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The Tourism in Latin America and Caribbean: a Panel VAR Evidence

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Abstract

In the late twentieth century, the increase in globalization was vital for the tourism industry. The tourism industry is commonly understood as essential for several economies. In this study, through a Panel Vector Autoregressive composed of 26 countries in Latin America and the Caribbean, there was a relationship between the Gross Domestic Product of tourism, the Gross Domestic Product, the decomposition of the KOF Globalization Index (social, economic, and political), public investment, the exchange rate, and the population. The time horizon for the empirical analysis comprises annual information from 1995 to 2015. The results show a bidirectional relationship between social globalization and public investment. In addition, evidence shows other important results: Gross Domestic Product and Gross Domestic Product of tourism, Gross Domestic Product of tourism and public investment, and Gross Domestic Product and public investment. The empirical results contribute to the discussions on tourism in Latin America and the Caribbean, providing a theoretical basis that contributes to the decision-making of public and private agents.

Keywords: *Tourism GDP; GDP; Latin America and the Caribbean; Globalization; Panel Vector Autoregressive.*

Introduction

Latin America and the Caribbean offer different types of tourism, beach, and sun, nature (Fuinhas et al., 2020), cultural (Voronkova, 2019), gastronomic, and religion (Belucio, Fuinhas, 2019; Wolf, 1954), among others. The region has two of the seven natural wonders of the world and three of the seven wonders of the modern world (Fuinhas et al., 2020). There are 36 crea-

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tive gastronomy cities worldwide (Forleo, Benedetto, 2020), and 12 are in Latin America and the Caribbean.

Tourism accounts for half of services exports in Latin America and the Caribbean and represents a significant gross domestic product (GDP) and employment (Mulder, 2020). Indeed, some economies depend directly on tourism. For example, in 2016, travel and tourism contributed more than 50% of the GDP of the top four countries on the World Travel and Tourism Council list (WTTC, 2016). As a result, it is common to find authorities guiding their economies to obtain more tourism revenue (Aydin, 2016). However, more recently, with the pandemic crisis caused by Covid-19, the tourism sector has had an unprecedented downturn. Furthermore, tourism in the region has almost reached a temporary standstill (Mulder, 2020).

The general objective of this study is, through historical data, to establish an empirical model with an autoregressive vector panel (PVAR) and point out the causal relationship between macroeconomic variables. This study will investigate the interactions and implications of tourism GDP with public investment, the exchange rate, and the decomposition of globalization, among other macroeconomic variables. Twenty-six Latin American and Caribbean countries were selected to accomplish the objective of this study: Antigua and Barbuda, Argentina, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Dominica, El Salvador, Grenada, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Suriname, Uruguay. The selection occurred by eliminating those who did not have or had missing data in the time series. The information used includes data between 1995 and 2015.

The findings point to a unidirectional and bidirectional relationship between the model's variables. Public policymakers, as well as tourism agents in Latin America, are beneficiated through empirical knowledge. After the first section (introduction), the research continues presenting the literature on tourism in Latin America and the Caribbean (second section). A third section describes the data obtained, their sources, and the choice of method of data analysis. Next, in the fourth section, we show the results and a discussion about the results. The last section reveals the conclusion and still indicates gaps that can be used in future studies.

Literature review

High tourism revenue can become a major budgetary factor and substitute other branches of economic activity (Kurmanaliyeva et al., 2014). The fact that the international tourism of a country depends on how competitive it is in relationship to others is widely recognized in the literature (Mendola, Volo, 2017; Andrades, Dimanche, 2017; Gomezelj, Mihalic, 2008; Ritchie, Crouch, 2005; Dwyer, Kim, 2003; Crouch, Ritchie, 1999). Gee et al. (1997) wrote about the magnitude of the sector in generating income, jobs, and the capacity to increase infrastructures in destination countries.

Ritchie and Crouch (2005) point out that the tourist destination, to be competitive, needs to bring more tourists and/or increase their expenditure, giving a great stay that will be forever remembered, profiting thereby, improving the well-being of locals and preserving the natural capital of the destination. However, Belucio and Fuinhas (2019), who studied religious tourism in Brazil, suggest that policymakers should use economic and climate data to benefit the country's religious residents and tourists.

