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Long run economic growth and tourism: inferring from Uruguay[*]

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Abstract

Argentina is the principal source of tourism in Uruguay. This paper analyzes the effects in the long run of tourism from Argentina on the economic growth of Uruguay. Using quarterly data from 1987.I to 2006.IV, the study uses co-integration analysis and shows the existence of one cointegrated vector among Uruguayan real per capita GDP, Argentinean tourism expenditure, and real exchange rate between Uruguay and Argentina, and tests that the causality relationship positively goes in one way from Argentinean tourism expenditure to real per capita GDP of Uruguay.

Keywords: economic growth; tourism earnings; Johansen cointegration test; Granger causality.

JEL Classification: C22, E01, F43, L83, O54

Introduction

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Tourism is a very important factor in the economic activity of a country, with its significant multiplying effects. Tourism is considered as an important source of foreign exchange earnings, employment of domestic labour and a source of growth for a country.

Many governments nowadays recognize the important role of tourism in both economic growth and social progress, and this is why they try to exploit their tourism potential. While in 1950 international tourism generated revenues for US$ 2,1 billion, in 2004 this digit has risen to US$ 622,7 billion.

Part of the literature considers exports as the engine for the economic growth, and there is a growing attention to non-tradable goods such as tourism.

Under the assumption of exports as the engine for economic growth there are several factors that can explain the contribution of tourism on economic growth in the long run. It can be argued that tourism brings currency that in turn can be used to import capital goods, and the greater the proportion of investment ploughed back into the capital goods sector, the faster the output grows in the long run (see Mckinnon, 1964).

On the other side, international tourism generates income increasing efficiency through a bigger competition among local firms and their international competitors (see Bhagwati y Srinivasan, 1979 and Krueger, 1980), facilitating the exploitation of economies of scale both at a local and international level (Helpman y Krugman, 1985).

Hazari and Sgro (1995 and 2004) develop a dynamic model in a small open economy and demonstrate that tourism demand has a positive effect on the long run growth rate and tourism act as time-saving device for domestic population. That is to say that tourism stimulates domestic population to consume today instead of consuming in the future owing to a low inter-temporal interest rate on saving.

Some recent studies focused on the contribution of tourism to the economic growth of a country.

Among these studies we can quote the following: Balaguer y Cantavella (2002), for the Spanish case, Armellini and Revertía (2003) as far the Uruguay in the period between 1996 and 2002 is concerned; Dritsakis (2004) proposes a methodology for studying the case of Greece; Cortés-Jiménez and Pulina (2006) focusing on the comparison between Spain and Italy; Louca (2006) analyzes tourism in Cyprus.

The tourism industry has become a key sector in the Uruguayan economy, both as a factor of creation of employment and added value. According to the Using data from the WTO statistic database, for the period 1988-2007, the Tourism and Travel activity showed an annual average contribution of 3.5% as percentage of GDP (considering the direct impact) and 8.65% (when considering the direct and indirect impact). In the 90's the tourism industry generated revenues equal to the one created by the traditional exports sector and it represented between 20% - 30% of the value of total exports and the 3% of the GDP.

Uruguay is the South America's smallest country. Situated between Brazil and Argentina, Uruguay is a country of European immigrants, and it is much more similar to European than Latin-American countries. It has the lowest poverty level and the highest life expectancy in Latin America. Uruguay is recognized for its economic, political and social stability, its democratic tradition and high level of safety and these are the main reasons why rich Latin-Americans prefer to have holidays in this country. Located in the temperate zone of the tropic of Capricorn, Uruguay boasts warm summers and crisp winters, with no extreme temperatures. The main tourism destination of Uruguay is Punta del Este, a world-class beach resort that has been the playground of rich Argentineans for years. Punta del Este welcomes all the important people from Argentina: movie and TV celebrities, as well as businessmen, cultural representatives, and politicians. Argentines account for the majority of arrivals in Uruguay. As a result, incoming tourism is highly dependent on Argentina. In 2005 about 85

percent of the 2 million tourists were from Argentina; an additional 10 percent were from Brazil, and smaller percentages came from Paraguay and Chile[2]. Many of the visitors from Argentina owned property in Uruguay, especially in the resort area of Punta del Este, which drew a big portion of all summer tourists. This particularity of tourism of second homes, transforms Punta del Este in a city of less than 150,000 inhabitants during winter, into a population of more than 1 million. In this sense, Punta del Este can be considered as a unique example in Latin America of a tourism destination almost only of second homes tourists.

