results and discussion are presented. Section 6 concludes the paper.

2. LITERATURE REVIEW

A review of the recent literature about tourism and its effect on the sovereign risk rating shows that previous studies have been limited to statistical analysis of the impact of international tourism earnings on sovereign ratings. Previous research has not shown what impact tourism earnings, or its export can have on psychological relief concerning discrete grades of sovereign risks. The papers on this topic are rare: only a few of them provide a comparison of tourism growth, country risk returns and their associated volatilities (or uncertainty) for 2 small island tourism economies, Cyprus and Malta (Ibidem). Using Country Risk Score data from 2012 relating to 186 countries and retrieving Tourist Arrivals data from 2012, other authors apply regression analysis to see if there is any relationship between country risk and tourism activity; they show that there is a strong relationship between the country risk, its indicators of sustainability and tourism activity (Cervelló-Royo, et al. 2016).

The research on the comparative dynamics of sovereign risk intercountry rating faces complexities that eclipse the role of tourism per se. Some authors state that a sovereign credit rating is a function of basic data and about information that is difficult to measure

which should reflect the creditworthiness and the probability of a country to default. They propose an alternative characterisation for the subjective component of a sovereign credit rating – the part related to the rate's lobbying effort or its familiarity from a United States point of view – and apply it to S&P and Moody's and Fitch ratings, using both traditional ordered logit panel models and machine learning techniques (De Moor et al. 2018). In the paper of Daud and Podivinsky (2011), it is found that the positive effect of the accumulation of reserves aiming to improve sovereign ratings is crowded out by the negative effect of the accumulation of external debt, resulting in a net negative effect. Other authors use ordered logit and probit plus random effects (RE) ordered probit approaches to study the determinants of sovereign debt ratings and find that the last procedure is the best for panel data as it accounts for the additional cross-section error (Afonso et al. 2009). The main finding of Afonso et al. (2011) in their next research is that changes in GDP per capita, GDP growth, government debt, and government balance have a short-term impact on a country's credit rating, while government effectiveness, external debt, foreign reserves, and default history are important long-term determinants. This next paper emphasised that the sovereign credit ratings are becoming increasingly important both within a financial regulatory context and as a necessary prerequisite for the development of emerging capital markets. Using a comprehensive dataset of rating agencies and countries over the period 1989–1999, the same paper demonstrates that artificial neural networks (ANN) represent a superior technology for calibrating and predicting sovereign ratings relative to ordered probit modelling (Erdem and Varli 2014). Other authors such as Ozturk et al. (2016) explore the prediction performance of several artificial intelligence (AI) techniques in predicting sovereign credit ratings in a heterogeneous sample. After the start of the European debt crisis in 2009, the importance of the financial balance, economic development and external debt increased substantially, and the effect of Eurozone membership switched from positive to negative (Reusens and Croux 2016); also, GDP growth gained much importance for highly indebted sovereigns and government debt became much more important for countries with a low GDP growth rate; it had been explored by using RE ordered probit modelling (Gultekin-Karakas et al. 2016). In one paper authors explore the reliability of credit ratings and conclude that separate analyses of developed and developing countries suggest that the consistency of credit ratings differs by favouring the developed country group (Luitel et al. 2016). It is found that credit rating agencies favour their home countries and the homes of their major shareholders, to the detriment of foreign countries (Kajurova 2014). One of the papers predicts sovereign ratings for developing countries that do not have risk ratings from agencies such as Fitch, Moody's, and S&P and generate shadow ratings for several developing countries that have never been rated; the key finding - unrated countries are not always at the bottom of the rating spectrum (Ratha and Mohapatra 2011).

3. THEORETICAL PRELIMINARIES

Rating agencies (e.g., S&P, Moody's Investors Service and Fitch Ratings) actively monitor countries issuing securities. Sovereign ratings are important not only because some of the largest issuers in the international capital markets are national governments but also because these assessments affect the ratings assigned to borrowers of the same nationality. For example, agencies seldom, if ever, assign a credit rating to a local municipality, provincial government, or private company that is higher than that of the issuer's home country (Cantor and Packer 1996).