Researchers do not cease their quest to understand the effects of tourism on the economy (Castilho et al., 2021; Croes et al., 2018; Chulaphan, Barahona, 2017). Fuinhas et al. (2020)

show that the impact of tourism on economic growth is an extensively explored theme in the economic growth literature. The literature has also addressed the causal relationship between tourism and economic growth in recent decades. There are four hypotheses of the relationship between economic growth led by tourism: (i) growth, (ii) conservation, (iii) feedback, and (iv) neutrality. However, conflicting evidence about this relationship was found (e.g., Tugcu, 2014; Aslan, 2013; Gunduz, Hatemi-J, 2005; Balaguer, Cantavella-Jordá, 2002). This issue may have occurred because different methodologies and time series were employed in each study (Dogru, Bulut, 2017).

According to *the hypothesis of growth driven by tourism*, tourism development leads to increased economic growth, suggesting that investment in the tourism sector may increase overall economic growth. This evidence can be found in Shahzad et al. (2017), Tugcu (2014), Cortes-Jimenez and Pulina (2010), Gunduz and Hatemi-J (2005), Dritsakis (2004), and Balaguer and Cantavella-Jordá (2002).

The conservation hypothesis states that economic growth leads to tourism development, pointing out that investment in other sectors of the economy generates positive externalities. Corroborating highlights are found in Aslan's studies (2013), Payne and Mervar (2010), and Oh (2005).

The feedback hypothesis says that economic growth and tourism development are interdependent and can serve as complementary, indicating that investment in other sectors of the economy leads to the development of tourism and investment in the tourism sector leads to increased economic growth (e.g., Perles-Ribes et al., 2017; Al-mulali et al., 2014; Lee, Chang, 2008; Demiröz, Ongan, 2005).

The hypothesis of neutrality suggests that there is no causal relationship between the development of tourism and the increase in economic growth, pointing out that policies and investments in tourism have little or no effect on increasing overall economic growth and investment in other sectors of the economy do not develop the tourism significantly (e.g., Tugcu, 2014; Aslan, 2013; Katircioglu, 2009).

The World Economic Forum (2017) points to Mexico as the country with the most competitive tourism sector in Latin America and the Caribbean, followed by Brazil and Panama. The countries occupy the 22nd, 27th, and 35th positions in the global ranking, respectively. Latin America is an important tourist destination, and Argentina and Brazil have stood out in hosting events (ICCA, 2017). In 2013 Brazil received the World Youth Day event organized by the Catholic Church, with more than 3 million national and international participants. The following year the country hosted the FIFA World Cup (FIFA), and in 2016 it hosted the Olympic Games.

It is commonly accepted that tourism is an essential driver of a nation's economic growth, especially in developing economies. This situation is because the tourist destination encourages public and private investment to attract more and more visitors. Table 1 presents the causal relationship between tourism and the growth hypothesis in Latin America.

As observed, most studies on the causality between tourism and growth in the Latin American context evidence the hypothesis of tourism's growth. Therefore, the next section will present the data and methodology of this article.

Table 1. *Tourism-Led Growth Hypothesis on Latin America and the Caribbean*

Authors (year)	Sample	Period in Study	Methodology	Causal Relationship
Fuinhas et al. (2020)	22 countries	1995-2014	PARDL	T → Y
Rivera (2017)	Ecuador	N/A	VECM and Granger	T ↔ Y
Shahzad et al. (2017)	México	1990–2015	QQ	T → Y
Apergis and Payne (2012)	Caribbean countries	1999–2004	PVECM	T ↔ Y
Amaghionyeodiwe (2012)	Jamaica	1970–2005	VECM e FEVD	T → Y
Lorde et al. (2011)	Barbados	1974–2004	ML and Granger	T ↔ Y
Brida et al. (2011ª)	Brazil	1965–2007	Dynamic panel data analysis	Neutral
Brida et al. (2011b)	Colombia	1990–2006	VECM and Granger	T ↔ Y
Schubert et al. (2011)	Antigua and Barbuda	1970–2008	VECM and Granger	T ↔ Y
Brida and Risso (2009)	Chile	1988–2008	VECM and Granger	T → Y
Croes and Vanegas (2008)	Nicaragua	1980–2004	VECM and Granger	T → Y
Brida et al. (2008ª)	Uruguay	1986–2006	VECM and Granger	T → Y
Brida et al. (2008b)	Mexico	1980–2007	VECM and Granger	T → Y