As mentioned, the principal country of origin of tourism in Uruguay is Argentina. It counts for more than the 70% of total tourists' arrivals and more than 60% of the total expenditure made by tourists (see Figure 1). It is mainly a second home market. This percentage is due to many reasons. First, Argentina and Uruguay are the most similar countries in the region, presenting a linked history. Secondly, tourism presents a strong seasonality presenting high peaks in the summer (see Figure 1) and the Uruguayan beaches are the nearest to Argentina and they are more attractive. The country has more than 500 kms of beaches close to Buenos Aires in contrast to Argentina where beaches are far from the capital. Third, Tourism is mostly regional because of the long distance from Europe and the United States and its difficulty to be reached, lack of services required by international tourists (like five-star hotels), lack of promotion, restrictive transportation policies (no charter flights to Uruguay).

Notwithstanding some events relative to the economic trend that caused a decline in the affluence of tourists from the principal country of origin (Argentina), tourism keeps its importance as for the creation of added value and as engine for growth.

[2] Protests that blocked roads and bridges connecting Uruguay and Argentina had a significant impact on Argentine arrivals, which were down significantly in the first quarter of 2006, compared with the same period in 2005. However, Brazilian arrivals grew tremendously between 2003 and 2006. This is because the strong "*real*" has made Uruguay a less expensive destination for travel than within Brazil.

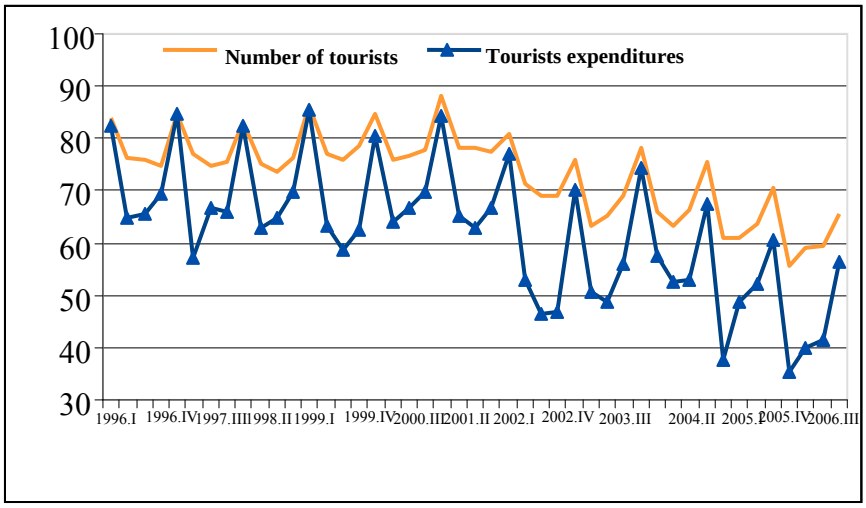


Figure 1. Argentinean tourism participation in Uruguay during the last decade (number of tourists and their expenditures). Source: database (Central Bank of Uruguay) BCU, Ministry of Tourism and National Direction of Migrations (Uruguay). It excludes Uruguayans residents in the outside.

Since 2002 Argentinean economy suffered a deep crisis associated to the macro-devaluation in 2001, and tourism from Argentina quite declined. Despite in 2003 Argentinean economy started its recovery; tourism was again affected by conjuncture occurrences (that to this date are still not over) that determined a cutting at the bridges between Uruguay and Argentina. The events reflect in both series of the analyzed decade as it is shown in Figure 1.

During this period, the level of relative prices (which is an important variable in determining tourists' affluence) suffered from the macro-devaluation of Argentina, notwithstanding the Uruguayan devaluation, thus determining a change of level of the real exchange rate with respect to the 90's (see Figure 2).

In Argentina, monetary politics decided for an intervention in the exchange rate market and for controlling internal prices which caused a "competitive" real exchange rate, which did not reflect the real fundamentals of the economy. Hopefully, in the medium and long run, the value of the

Argentinean currency will turn back to reflect the internal fundamental of the economy.

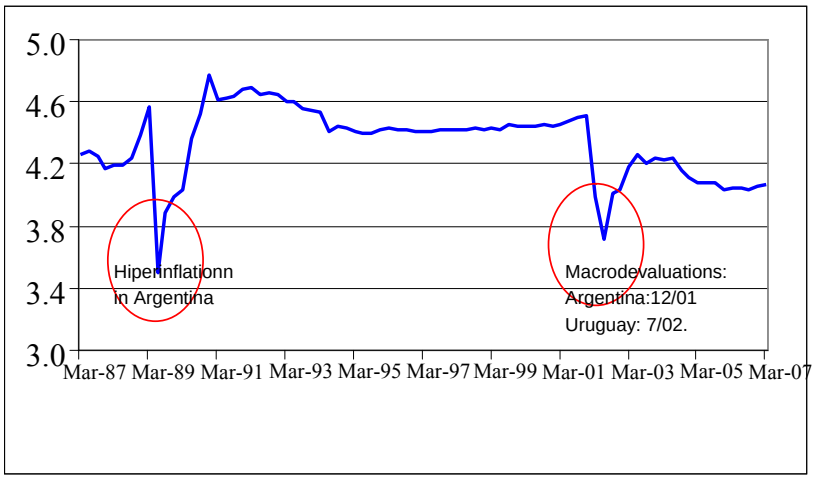


Figure 2. Real bilateral exchange rate between Uruguay and Argentina (RERA) (in logarithms) Source: Reprocessing databases BCU and Argentinean Ministry of Economy (MECON).