The general thesis of this paper is that the information about tourism earnings growth reduces sovereign risk rating. However, there are various specificities for countries that form their own GDP, predominantly on the sale of the tourist experience, in which international tourist receipts and tourism exports are stressed in their GDP structure.

A simple definition of a sovereign credit rating is that it is the credit rating of a country or sovereign entity. At the request of the country, a credit rating agency will evaluate the country's economic and political environment to determine a representative credit rating (Investopedia). The rating has several levels of evaluation and an idiosyncratic structure. In further text the intuition relating to the above-stated theses is explained.

Tourism earnings can mitigate external repayment risk and make a country more able to service its external debt. Tourism earnings generated by economic activity in the public domain are important inputs for taxation; namely, tourism earnings may augment the fiscal basis in the private sector and bring more revenue to the state treasury. With a sharp inflow of tourism earnings into a country, fiscal risk becomes a negligible category, the public finances may remain sound and there is room to manoeuvre if a shock hits (the country may wait for the earnings expected in the next tourist season). Tourism earnings can help to reduce economic risk if the growth is broadly based and sustainable.

This assertion is supported or addressed implicitly by a strand of literature that, through time series analysis, tests the tourism-led growth (TLG); that is, it attempts to explain whether tourism earnings can be an engine of growth for specific countries and "how much" of growth can be explained by tourism. If it is sustainable in the long term, tourism-based growth can bring in foreign currency, which can be used to import capital goods to produce goods and services, thus leading to economic growth that reduces economic risk. That issue is theoretically founded within the tourism-capital import growth (TKIG) hypothesis that works through the super-multiplier, see (Candela and Figini 2012).

The next level is exchange rate risk. Rating agencies analyse whether the exchange rate is overvalued and whether foreign exchange reserves are sufficient. Tourism earnings fill the holes in the foreign exchange reserves treasury of countries that are not members of the Eurozone (e.g. tiny Croatia) and belong to the STC club, in our empirical analysis. This applies to a few countries in our empirical sample, but this type of risk is less relevant for the Euro subjects in our analysis.

For the subsequent two levels, the position of tourism earnings is ambivalent, and there is no unambiguous answer to the question whether tourism contributes to a higher rating.

Rating agencies try to foretell financial risk and determine whether the financial system is solid and properly supervised. Institutional regulations are in charge of central banking systems and not of tourism subjects. However, why does it seem that financial risk is amassed in a small circle of countries with a well-developed tourism industry that are located on the Mediterranean periphery? Sovereign credit ratings are only a bureaucratic synonym for a well-functioning economy. The Global Financial Crisis (2007–2013) was due to moral hazard problems: imbalances built up in the form of financial or real estate market bubbles because agents believed, rightly or wrongly, that they would be bailed out by the public sector if things went amiss. The implicit guarantees actually or seemingly offered by national governments or international financial institutions allowed reckless overinvestment and were therefore at the root of the crisis. Some of the countries in our Mediterranean sample suffered greatly in this type of economic crisis; in particular, some STCs suffered in the aftermath due to market bubbles and the uncontrolled inflow of external capital and proliferation of foreign banks. Past studies have shown that changes in the house price of a region may transmit to neighbouring regions. The transmission mechanism may follow spatial and temporal diffusion processes (Nanda and Yeh 2014). In theory, we know that the relationship between the local population and holiday home owners exhibits secondary elements of conflict, as the two groups share an implicit social pact (Bimonte and Punzo 2007); however, a trade-off between tourists and local residents may arise when the high demand for holiday homes by the former inflates real estate prices to the disadvantage of the latter.

Political risk is another aspect of credit rating, as political upheaval may lead to debt repudiation. Political risk is a very complex and vague concept. However, we cannot abstract from events such as a terrorist attack, war or earthquake that may act as a negative shock on tourism earnings and lead to possible downgrading of sovereign credit ratings.

In summary, prevailing theoretical discussions suggest that tourism earnings can reduce the sovereign risk rating of countries whose populations specialise in tourism activity. A lack of tourism earnings limits these countries' technological development and industrial diversification, which may worsen their macroeconomic volatility and reduce their down risk rating. The present paper tests these theoretical considerations.