N/A: Not aplicable; T → Y: Evidence referring to the hypothesis of growth driven by tourism;
T ← Y: Evidence referring to the conservation hypothesis;
T ↔ Y: Evidence referring to the feedback hypothesis; Neutral: Evidence referring to the neutrality hypothesis.

Data and method

In this section, the data obtained on a reliable basis are presented. The econometric method presented is the one that best adapts to the nature of the variables and allows the execution of empirical and robust analysis.

Data

This study contains 26 Latin American and Caribbean countries, namely: (Antigua and Barbuda, Argentina, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Dominica, El Salvador, Grenada, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Suriname, Uruguay)

The time horizon used includes data between 1995 and 2015. Countries that did not have data for variables for some periods were eliminated from the study. Table 2 presents details of the variables and the descriptive statistics.

The variables highlighted in Table 2 were chosen given the impact each one suffers or causes on tourism GDP. Public Investment is a large and important component of Aggregate Demand, with Investment being a great engine of any economy and public budget given as a function of GDP.

The Exchange Rate defines the terms of trade of the Country's Balance of Payments, affecting the relative price of the products of each country. The exchange rate is closely linked to tourism GDP, representing the added value of the countries' tourism sector. Therefore, when working with GDP without Tourism GDP, this variable represents how the tourism sector relates to the rest of the domestic economy.

Table 2. *Data description and descriptive statistics*

Variables	Acronyms	Source	Obs	Mean	Std. Dev.	Min	Max
Social globalization	globs	A	546	60.9584	9.2340	33.0722	83.4463
Tourism GDP	lgdptur	B	546	2.5805	0.7618	0.6707	4.4231
GDP lessTourism GDP	lgdpst	B	546	23.0621	2.3306	19.2272	28.5942
Public Investment	llcinv	B	546	1.1341	3.3547	-4.6052	9.0584
Exchange rate	doer	C	546	295.2755	943.1178	0.4010	6424.3390
Political globalization	globp	A	546	56.3238	21.1910	11.9863	93.5160
Economic globalization	globe	A	546	54.6473	9.5964	27.2625	78.9477
Total population	lpopt	D	546	14.6600	2.3657	10.6664	19.1432

Notes: L denotes natural logarithm; A: KOF Swiss Economic Institute; B: World Travel and Tourism Council; C: International Monetary Fund, International Financial Statistics; and D: World Bank.

For Gygli et al. (2018), the decomposition of globalization is (i) Political Globalization -public policies that facilitate or hinder the transit of people are relevant to the analysis, and (ii) Economic Globalization -when globalization grows, companies' close international contracts and make more money by doing another type of service. This variable measures this factor; and (iii) Social globalization: This variable represents the greater traffic of ideas, information, and people between societies, that is, the impact of social connections in tourism.

Method

Love and Zicchino (2006) developed the methodology PVAR used in this article. This technique combines the traditional VAR approach, which treats all variables in the system as endogenous, with the panel-data approach that allows unobserved individual heterogeneity (Grossmann et al., 2014). The PVAR estimation is commonly found in the economic literature (Brana et al., 2012; Neves et al., 2018; Jawadi et al., 2016; Koengkan et al., 2017; Lin, Zhu, 2017). The specification of the equation for the first-order PVAR, according to Love and Zicchino (2006), can be seen in equation 1:

$$A_{it} = \Gamma_0 + \Gamma_1 z_{it-1} + fi + d_{c,t} + u_t$$

Where, A_t is a vector of variables in which all variables are stationary in first differences. Γ_o is the vector of constant, $\Gamma_1 z_{it-1}$ in equation designates the matrix polynomial, the fixed effects in the model f_i, the effects of time are represented for $d_{c,t}$, and the term of random errors u_t. Some procedures are required to perform a good estimation, details in Table 3:

Table 3. *PVAR Estimation*

VIF (Variance Inflation Factor) statistic
Hausman test
Lag-order selection test
PVAR model
Granger causality Wald test
Eigenvalue stability condition
IRF (impulse response function) test

Being that (i) allows to check of multicollinearity, (ii) reveals the existence of fixed or random effects, (iii) determines the number of lags to be used in the model, (iv) is the estimation, (v) indicates the amount of information that each variable contributes to the others, (vi) in a dynamic system is the output when the input signal is displayed, and (vii) calculates the time for the return of the exogenous shock response in each variable and graphically demonstrates the return of a variable to stability.

Results and discussion

This section presents the empirical results and the discussions regarding the results obtained. The first step in estimating the PVAR model was verifying the VIF statistic (Table 4). The results are on the benchmark of equal to or less than 10.

Table 4. *VIFstatistic*

	VIF	1/VIF
dlgdpst	1.19	0.842924
doer	1.15	0.872675
dllcinv	1.05	0.948596
dglobe	1.05	0.948848
dlgdptur	1.05	0.954862
dlpopt	1.03	0.969496
dglobp	1.02	0.977484
dglobs	N.A	N.A
Mean	1.08	

Note: "N.A" means not applicable

The Hausman test has a Prob>chi^2 of 0.0443, proving that the fixed effects are verifiable for at least one dependent variable combination. The *sigmamore* option of Stata 15 was used. More information about the Hausman test can be seen, e.g., Massardi (2016), which also found fixed effects for Brazilian municipalities.

Unit root and stationary tests are commonly used when working with data panels (e.g., Koengkan et al., 2017). However, Latin America and the Caribbean countries suffered several important shocks during the analyzed period, mainly the global economic crisis (e.g., Kouame, Reyes, 2011; Singer, 2009). Given the relatively short time horizon, the first- and second-generation tests do not capture the effects of a structural break and shocks, so we chose to verify only the stability of the model, which is presented at the most opportune moment in this article. The optimal order of lags of the model was performed using the *pvarsoc* option, with a maximum of 4 lags (see Table 5).

Table 5. *Lag order select*

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.63	230.22	0.03	-915.28	-153.78	-455.64
2	0.97	169.03	0.01	-594.64	-86.97	-288.21
3	1.00	60.00	0.62	-321.84	-68.00	-168.62
4	0.97	78139.30	0.00	77996.11	78091.30	78053.57

The test indicated the number of 1 lag as ideal for estimation (see MBIC, MAIC, and MQIC statistics that presented the lowest value for 1 lag). The lags represent a loss in the explanatory capacity of the model. Therefore, the fewer lags used, the more robust the results. The suggestion was followed, and the number was applied to the estimation. The GMM specification was used, show the results are presented in Table 6.