Several studies analyzed different themes on tourism in Uruguay. Some of them focus on the determinants of the demand for tourism, that is to say they investigate on the factors that influence the number of arrivals into the country. Among them Mantero et al. (2004), use cointegration technique with monthly data in Uruguay. They estimate two kinds of models: one with aggregate data and the other considering the nationality of tourists. The second model, with the dis-aggregation by nationality, provides more relevant information to understand the past evolution of global tourism and a better statistical approximation for the number of total tourists. The determinants of the tourism revenues vary owing to the country of origin, reflecting tourists' behaviour heterogeneity.

Robano (2000) analyzes the determinants of tourist's expenditure using cointegration technique with quarterly data between 1987 and 2000. She proves the existence of a long run relationship between tourism services exports and the Argentinean consumption and the relative prices between Argentina and Uruguay.

Armellini and Revertía (2003) concentrate on the contribution of tourism to the added value, to the employment and to the level of salaries during the period between 1996 and 2002. Using national accounting they stress the importance of tourism for Uruguay.

The purpose of this study is determining the importance, in the long run, of the tourism sector in the economic growth of Uruguay, using quarterly data series that covers two decades: from the first quarter of 1987, until the fourth quarter of 2006. It focuses on tourism coming from Argentina which is the principal country of origin for tourism in Uruguay. This paper uses cointegration technique developed by Johansen (1988), and estimates the model with Error Correction Mechanism Autoregressive Vectors. These techniques allow determining the long run equilibrium relationship among the variables considered and model the long/short run dynamics that link the variables.
Moreover it studies the Granger causality between tourism expenditure made by the Argentineans and the long run growth of the Uruguayan economy.

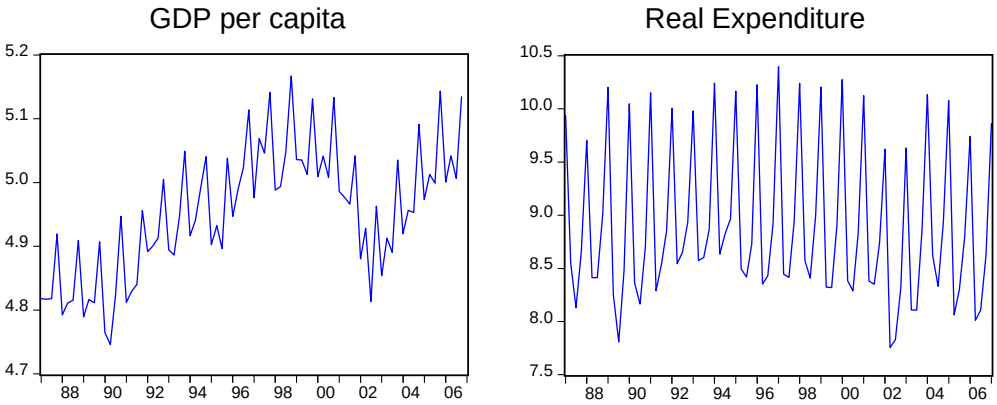
The remainder of the paper is organized as follows. The next section presents the data and the empirical evidence. Section 3 concludes. The Appendix provides a complete overview the empirical results.

Empirical Evidence

The empirics of this paper consider quarterly data temporal series that start from the first quarter of 1987, until the fourth quarter of 2006. Firstly, in order to obtain the series relative to the GDP per capita we considered the Index of Physical Volume provided by the BCU as a measure of the Domestic Product and the numbers of the employed people in the Urban

Zone of the Permanent Households Survey ("Encuesta Continua de Hogares" ECH) provided by the National Institute of Statistics. Indeed we looked at the total expenses of the Argentinean tourists in thousands of current value dollars multiplied by the nominal average exchange rate, after divided by the quarterly Consumption Price Index (CPI). In this way we obtain a constant series from the first quarter of 1996 until the fourth quarter of 2006. In order to enlarge the series period till 1987 we added the rate of growth of the Real Expenditure in tourism at constant prices of 1997. These data were provided by the BCU and the Ministry of Tourism.