4. METHODOLOGY AND ESTIMATIONS

4.1. Econometric analysis

Two different models are used in this paper:

- a panel ordered probit model, and
- a panel Poisson model for count data.

The first statistical model applied was a panel ordered probit model (or the "proportional odds model" in the general setting, invented by McCullagh (1980), which has been used quite recently by Teker, Pala and Kent (2013) for determination of sovereign rating based on panel data. Let the state of risk rating of alternative j be specified as

$$Y_{ijt} = \alpha_j + \beta_j x_{it} + \varepsilon_{ijt} \quad (1)$$

where, x_{it} is a vector of country-specific characteristics and year dummies and α_j represents choice specific constant terms for state of risk rating j. If ε_{ijt} is independently and identically distributed according to a type I extreme-value distribution, then the probability that country i chooses state of risk type j (or receives the rating by a credit rating agent) is given by the probability constraints in the next model.

If Y_{it} is the response factor with K levels, the model is written as:

$$P(Y_{it} \leq k|x_{it}) = \Phi(\theta_{jit} - \beta^{i} x_{it}) \quad (2)$$

where Φ is the cumulative normal function, $\theta_0 = -\infty < \theta_1 < \cdots < \theta_K = \infty$ are the breakpoints or threshold parameters for estimation, x_{it} is the vector of the explanatory factors referring to tourism receipts and β is the vector of the unknown parameters. The subscript i denotes a generic country and t a generic year.

The next specification that is analysed is the Poisson panel model with count response variable. For the Poisson model,

$$\mathrm{P}(Y_{it}) = \frac{e^{-\lambda it}\lambda_{it}^{Yit}}{Y_{it}!} \text{ where } \lambda_{it} = \alpha + \beta x_{it,m} + \varepsilon_{it} \quad (3)$$

i indexes countries and t indexes years and log λ_{it} is a vector of m regressors for unit i at time t. The basic Poisson model embodies some strong assumption, e.g.,

$$\mathrm{E}\,(Y_{it}|x_{it}) = \lambda_{it} = V\,(Y_{it}|x_{it,m}) \quad (4)$$

Although the agencies use different symbols in assessing credit risk, every Moody's or Fitch symbol has its counterpart in the S&P rating scale. For the input ordinal (or count) value for Y_{it}, see Table 1.

Within these extremal points in grading, various ordinal risk ratings can occur in the sample of chosen countries. As explained previously, y is the response factor with k levels that overlap sovereign credit rates. For a model to uncover this relationship, we must present the response variable with a numeric encoding of the ordered categories that represents a linear ordering (Kuhn and Johnson 2013).

Table 1 presents the transformation of the categorical variable indicated by rating symbols for long-term debt to a numerical factor variable. Since the coding of the responses factor in levels varies from 1 (very bad credit rate) to 18 (excellent credit rate), a positive value for a variable coefficient indicates a tendency to consider the proposed explanatory variable of tourism receipts proactively as an instrument to alleviate a worse credit rating.

The response variable Y_{it} in the model can be considered as ordinal since, according to the nature of sovereign credit ratings, it can take the values 1-18, or, in the case of S&P, from CCC = 1 to AAA = 18. Moody's rating is recoded in like manner. Since the S&P and Fitch rating grades are much the same, there is no need to run a separate regression in the empirical part of this paper.