Table 6. *Results of PVAR*

		Response to						
			Coef.	Std. Err.	z	P>|z|	[95% Conf.Interval]	
Response of	dglobs	dglobs(-1)	0.038	0.052	0.730	0.464	-0.064	0.139
		dlgdptur(-1)	-0.341	0.511	-0.670	0.505	-1.343	0.661
		dlgdpst(-1)	2.569	0.781	3.290	0.001	1.038	4.100
		dllcinv(-1)	-2.729	0.296	-9.220	0.000	-3.309	-2.149
		doer(-1)	0.000	0.000	1.380	0.169	0.000	0.001
		dglobp(-1)	0.124	0.033	3.780	0.000	0.060	0.188
		dglobe(-1)	0.119	0.032	3.780	0.000	0.057	0.181
		dlpopt(-1)	0.255	24.044	0.010	0.992	-46.871	47.380
	dlgdptur	dglobs(-1)	-0.010	0.004	-2.940	0.003	-0.017	-0.003
		dlgdptur(-1)	0.473	0.081	5.820	0.000	0.314	0.632
		dlgdpst(-1)	0.250	0.060	4.190	0.000	0.133	0.367
		dllcinv(-1)	-0.077	0.025	-3.100	0.002	-0.126	-0.028
		doer(-1)	0.000	0.000	0.280	0.778	0.000	0.000
		dglobp(-1)	0.001	0.003	0.240	0.813	-0.005	0.006
		dglobe(-1)	0.001	0.002	0.380	0.703	-0.004	0.005
		dlpopt(-1)	11.247	2.002	5.620	0.000	7.324	15.170
	dlgdpst	dglobs(-1)	0.018	0.004	4.300	0.000	0.010	0.026
		dlgdptur(-1)	0.112	0.034	3.300	0.001	0.046	0.179
		dlgdpst(-1)	0.572	0.164	3.500	0.000	0.251	0.893
		dllcinv(-1)	0.277	0.030	9.100	0.000	0.217	0.336
		doer(-1)	0.000	0.000	2.890	0.004	0.000	0.000
		dglobp(-1)	0.020	0.003	6.240	0.000	0.014	0.026
		dglobe(-1)	0.019	0.004	5.490	0.000	0.013	0.026
		dlpopt(-1)	-34.265	3.295	-10.400	0.000	-40.723	-27.807
	dllcinv	dglobs(-1)	0.013	0.006	2.250	0.024	0.002	0.024
		dlgdptur(-1)	0.191	0.050	3.810	0.000	0.093	0.290
		dlgdpst(-1)	-0.460	0.088	-5.210	0.000	-0.634	-0.287
		dllcinv(-1)	0.242	0.040	6.000	0.000	0.163	0.321
		doer(-1)	0.000	0.000	-1.320	0.185	0.000	0.000
		dglobp(-1)	-0.011	0.003	-3.710	0.000	-0.016	-0.005
		dglobe(-1)	-0.004	0.003	-1.100	0.271	-0.010	0.003
		dlpopt(-1)	-7.079	2.926	-2.420	0.016	-12.813	-1.345

		Response to						
			Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Response of	doer	dglobs(-1)	-49.585	13.393	-3.700	0.000	-75.835	-23.335
		dlgdptur(-1)	-243.730	105.065	-2.320	0.020	-449.653	-37.806
		dlgdpst(-1)	-1886.691	561.532	-3.360	0.001	-2987.273	-786.109
		dllcinv(-1)	-916.855	98.779	-9.280	0.000	-1110.459	-723.252
		doer(-1)	-0.455	0.233	-1.950	0.051	-0.911	0.001
		dglobp(-1)	-59.647	9.337	-6.390	0.000	-77.946	-41.347
		dglobe(-1)	-51.065	11.654	-4.380	0.000	-73.907	-28.223
		dlpopt(-1)	114601.500	10351.850	11.070	0.000	94312.230	134890.700
	dglobp	dglobs(-1)	-0.225	0.064	-3.520	0.000	-0.350	-0.100
		dlgdptur(-1)	3.023	0.737	4.100	0.000	1.579	4.468
		dlgdpst(-1)	-8.925	2.871	-3.110	0.002	-14.551	-3.298
		dllcinv(-1)	-3.500	0.450	-7.770	0.000	-4.383	-2.618
		doer(-1)	-0.005	0.001	-4.050	0.000	-0.007	-0.002
		dglobp(-1)	-0.170	0.047	-3.580	0.000	-0.263	-0.077
		dglobe(-1)	-0.153	0.052	-2.940	0.003	-0.255	-0.051
		dlpopt(-1)	526.668	47.636	11.060	0.000	433.304	620.033
	dglobe	dglobs(-1)	-0.251	0.095	-2.630	0.009	-0.438	-0.064
		dlgdptur(-1)	-3.639	0.919	-3.960	0.000	-5.439	-1.838
		dlgdpst(-1)	-13.276	4.042	-3.280	0.001	-21.199	-5.353
		dllcinv(-1)	-7.114	0.764	-9.310	0.000	-8.612	-5.616
		doer(-1)	-0.006	0.002	-3.740	0.000	-0.009	-0.003
		dglobp(-1)	-0.377	0.071	-5.300	0.000	-0.516	-0.237
		dglobe(-1)	-0.228	0.088	-2.580	0.010	-0.402	-0.055
		dlpopt(-1)	905.194	72.413	12.500	0.000	763.267	1047.121
	dlpopt	dglobs(-1)	0.000	0.000	0.200	0.838	0.000	0.000
		dlgdptur(-1)	-0.003	0.000	-9.530	0.000	-0.004	-0.002
		dlgdpst(-1)	-0.003	0.001	-5.160	0.000	-0.004	-0.002
		dllcinv(-1)	0.001	0.000	9.270	0.000	0.001	0.002
		doer(-1)	0.000	0.000	-2.140	0.032	0.000	0.000
		dglobp(-1)	0.000	0.000	-3.940	0.000	0.000	0.000
		dglobe(-1)	0.000	0.000	-1.510	0.130	0.000	0.000
		dlpopt(-1)	0.928	0.011	84.890	0.000	0.907	0.950