As we can see from Figure 3, both GDP per capita and Real Expenditure (RE) seem to present seasonality, presenting high peaks in summer.



Another problem is the non stationarity. A non stationary series is said to be integrated, with the order of integration being the number of times the series needs to be differentiated before becoming stationary. GDP per capita, RE and the real exchange rate between Uruguay and Argentina (RERA) seem to present this problem.

Looking for relationship among temporal series occasionally introduce a problem in econometrics called spurious regressions. This comes about when the temporal series are not stationary, as it often happens with the economic series. Usually the OLS parameters estimates are significant and the R^2 is high, but the residual of the regression behaves as a no stationary series, not respecting the classical assumptions. Phillips (1986) pointed out

this problem. In this case cointegration technique must be applied. The only case when such a regression does not yield a spurious relationship is when the series are cointegrated. As a first step it needs to be identified the order of integration of the series. There are several Unitary Roots tests: here we will implement the Augmented Dickey-Fuller test (ADF) and the KPSS test. We select these specific tests because they use two opposite Null Hypothesis; in this way there is a double check on the order of integration of the series. In the ADF test case the Null Hypothesis is that the process is integrated of order one I(1) and we accept this Hypothesis unless there is strong evidence against it. In the KPSS case the Null Hypothesis is the stationarity of the series. This double method can be particularly useful when there processes close to the unit root. In this way a stationary process declines the Null Hypothesis in the ADF test case, but accepts the Null Hypothesis in the KPSS test case. Tables 1 and 2 show the Unitary Roots tests results for the logarithms of the variable both in levels and in differences.

Variables	GDP per capita		RE		RERA	
Unit Root Tests	ADF	KPSS	ADF	KPSS	ADF	KPSS
Constant and Trend	-2.04	0.21*	-3.73*	0.13	-3.48*	0.19*
Constant	-1.75	0.73*	-3.42*	0.20	-3.15*	0.39
No Constant, No Trend	0.85		-0.25		-0.31	
* Rejection of the null hypothesis at 5%. Source: Own calculations.						

Table 1. Unitary roots results : Levels

Variables	Δ (GDP per capita)		Δ (RE)		Δ (RERA)	
Unit Root Tests	ADF	KPSS	ADF	KPSS	ADF	KPSS
Constant and Trend	-3.76*	0.09	-5.18*	0.08	-10.57*	0.04
Constant	-3.76*	0.09	-5.21*	0.16	-10.61*	0.08
No Constant, No trend	-3.63*		-5.24*		-10.68*	
* Rejection of the null hypothesis at 5%. Source: Own calculations.						

Table 2. Unitary roots results: primary difference

Owing to the tests, the series are integrated processes of order 1. The real expenditure variable could be considered stationary, because the unitary roots is not refused if not in the model without constant and trend, but this does not represent any problem for a relation of cointegration because there more than two variables. One of the methods for checking for a relationship of cointegration is the one proposed by Engle y Granger (1987); this method assumes the existence of just one relationship of cointegration. A more general method is the one proposed by Johansen (1988), Johansen and Juselius, (1990) that check for all the possible cointegration relationships.

Cointegration implies that deviations from the equilibrium are stationary, with finite variance (a linear combination of two or more series is integrated of a lower order).

Thus an Error Correction Mechanism Model in primary differences can be presented as in equation (1):

$$\Delta Y_t = \mu + \Pi Y_{t-1} + \sum_{i=1}^{i=k-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t \qquad (1)$$

Where

- *Y=(GDP per capita, RE, RERA)*
- μ= constant variables vector
- Π= matrix with info on the long run relationships among the Y variables
- The rank of Π = number of stationary and linearly independent combinations among the Y variables.

Banerjee et. al. (1993) point out the connection between a cointegration relationship and the correspondent long run relationship. Looking for a cointegration relationship means looking for a statistical equilibrium among variables that tend to grow over time.

Everything that diverges away from the equilibrium can be modelled by the Error Correction Vector that shows how the variables go back to the equilibrium after a shock. As a result of the estimates the GDP per capita

was corrected for the seasonality specifically in the second quarter of 1989 and in the first and second quarter of 2002.

Trend assumption:		Linear deterministic trend		
Series:	GDP per capita, RE, RERA			
Unrestricted Cointegration Rank Test (Trace)				
No. of CE(s) Hyp.	Eigenvalue	Trace Statistic	Critical Value	Prob.
None*	0,637	84.03	29.797	0.000
At most 1	0,155	12.00	15.495	0.157
At most 2	0,000	0.015	3.841	0.903
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
No. of CE(s) Hyp.	Eigenvalue	Max-Eigen Statistic	Critical Value	Prob.
None*	0.637	72.029	21.132	0.000
At most 1	0.155	11.986	14.265	0.111
At most 2	0.000	0.015	3.841	0.903
Trace test and Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				

Table 3. Cointegration with no restrictions, Rank Test.