Table 1: Rating symbols for long-term debt with a numeric encoding

Factor	Standard and Poor's	Moody´s	Fitch	Credit Rating
18	AAA	Aaa	AAA	Highest credit quality, virtually no risk of default
17	AA+	Aa1	AA+	High probability of timely and
16	AA	Aa2	AA	complete
15	AA-	Aa3	AA-	payment
14	A+	A1	A+	Adequate capacity to meet financial commitments, many positive
13	A	A2	A	investment attributes but also elements susceptible to adverse effects
12	A-	A3	A-	of changes in economic conditions
11	BBB+	Baa1	BBB+	Adequate capacity to meet financial commitments but also speculative
10	BBB	Baa2	BBB	characteristics or lack of protection against changes of economic
9	BBB-	Baa3	BBB-	conditions
8	BB+	Ba1	BB+	Moderate capacity to meet financial commitments,
7	BB	Ba2	BB	also in good
6	BB-	Ba3	BB-	economic conditions
5	B+	B1	B+	Weak protection
4	B	B2	B	of interest and
3	B-	B3	B-	repayment
2	CCC+	Caa	CCC	Lowest credit quality, lowest protection of investors, in immediate
1	CCC	Ca	CC	danger of credit default
	D	C	D	In credit default*

Source: *as in (Fisher, 2012) and own adaptation of factors;*
Note: * *the event that does not occur in collected data*

Since the first sample set of countries effectively constitutes almost the entire population of the Mediterranean region, a fixed effects (FE) model could have been considered. However, the RE model is more appropriate when the cross sections in the sample have been randomly selected from the population – for second extended sample. Because some countries are omitted from the Mediterranean sample due to missing data about grading, an FE estimation is not appropriate. Additionally, due to the problem of incidental parameters, it is impossible to estimate an FE model of this type. A conditional probit model may overcome this problem, but all the country-individual variables would be removed from the specification. This problem can be circumvented by introducing RE (Butler and Moffitt 1982). Yet, is an RE ordered probit model truly needed?

When T is large, and N is small, there is little difference between the RE and FE, in our case, T = 21, N = 10 (or 22), and FE are preferred for computational convenience (Baltagi 2008). The issue of whether to use RE or FE estimation approaches will be formally determined by statistical testing. Therefore, the first test for data pooling (Chow F-test) by comparing the FE and the benchmark pooled OLS fits by means of the F-test for country-individual effects, is performed. The Hausman specification test will eventually be performed to evaluate the assumption in the RE model that unobserved variables are orthogonal to explanatory variables. The Lagrange multiplier (LM) test is proposed by to see whether the variance of the intercept components of the composite error term is zero. Rejection of the null in both these cases would lead to rejection of the RE estimator.

4.2. Statistical hypotheses and economic intuition

In this paper, the following hypotheses are tested.

H0(1): There is no significant positive impact of the tourism industry on credit risk grading. Since the coding of the responses varies from 1 (very bad: on the edge of credit default) to 18 (without risk in regard to default), a positive and statistically sound value for a variable coefficient indicates a tendency to consider the proposed tourism explanatory variables as an affirmative impact that brings financial relief and an improved state of liquidity.

H0(2): There is no significant difference between the small countries and the rest of the sample in terms of the impact of tourism volatility on the established risk rating structure. Increases in lagged tourism volatility can raise apprehension in the financial sector, which in the light of rational expectation will worsen credit rating. STCs are in greater danger of volatility, since they do not have advanced capital markets to hedge against adverse macroeconomic shocks; such is the volatility in tourism earnings.

4.3. Data

This study examines the determinants of sovereign credit ratings in a set of selected countries. The first set is constructed as a panel of 10 Mediterranean countries, Croatia, Cyprus, Arab Republic of Egypt, France, Greece, Italy, Malta, Slovenia, Spain and Turkey. The second set consists of the additional 12 countries around the world whose economy is largely based on tourism output (Austria, Dominican Republic, Iceland, Jamaica, Jordan, Lebanon, Morocco, Mexico, Nicaragua, Panama, Thailand and Tunisia). That is a total of 22 countries, for the time period 1997–2016 on an annual basis. The sample includes countries for which adequate data were available.

The data for S&P and Moody's ratings were sourced from *https://tradingeconomics.com/country-list/credit-rating* (database online). As a measure of tourism, the following variables are considered: 1) the log of tourism receipts (exports) divided by GDP (total export) in current US$. As an alternative to receipts, one can use tourism arrivals. However, for this type of panel analysis, arrivals have the disadvantage of being hardly an instrument for obtaining revenue and monetary receipts. The advantage is that arrivals have a smaller measurement error and are immediately comparable across countries, without requiring transformations that could further increase the measurement error. 2) The log of the absolute value of the tourism deficit divided by GDP in current US$, the log of tourism receipts (% of total GDP). 3) The log of the volatility of tourism receipts. 4) The log of the volatility of tourism exports. 5) A dummy variable for an STC. Given the large cross-country differences in total tourist inflows, the log-transformation generates a smoother distribution. The data is obtained from the World Development Indicators published by the World Bank and extracted from *http://go.worldbank.org* (database online).