It is important to emphasize the existence of a negative sign in the relationship between public investment and tourism GDP, which suggests that Latin American and Caribbean countries are not reaching public investments related to tourism. However, that does not mean tourism in those countries does not grow. On the contrary, our results still show that tourism GDP has a positive signal on public investment. What the government invests is justified by what it collects from the tourism sector.

Latin America and the Caribbean strongly relate to rich countries (where much of their income comes from). However, they suffer from various impositions, which, together with internal mismanagement, make it almost impossible to distribute income among the popula-

tion and sectors of the economy. The islands' population depends more on the tourism sector. Other countries like Brazil and Mexico have a very diversified economies. This situation does not mean South, Central America, and Caribbean countries can neglect the tourism sector.

It is important to take advantage of the ease of establishing contacts that globalization has brought and ask for support from other countries with more know-how in the tourism sector. No country wants to depend exclusively on one sector, especially poor (or developing) countries that suffer from high levels of corruption. At the same time, the inspiration for projects, laws, and partnerships in Latin American and Caribbean countries could look to Spain and Portugal because the two Europeans have much to offer regarding tourism and have the vantage of proximity due to the cultural matrix.

In sequence, we present the Granger causality Wald test. The test has two hypotheses. If the null hypothesis is not excluded, the variable does not Granger cause the variable. The Wald test of Granger causality results is presented in Table 7.

Table 7. *Granger causality results*

Equation\Excluded	chi2	df	Prob>Chi2	Equation\Excluded	chi2	df	Prob>Chi2
dglobs				doer			
dlgdptur	0.445	1	0.505	dglobs	13.707	1	0.000
dlgdpst	10.817	1	0.001	dlgdptur	5.381	1	0.020
dllcinv	84.920	1	0.000	dlgdpst	11.289	1	0.001
doer	1.892	1	0.169	dllcinv	86.153	1	0.000
dglobp	14.304	1	0.000	dglobp	40.812	1	0.000
dglobe	14.281	1	0.000	dglobe	19.199	1	0.000
dlpopt	0.000	1	0.992	dlpopt	122.559	1	0.000
ALL	129.665	7	0.000	ALL	238.711	7	0.000
dlgdptur				dglobp			
dglobs	8.655	1	0.003	dglobs	12.417	1	0.000
dlgdpst	17.578	1	0.000	dlgdptur	16.827	1	0.000
dllcinv	9.605	1	0.002	dlgdpst	9.664	1	0.002
doer	0.080	1	0.778	dllcinv	60.415	1	0.000
dglobp	0.056	1	0.813	doer	16.405	1	0.000
dglobe	0.145	1	0.703	dglobe	8.663	1	0.003
dlpopt	31.577	1	0.000	dlpopt	122.238	1	0.000
ALL	58.336	7	0.000	ALL	187.193	7	0.000
dlgdpst				dglobe			
dglobs	18.480	1	0.000	dglobs	6.891	1	0.009
dlgdptur	10.895	1	0.001	dlgdptur	15.687	1	0.000
dllcinv	82.774	1	0.000	dlgdpst	10.786	1	0.001
doer	8.371	1	0.004	dllcinv	86.648	1	0.000
dglobp	38.918	1	0.000	doer	14.019	1	0.000
dglobe	30.179	1	0.000	dglobp	28.069	1	0.000
dlpopt	108.148	1	0.000	dlpopt	156.260	1	0.000