The Johansen Maximum likelihood procedure takes into accounts two different tests in order to determine the number of equations of cointegration; as we can see from Table 3 both tests prove the existence of a cointegration vector. The following equation shows the long-run cointegration relationship.

$$(GDP\ per\ capita) = 3.045 + 0.467(RE) - 0.513(RERA) \qquad (2)$$
$$[-3.745] \qquad [5.456]$$

To notice in equation (2) that in the long run the real expenditure variable is positively related with the GDP per capita while the real exchange rate is negatively related.

The existence of a cointegration vector does not give any information on the causality relationship among the variables, or on which variables could be considered as exogenous. For inference purposes it is important to understand what are the variables that at least can be considered weakly exogenous to the model.

McCallum (1984), gives an example of the importance of studying exogeneity, stressing the possibility of arriving at wrong conclusions when the causal relationship is not well established. The existence of weak exogeneity allows using the estimated equations without the need to model the variables in the model.

In this case just the real expenditure variable results to be weakly exogenous, which is an important result for the purpose of this study in checking the effects of the real expenditure made by Argentinean tourists on the economic growth of the country.

Cointegration Restrictions:	
B(1,1)=1, A(2,1)=0	
LR test for binding restrictions (rank = 1)	
Chi2(1):	1,808748
Probability:	0,178658

Table 4. Weak Exogeneity of Real Expenditure

Equation (3) shows the cointegrating relationship considering the exogeneity.

$$(GDP\,per\,capita) = 3.317 + 0.421(RE) - 0.482(RERA) \qquad (3)$$
$$[-3.743] \qquad [5.125]$$

We also tested the Granger causality. Table 5 shows the cointegration relationship after the weak exogeneity test, and table 6 shows the Granger causality in the long run among the variables.

Null Hypothesis	**F-statistic**	**Probability**
RE does not cause GDP per capita	4.31006	0.000*
GDP per capita does not cause RE	1.48464	0.184
RERA does not cause GDP per capita	1.07597	0.393
GDP per capita does not cause RERA	0.77272	0.628
RERA does not cause RE	1.49464	0.180
Real Expenditure does not cause RERA	1.08133	0.389
* Denotes rejection of the hypothesis at the 0.05 level. Source: Own calculations		

Table 5. Granger Causality Test (LR)

Equation (2) shows the long run equilibrium or the cointegration relationship after checking for weak exogeneity of Real Expenditure. Note that the elasticity of the GDP per capita with respect to the real expenditure is of 0.42 percentage points. That means that an increase of 100% of the real expenditure produces an increase of 42% of the GDP per capita, in the long run. Balaguer and Cantavella (2002) found that the elasticity is 0.30 in the Spanish case and Dritsakis (2004) obtain a 0.31 for the Greek case. Kim et al. (2005) found that a %5 increase in tourism arrivals leads to 0.1% increase in GDP of Taiwan. Such et al. (2009) estimate this elasticity in 0.51 for Colombia and Brida et al. (2008a) found 0.69 for the Mexican case. Comparing the results, Uruguay is in the average among these countries. It presents elasticity less than the other Latin-American countries but a bit smaller than countries such as Greece and Spain. It suggests that Greece and Spain have arrived to the frontier and the impact of the expenditure is not so high. However, countries such as Mexico and Colombia still have potential and the impact of the RE is larger. This is also supported by the results in Brida et al (2008b). In this papers we show that countries like Spain and France present high tourism sector's contribution to GDP (about 7%) but

low contribution of tourism to the economy's performance in terms of growth of the GDP (in particular with negative contribution). By the contrary, we also show that countries like Colombia and Uruguay present a very small weight of tourism on GDP (about 1,5%) but a positive and increasing contribution of tourism to the growth of GDP.

Note that the fact that the share of GDP generate by tourism (i.e., T/GDP where T is the potion of GDP generated by the tourist sector) is low do not contradicts the fact that the elasticity *E* of GDP with respect to tourism can be high. The reason for why this is not a contradiction is that *E* is the product of two factors: the ratio *T/GDP* and the derivative *dGDP/dT*:

$$E = \frac{\partial GDP}{\partial T}\frac{T}{GDP}$$

and then a low share T/GDP can be compensated by a high *dGDP/dT* to produce a high value of *E*. Then when T/GDP is low and *E* is high, an increment of one unit in T can produce a high impact on the growth of GDP. This can be the case of Uruguay.