5. RESULTS AND DISCUSSION

Whether the effects in our sample are truly random or not can be determined by the F-test. The F-statistic

Table 2: Input data in calculating explanatory and expected variables in the equations

Variables	Definition	Expected Sign	Data Source
TR	International tourism receipts (current US$)		WDI
GDPC	GDP, PPP (current US$)		WDI
TR_GDPC	TR to GDPC ratio	Positive	
TE	International tourism expenditures (current US$)		WDI
TE_GDPC	TE to GDPC ratio	Positive	
TD_GDPC	Absolute value of tourism deficit calculated by subtracting the sum of TR and TE and dividing by GDPC	Positive	
TRX	International tourism receipts (% of total exports)	Positive	WDI
SD_TR	Volatility in international tourism receipts is calculated as a rolling standard deviation in TR over a window of four observations	Negative	
SD_TRX	Volatility in international tourism, receipts (% of total exports) is calculated as a rolling standard deviation in TRX over a window of four observations	Negative	
Dummy	Group of small touristic countries (Cyprus, Greece, Croatia, Malta, Slovenia, Tunisia, Dominican Republic, Iceland, Jamaica, Jordan, Lebanon, Nicaragua, Panama.)	Negative	

Source: *Constructed by the author*

of the FE indicates that the FE is not needed and that the country effects are significant and confirms substantial intercountry variation in the sample (see Table 3). It is therefore more appropriate to choose the competitive RE model, according to the exclusion principle. This result is not surprising because the selected Mediterranean countries are a very heterogenous economic group; it is intuitively obvious that individual effects would be unstable for the different units in the studied period.

Table 3: FE vs. pooled OLS Estimator: Diagnostic Results of F-test (Chow Test)

Dependent variable (model)	Mediterranean countries	All countries
Standard and Poor's	10.95**	12.42**
Moody's	10.31**	13.15**

Source: *Author computation from collected data (2018)*
Notes: *F test for individual effects; ** represents statistical significance at the 1% level*

First, a simple pretest shows only that a pooled OLS estimator is better than a fixed estimator. Accordingly, to determine which of these estimators is more appropriate to use later, both an FE and an RE estimator were initially used to model sovereign risk rating, and the Hausman specification test is performed to evaluate the assumption in the RE model that the unobserved variables are orthogonal to the explanatory variables. The LM test to determine whether the variance of the intercept components of the composite error term is zero (Honda, 1985), is utilised subsequently.

Rejection of the null in both these cases would lead to rejection of the RE estimator. The results of the Hausman specification tests and LM tests are summarised in Table 4 below.

Table 4: Pooled OLS Estimator: Diagnostic Results

Dependent variable (model)	Sample	Breusch-Pagan LM Test	Hausman Specification Test
Standard and Poor's	Mediterranean countries	36.75 **	8.87
	All countries	38.78 **	12.49
Moody's	Mediterranean countries	60.08 **	10.10
	All countries	68.17 **	14.23

Source: *Author computation from collected data (2018)*
Note: *χ^2 test statistics; ** represents statistical significance at the 1% level*

In both regressions, the LM test rejects the null and concludes that RE are more appropriate. This is evidence of significant differences across countries is

present, and therefore, we cannot run a simple OLS regression. However, this confirms only the F-test. To truly decide between an FE or RE estimator, a Hausman test is run with the null hypothesis that the preferred model is RE vs. the alternative, FE (Hausman 1978), as in (Greene 2008). This tests whether the unique errors (ui) are correlated with the regressors; the null hypothesis is that they are not. If the p-value is significant (for example <0.05), then FE will be utilised, otherwise, RE will be used. The RE model is the preferred model of the two since the Hausman test showed no correlation between the country-specific errors. The endogeneity does not appear to be a problem; hence, the RE model will be estimated.