Equation\Excluded	chi2	df	Prob>Chi2	Equation\Excluded	chi2	df	Prob>Chi2
ALL	227.189	7	0.000	ALL	231.811	7	0.000
dllcinv				dlpopt			
dglobs	5.069	1	0.024	dglobs	0.042	1	0.838
dlgdptur	14.501	1	0.000	dlgdptur	90.760	1	0.000
dlgdpst	27.136	1	0.000	dlgdpst	26.597	1	0.000
doer	1.755	1	0.185	dllcinv	86.017	1	0.000
dglobp	13.753	1	0.000	doer	4.596	1	0.032
dglobe	1.211	1	0.271	dglobp	15.547	1	0.000
dlpopt	5.855	1	0.016	dglobe	2.290	1	0.130
ALL	87.005	7	0.000	ALL	139.834	7	0.000

The model is accepted as endogenous with a statistical probability of 1%. In sum, most variables have a causal relationship of 1%. Three variables have results that deserve further discussion. First, GDPST bidirectionally causes GDPTUR. The wealth of Latin American countries generates tourism attractiveness, thus benefiting the tourism sector. This result goes against the literature, e.g., Apergis and Payne (2012), that shows the same tourism-led growth hypothesis for a set of countries Caribbean. Second, the relationships between GDPTUR and CINV are bidirectionally, so all the wealth that the tourism sector generates becomes more investments in the country. It is up to the decision-makers and regulators to properly apply these investments so that the wealth of tourism will effectively contribute to economic growth. Third, GDPST also has a two-way causal relationship to investment, so what the nation generates (wealth) becomes a public investment that may return and generate more wealth. In addition to private and international investment. Therefore, the economies have good prospects for growth.

The curse of resources must be remembered, and diversification strategies may be the best alternative for poor and developing countries. However, in these economies, it is common to find antagonists such as corruption, drug trafficking, or lack of security, which is not good for the image of the tourist destination, and tourists are very concerned about their security (Liu, Pratt, 2017).

Social globalization has a unidirectional causal relationship with tourism GDP. It reaffirms that Latin America and the Caribbean countries need to develop further connections to increase the gains from tourism. It is up to the public agents to establish measures and regulations that facilitate and increase the publicity of the destinations internationally.

Generally, the exchange rate does not influence tourism GDP since it is based on the consumption of goods and services within the country with local currency. The consumption decision of foreigners (from rich countries in Europe, Asia, and North America) is generally not influenced by the exchange rate variation of Latin American countries.

When discussing globalization, tourism is considered an activity of absolute importance for developing countries since it is a way for foreign capital to enter these countries and create jobs. In addition, tourism brings stability to the local population of regions where tourism is attractive. Therefore, it is important to note that international measures to support globalization can benefit the destination. However, suppose these measures are not applied correctly by local agents. In that case, there will be imbalances in the native population since the sector cannot absorb the totality of the local labor force. Further details of causal relationships can be observed through the summary flow in Figure 1.

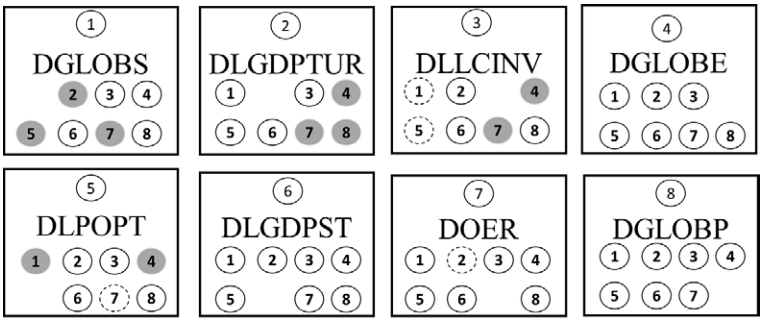
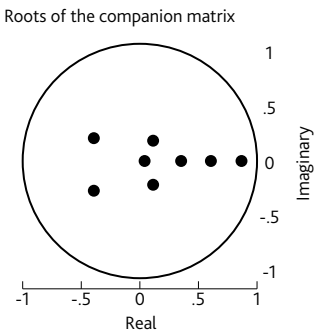