The real expenditure variable is weakly exogenous and in the long run impacts "a la Granger" the GDP per capita.
Moreover, we checked the response over time of the GDP per capita after a shock of the real expenditure, and the real exchange rate.
As can be observed in Figure 4 a shock of the real expenditure of tourists provokes a positive response on the GDP per capita, and it takes about 15 periods to absorb de whole impact. Meanwhile, a shock on the relative prices causes an inverted *J* curve, with an initial negative impact for the first quarter, followed by a positive effect for two quarters, and then a long run negative effect.

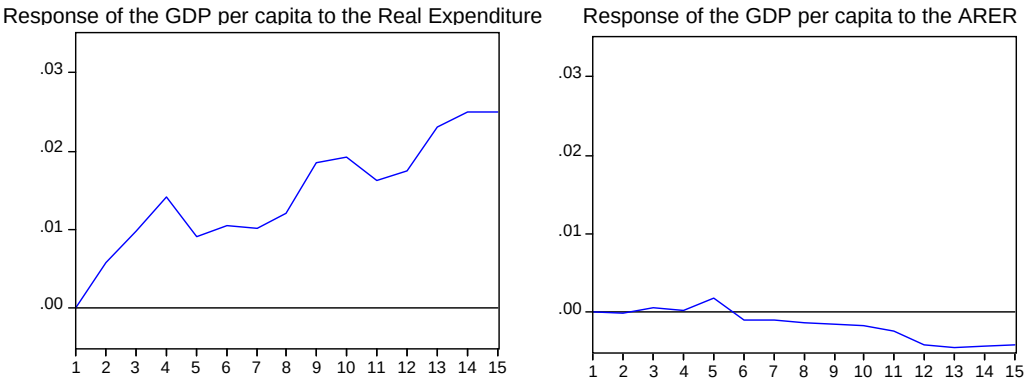


Figure 4. GDP per capita response to a shock provoked to the Real Expenditure and the Real Exchange Rate.

Conclusions

As it as said at the beginning of this study, Tourism is a very important factor in the economic activity of a country, with its significant multiplying effects. Tourism is considered as an important source of foreign exchange earnings, employment of domestic labour and a source of growth for a country.

Many governments nowadays recognize the important role of tourism in both economic growth and social progress, and this is why they try to exploit their tourism potential. While in 1950 international tourism generated revenues for US$ 2, 1 billion, in 2004 this digit has risen to US$ 622, 7 billion.

The purpose of this paper is to analyze the impact of the tourism sector on the economic growth of Uruguay. Tourism is a key sector in the Uruguayan economy, both for its importance on the creation of added value and employment and revenues, notwithstanding the decrease of tourists in the last years from one of the principal important country of origin (Argentina).

Because the most important country of origin for tourism in Uruguay is Argentina (almost 70% of all the inbound tourists), the analysis focuses on the relationship between the expenditures of the Argentinean tourists and the economic growth of Uruguay, measured by the GDP.

The cointegration analyses (using the technique proposed by Johansen) confirm the hypothesis of a positive relationship. It can be concluded that a unique cointegration vector exists among the GDP per capita, the real expenditure of Argentinean tourists, and the relative price between the two countries (corrected for the exchange rate between Uruguay and Argentina). That is to say that among these variables a long run equilibrium relationship does exist.

The real expenditure of Argentinean tourists is weakly exogenous. And Granger causality test suggests that causality is from real expenditure of tourists to the GDP per capita.

The elasticity of the GDP per capita with respect to the real expenditure is of 0.42 percentage points, which means that an increase of 100% of the real expenditure produce in the long run an increase of 42% of the GDP per capita.

The results confirm the hypothesis of exports as the engine for economic growth. That is to say that tourism generates revenues used to import capital goods.

Moreover, we checked the response over time of the GDP per capita after a shock of the real expenditure, and the real exchange rate.

A shock of the real expenditure of tourists provokes a positive and relatively slow response on the GDP per capita. While a shock on the relative prices causes an inverted J curve, with an initial negative impact for the first quarter, followed by a positive effect for two quarters, and then a long run negative effect.