The RE ordered probit and Poisson count model estimations for the two types of credit ratings assessed by different agencies are presented in Table 5. For comparison purposes, log-likelihood values from the ordinal probit and the Poisson specification are presented at the bottom of each table. Due to the ordinal nature of the dependent variable, the ordered probit model is the more appropriate model of the two, and the discussion of the results that follow support that presumption, although the value of the log-likelihood favours the Poisson model. Tables 5 and 6 report the estimated panel-level variance component that is labelled as sigma.

The full set of estimated threshold cut points (from 1–16, with two points missing due to the non-occurrence of some grades in the full range) is significant. That part of the results obtained using the two measures of credit rating separately are available upon request. It is omitted here in order to make this paper more readable.

When considering ordinal probit RE for S&P in the first Mediterranean data sample (Regression 1), evidence shows that the external tourism receipts in GDP and the percentage of tourism export in total export are statistically significant and have a negative impact on sovereign credit rating. A similar consideration from other regressions in Table 5 is deduced but without significance. However, in the case of the extended sample that includes the countries that most rely on their tourism industry (see in Table 6) the same result (Regression 5) is just opposite in the S&P dependent variable regression, but for the Moody's variable (regressions 7 and 8) the result is still negative and moreover significant. Also, the result is practically the same in the case of tourism export to GDP ratio variable (regression 1 and regression 5). The highlight summary is that the negative and significant signs of these determinants (in the majority of cases for both samples) are not in line with the presumed rationality presented in the short section about the economic intuition and hypotheses. These surprising results at first appear paradoxical. The tourism variables partially contribute to the growth of the aggregate economy and, according to the literature, a high growth rate indicates a country's ability to service its debt burden (Afonso 2003; Cantor and Packer 1996; Eliasson 2002; Afonso, Gomes and Rother 2011; Mellios and Paget-Blanc 2006; Rowland and Torres 2004; Rowland 2004), see in Pretorius and Botha (2016). However, in these considerations, previous authors neglect the relative capacity of the particular sector in the issue of settling debts. The dominance of tourism over other sectors is why the sign of the tourism growth variables is different from that expected and might be attributed to the focus on Mediterranean and other tourism dependant countries in both samples. However, dynamics such as the unequal growth capacity distribution in the economy, the vanishing middle class and the increase in low-wage earners that brings poverty and political instability may partly explain why the first hypothesis is not confirmed. The sectoral crowding out of other export sectors or potential growth incubators from the sclerotic economic structure in some countries included represents a missing variable in line with this observed result. Sometimes, a boom in an attractive resource (in both cases, with the basic ingredients of Mediterranean sun, sea, and cultural heritage or the far edge of the exotic culture and landscape) can have negative effects because inherited comparative advantage in the Ricardian manner naturally crowds out some economic activities, such as manufacturing, which have better prospects of managing unsettled debts.

The external tourism balance or net tourism deficit over GDP has a positive sign and is significant (in Regression 1-2 as well as in the Regressions 5, 7 and 8); this is in accordance with the hypothesis. Even large and leading countries in both samples (such as France, Spain, Italy or Mexico and Thailand) have a well-developed tourism industry, and its function of invisible export contributes substantially to creating a surplus in the services current account. That coefficient is significant when S&P is the dependent variable (regression 1-2), but when Moody's is the dependent variable in the extended data sample, the coefficient is significant only at the 10% level in the Poisson regression (reg. 8).