Figure 1. Resume of results

Note: The circles above the variables represent a number assigned to each variable; the filled circles represent the variables that have no causal relationship; circles with dotted lines represent variables with a causal relationship of 5% or 10%; the complete circles represent the variables with a causal relationship of 1%.

It is necessary to verify the stability of the model to validate the estimated results. Stability implies stationarity, being possible through two forms: a graph and/or the results of the Eigenvalue stability condition (see Table 8).

Table 8. *Graphical and Eigenvalue stability condition*



Real	Imaginary	Modulus
0.8377	0.8377	0.8377
0.5966	0.5966	0.5966
-0.3481	-0.3481	-0.3481
-0.3481	-0.3481	-0.3481
0.3550	0.3550	0.3550
0.1215	0.1215	0.1215
0.1215	0.1215	0.1215
0.0633	0.0633	0.0633

Graphically all values are within the circle, and since the results are less than 1, we assume that the model is stationary or stable, thus possessing the ability to explain.

Figure 2 (in the Appendix) shows that the impulse-response functions show all variables converging to return to zero. After a certain period, the variables likely return to equilibrium through a harmonic motion. In figure 2, most variables return to the stability point (up to five years) after a shock. Only shocks caused by the population in the economy are the ones that take the longest to return to equilibrium since the population size defines the size of the labor market and, consequently, a relevant part of the GDP size in the medium run.

Conclusions

Tourism in Latin America and the Caribbean is a complex phenomenon that involves close interaction with several variables. Among those variables is the interaction with GDP, public investment, and globalization (economic, social, and political). Globalization is one of the most influential variables in countries' economic, social, and political environments. So, it was

expected to exert a strong impact on societies. Therefore, policymakers should be aware of this international trend and implement measures that take advantage of this endogeneity to improve people's social and economic well-being. In this article, a Panel VAR was executed for 26 Latin American and Caribbean countries to explore these complexities. The data includes annual information from 1995 to 2015, the maximum period with information available for globalization and tourism GDP variables. Furthermore, the Granger causality test was applied to an endogenous and cointegrated model.

Our results show a causal relationship between tourism GDP and public investment. Moreover, this relationship is bidirectional - the tourism GDP causes public investment and vice versa. The fact is that Latin American and Caribbean countries also depend on the wealth of this sector to develop in economic, social, and political aspects.

Globalization is fundamental for establishing international relationships between the economies of Latin America and the Caribbean, and other continents. Maintaining good political relationships with rich countries collaborates to establish agreements encouraging tourism and publicity. Another result of this study is that the GDP, without the tourism sector's contribution, has a bidirectional relationship with public investment. The public investment possibly will return to generate wealth. Therefore, in addition to private and international investment, the economies have good prospects for growth.

This study can substantiate important policy implications to allow economic agents to make their decisions rationally. First, the results indicate that companies from sectors dependent on public investment benefit from the growth of GDPTUR, given bidirectional causality. The government, in turn, must keep in mind that pro-tourism policies, i.e., the ones that increase the level of globalization measured by the KOF Index, will increase tax revenue and GDP.

It is clear from the bidirectional relationship between GDPTUR and GDPST as tourism-led growth is a dynamic of economic growth observable in Latin America and the Caribbean. Therefore, policymakers must consider this when seeking to increase GDP growth.

This article presents important information to public policymakers and tourism agents in Latin America and the Caribbean. The development of sound public regulation can generate economic growth and benefits for tourism agents, which is reflected in improvements for the population.

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APPENDIX

Figure 2. Impulse: Response