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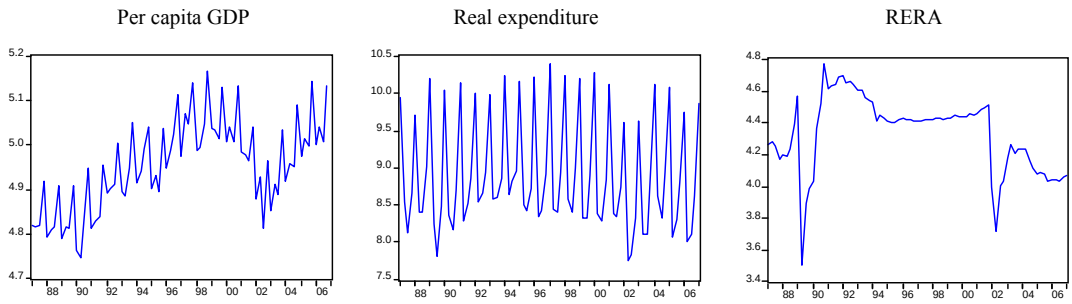
APPENDIX I : Graphic of the Evolution of the Data

Evolution of the GDP per capita, Real Expenditure and Real Exchange rate between Uruguay and Argentina



APPENDIX II: Cointegration Test

Sample (adjusted): 1989Q2 2006Q4

Included observations: 71 after adjustments

Trend assumption: Linear deterministic trend

Series: Y/L GR TCRA

Exogenous series: GDS D(PSC) D(AFE>=198902) D(AFE>=200201) D(AFE>=200202)

Warning: Critical values assume no exogenous series

Lags interval (in first differences): 1 to 8

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.637414	84.02966	29.79707	0.0000
At most 1	0.155332	12.00055	15.49471	0.1569
At most 2	0.000210	0.014901	3.841466	0.9027

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.637414	72.02910	21.13162	0.0000
At most 1	0.155332	11.98565	14.26460	0.1112
At most 2	0.000210	0.014901	3.841466	0.9027

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

Y/L	GR	RERA
13.38170	-6.244766	6.860009
2.378880	12.52700	-7.841911
-10.14549	5.881487	2.345472

Unrestricted Adjustment Coefficients (alpha):

D(Y/L)	-0.006371	-0.001500	0.000310
D(GR)	0.015912	-0.036188	0.000208
D(RERA)	-0.038143	-0.003356	-0.000352

1 Cointegrating Equation(s): Log likelihood 377.4118

Normalized cointegrating coefficients (standard error in parentheses)

Y/L	GR	RERA
1.000000	-0.466665	0.512641

	(0.12462)	(0.09395)

Adjustment coefficients (standard error in parentheses)

D(Y/L)	-0.085250
	(0.04837)
D(GR)	0.212923
	(0.20343)
D(RERA)	-0.510424
	(0.08383)

APPENDIX III: Weakly exogenenity test and Error Correction Vector

Vector Error Correction Estimates
Sample (adjusted): 1989Q2 2006Q4
Included observations: 71 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegration Restrictions:
B(1,1)=1, A(2,1)=0,
Convergence achieved after 5 iterations.
Restrictions identify all cointegrating vectors
LR test for binding restrictions (rank = 1):

Chi-square(1)	1.808748
Probability	0.178658

Cointegrating Eq:	CointEq1
Y/L(-1)	1.000000
GR(-1)	-0.421191
	(0.12482)
	[-3.37426]

RERA(-1)	0.482303		
	(0.09410)		
	[5.12518]		
C	-3.316968		

Error Correction:	D(YL)	D(GA)	D(RERA)
CointEq1	-0.099540	0.000000	-0.516137
	(0.04669)	(0.00000)	(0.08418)
	[-2.13176]	[NA]	[-6.13150]
D(Y/L(-1))	-0.208790	0.367416	-0.050173
	(0.15153)	(0.63963)	(0.26207)
	[-1.37789]	[0.57442]	[-0.19145]
D(Y/L(-2))	-0.025737	0.214406	-0.514175
	(0.15839)	(0.66857)	(0.27393)
	[-0.16250]	[0.32069]	[-1.87703]
D(Y/L(-3))	-0.091242	1.262797	-0.454893
	(0.15805)	(0.66716)	(0.27335)
	[-0.57729]	[1.89279]	[-1.66412]
D(Y/L(-4))	0.116369	0.572717	-0.107190
	(0.15434)	(0.65150)	(0.26693)
	[0.75398]	[0.87908]	[-0.40156]
D(Y/L(-5))	-0.000163	-1.479710	-0.179604
	(0.15337)	(0.64740)	(0.26526)
	[-0.00106]	[-2.28561]	[-0.67709]