Furthermore, it is assessed whether it is possible to detect significant advantages or disadvantages for STCs by adopting a set of geographical dummies. When the performance of STCs is isolated, it can be seen that a country's small size clearly has a detrimental impact on sovereign rating (regressions 1–2 and regression 7). Undiversified economic structure seems to be even more key to understanding why STCs are

Table 5: Estimates of the panel data models (the Mediterranean sample) (Standard and Poor's and Moody's ratings: dependent variable)

Variable	Standard and Poor's		Moody's	
	Ordinal probit RE	Poisson RE	Ordinal probit RE	Poisson RE
	Reg 1	Reg 2	Reg 3	Reg4
(Intercept)	1.144 (1.730)	6.284 (1.359)***	0.566 (1.440)	5.566 (1.291)***
log(TR_GDPC)	-1.251 (0.339)***	-0.393 (0.276)	-0.496 (0.324)	-0.136 (0.261)
log(TD_GDPC)	0.907 (0.244)***	0.529 (0.175)**	0.400 (0.222)	0.310 (0.162)
log(TRX)	-1.035 (0.313)***	-1.284 (0.210)***	-0.285 (0.268)	-1.161 (0.201)***
dummy	-8.135 (2.369)***	-4.519 (1.343)***	-3.999 (2.122)	0.539 (1.239)
log(SD_TR)	0.106 (0.061)	0.005 (0.027)	0.088 (0.058)	0.024 (0.027)
log(SD_TRX)	0.027 (0.077)	-0.028 (0.030)	-0.139 (0.063)*	-0.059 (0.027)*
log(SD_TR)*dummy	0.472 (0.118)***	0.253 (0.063)***	0.243 (0.104)*	-0.001 (0.057)
log(SD_TRX)*dummy	-0.144 (0.126)	-0.022 (0.045)	0.060 (0.122)	0.044 (0.043)
Sigma	1.267 (0.187)***	1.610 (0.760)*	1.302 (0.183)***	1.655 (0.775)*
Log-Likelihood	-445.619	-537.681	-452.633	-530.964
Num. obs.	188	188	188	188

Source: *Author computation from collected data (2018)*
Note: ****, **,* represent statistical significance at the .1%, 1% and 5% levels*

not at an advantage compared to other countries in both samples that are more industrialised.

The lagged volatility controls the effect of volatility on sovereign credit rating, which can be negative as well as positive. The input variable is the standard deviation of per annum international tourism receipts (or tourism export as a percentage of GDP), which is an adopted measure of output volatility with the focus on tourism export gains in flows. It is negative if the quantity of a country's tourism receipts or tourism exports decrease within a short time because of a random shock in tourism demand. Otherwise, it can be positive if tourism increases unexpectedly. The estimate for the effect of the weight of the log of the tourism export in GDP as an output volatility coefficient is approximately -0.14 and -0.06 for Moody's rating (regressions 3 and 4, respectively), and -0.24 and -0.06 and 0.20 for both kinds of sovereign rating (regressions 5, 6 and 7) which is statistically significant at the 5% level. The estimated values imply that an increase of 10% in the standard deviation of the tourism export to GDP ratio is associated with a 6–24% probability of a downgrade in credit ratings in both samples on average. Otherwise, the alternative measure of volatility does not have a significant impact on credit rating in the Mediterranean data sample, but in table 6 (for the extended data sample) the Moody's rating obtained is evidence that more short-term volatility in tourism receipts over GDP has a detrimental impact on concurrent grading. Finally, this research tests whether the interaction of STCs with the volatility of tourism output alters the direction of the impact and become

Table 6: Estimates of the panel data models (the extended data sample) (Standard and Poor's and Moody's ratings: dependent variable)

Variable	Standard and Poor's		Moody's	
	Ordinal probit RE	Poisson RE	Ordinal probit RE	Poisson RE
	Reg 1	Reg 2	Reg 3	Reg4
(Intercept)	10.109 (1.124)***	2.843 (0.587)***	4.613 (1.102)***	3.566 (0.495)***
log (TR_GDPC)	1.546 (0.197)***	0.199 (0.130)	-1.463 (0.178)***	-0.267 (0.124)*
log (TD_GDPC)	0.747 (0.156)***	0.094 (0.087)	0.864 (0.150)***	0.133 (0.052)*
log (TRX)	-0.378 (0.123)**	0.121 (0.086)	-0.011 (0.120)	-0.134 (0.069)
log (SD_TR)	-0.066 (0.049)	-0.013 (0.018)	-0.175 (0.047)***	-0.059 (0.017)***
dummy	-2.626 (1.408)	-0.447 (0.644)	-3.348 (1.381)*	-1.038 (0.537)
SD_TRX	-0.241 (0.080)***	-0.064 (0.030)*	0.201 (0.081)*	0.029 (0.023)
log (SD_TR):dummy	-0.023 (0.072)	-0.014 (0.032)	0.157 (0.070)*	0.065 (0.026)*
dummy: SD_TRX	0.464 (0.087)***	0.062 (0.034)	-0.210 (0.123)<	-0.036 (0.025)
sigma	1.572 (0.107)***	8.929 (3.450)**	1.375 (0.112)***	9.009 (3.066)**
Log-Likelihood	-858.190	-964.999	-1074.176	-1262.001
Num. obs.	418	418	418	418

Source: *Author computation from collected data (2018)*
Note: ****, **,* represent statistical significance at the .1%, 1% and 5% levels*

a growth enhancing determinant of credit rating. Regressions 1–3 in the first country data sample and regressions 7-8 in the extended data sample, which interact the volatility of tourism receipts (or tourism export according to regression 5) to GDP with dummy variables, are significant at least at the 5% level. This and the positive value of related coefficients indicate that the specialisation of STCs in tourism generates a beneficial effect upgrading their credit rating over time when uncertainty concerning the uneven rise and fall in international receipts is included. This empirical finding shows that the sudden increase in the tourism recipes of STCs or the economic losses from the contraction of tourism activities should be outweighed by the direct gains from the tourism resource boom.

6. CONCLUSION

This research contributes to the literature by using available panel data for 10 Mediterranean countries, plus 12 selected ones, which, for the period 1997–2016, were the world's countries most dependant on the travel industry. It directly estimates the effect of international tourism flows i.e. earnings, net balance, tourism service export (all the variables in the analysis are transformed in order to express relative tourism importance) and its volatility on the credit rating alteration of a host country, thereby investigating the extent to which the tourism industry can assist a host economy to overcome a sovereign credit rating downturn or sustain an advancement in that direction. In contrast to previous and not-so-recent related research, the sovereign credit risk rating linked

to the tourism variables do not rely on wide panel macroeconomic data set tests, but use only descriptive institutional approach (Shareef 2003) or are relying on VARMA–(A)GARCH models dealing with two small island destinations and covering as such a limited geographical setting (Hoti, McAleer, and Shareef 2007). This paper used different estimation strategies to address concerns regarding the discrete risk rating determination, and the choice technique where the ordered response probit regression (supported by Poisson count regression).

The results in the Mediterranean sample show that an increase in tourism earnings - GDP ratio and share of tourism export in total export generally causes the Standard and Poor's credit rating to fall, whereas the Moody's rating does so only if the last determinant is taken into consideration. In the extended sample, the verification of the results assessment for the Moody's rating brought the same mutual inverse events direction in both mentioned covariates. The effect is essentially contemporaneous, meaning that an increase in relative tourism earnings and export in a certain year affect the credit rating in that year, shifting grades more to an undesirable and retrograde position. Thereby, the main results were contrary to the widely accepted view that tourism growth and country risk are positively related (at least for the circle of Mediterranean countries, but some suspicions in regard to the Standard and Poor rating still exist in the second extended sample). This does not contradict viewing and empirical studies investigating tourism growth and credit risk returns for Cyprus and Malta (ibidem) but does perhaps erase the concept that growth of tourism earnings or tourism export relative to specific weight of economy will attract more foreign investors, that one can hear here and there, and that are coming occasionally from political elites. The truth is just opposite; crowding out other sectors from the economy portfolio by forcing strong tourism development may bring internal disequilibrium that will repel investors in other promising sectors. The other findings further suggest that an increase in the volatility of tourism growth variable shall affect negatively Moody's credit rating in both samples. In the second extended sample the same finding is even more accentuated with the Standard and Poor's credit rating. In general, the indications based on this research should be read: the tourism industry does not always play the role of stubborn angelic guardian of a host country, but whimsical rating agencies, in small and vulnerable national economies often underestimate the country strength sourced from tourism.

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