D(Y/L(-6))	0.164716	0.637190	-0.265713
	(0.17077)	(0.72085)	(0.29535)
	[0.96454]	[0.88394]	[-0.89965]
D(Y/L(-7))	-0.070906	-1.600746	-0.097803
	(0.15896)	(0.67099)	(0.27492)
	[-0.44607]	[-2.38566]	[-0.35575]
D(Y/L(-8))	0.128972	-0.332546	0.032443
	(0.15722)	(0.66366)	(0.27192)
	[0.82032]	[-0.50108]	[0.11931]
D(GR(-1))	0.004947	-0.131709	-0.185590
	(0.03538)	(0.14934)	(0.06119)
	[0.13984]	[-0.88195]	[-3.03313]
D(GR(-2))	0.010055	-0.429404	-0.148999
	(0.03394)	(0.14326)	(0.05870)
	[0.29626]	[-2.99733]	[-2.53840]
D(GR(-3))	0.034570	-0.147978	-0.152731
	(0.03667)	(0.15478)	(0.06342)
	[0.94276]	[-0.95604]	[-2.40831]
D(GR(-4))	-0.029723	0.171912	-0.198991
	(0.03626)	(0.15307)	(0.06272)
	[-0.81966]	[1.12308]	[-3.17283]
D(GR(-5))	-0.019139	-0.034885	-0.199674
	(0.03850)	(0.16252)	(0.06659)
	[-0.49709]	[-0.21465]	[-2.99862]

D(GR(-6))	-0.046859	0.041689	-0.147484
	(0.03747)	(0.15818)	(0.06481)
	[-1.25048]	[0.26356]	[-2.27566]
D(GR(-7))	-0.044884	-0.002328	-0.102852
	(0.03599)	(0.15193)	(0.06225)
	[-1.24701]	[-0.01532]	[-1.65223]
D(GR(-8))	0.037432	-0.142329	-0.072030
	(0.03038)	(0.12822)	(0.05254)
	[1.23227]	[-1.11002]	[-1.37106]
D(RERA(-1))	0.046396	0.494166	-0.067468
	(0.03471)	(0.14652)	(0.06003)
	[1.33663]	[3.37266]	[-1.12384]
D(RERA(-2))	0.039824	0.159196	0.064024
	(0.03440)	(0.14521)	(0.05950)
	[1.15766]	[1.09632]	[1.07610]
D(RERA(-3))	0.019932	0.006885	0.162447
	(0.03401)	(0.14355)	(0.05882)
	[0.58609]	[0.04796]	[2.76187]
D(RERA(-4))	0.046258	-0.106840	0.010784
	(0.03442)	(0.14528)	(0.05952)
	[1.34406]	[-0.73542]	[0.18118]
D(RERA(-5))	0.017838	-0.028719	0.125097
	(0.03309)	(0.13970)	(0.05724)
	[0.53902]	[-0.20558]	[2.18559]

D(RERA(-6))	0.032705	0.012047	0.024776
	(0.03173)	(0.13395)	(0.05488)
	[1.03058]	[0.08994]	[0.45142]
D(RERA(-7))	0.035220	0.049549	0.159547
	(0.03029)	(0.12788)	(0.05240)
	[1.16258]	[0.38747]	[3.04506]
D(RERA(-8))	0.022335	-0.072004	0.042490
	(0.02950)	(0.12450)	(0.05101)
	[0.75723]	[-0.57833]	[0.83294]
C	0.004948	-0.001905	0.027788
	(0.00427)	(0.01803)	(0.00739)
	[1.15863]	[-0.10569]	[3.76193]
DS1	-0.076022	1.122562	0.171055
	(0.07626)	(0.32191)	(0.13189)
	[-0.99686]	[3.48719]	[1.29690]
DS2	-0.097121	-0.375298	0.095790
	(0.08478)	(0.35786)	(0.14663)
	[-1.14557]	[-1.04872]	[0.65329]
DS3	-0.023639	0.161519	-0.001375
	(0.07989)	(0.33722)	(0.13817)
	[-0.29590]	[0.47898]	[-0.00996]
D(PSC)	-0.001543	0.024531	0.000342
	(0.00162)	(0.00683)	(0.00280)
	[-0.95323]	[3.58998]	[0.12211]

D(AFE>=198902)	-0.046634	-0.059015	-1.093292
	(0.04084)	(0.17240)	(0.07063)
	[-1.14185]	[-0.34232]	[-15.4781]
D(AFE>=200201)	-0.040476	-0.403033	-0.555737
	(0.03582)	(0.15120)	(0.06195)
	[-1.13002]	[-2.66562]	[-8.97087]
D(AFE>=200202)	0.024898	0.221224	-0.473258
	(0.04282)	(0.18077)	(0.07407)
	[0.58139]	[1.22379]	[-6.38967]
R-squared	0.939789	0.992847	0.948192
Adj. R-squared	0.889084	0.986824	0.904565
Sum sq. resids	0.035190	0.627021	0.105261
S.E. equation	0.030431	0.128455	0.052631
F-statistic	18.53469	164.8294	21.73378
Log likelihood	169.3986	67.15100	130.5021
Akaike AIC	-3.842214	-0.962000	-2.746538
Schwarz SC	-2.790546	0.089668	-1.694870
Mean dependent	0.004860	-0.022286	-0.007157
S.D. dependent	0.091374	1.119055	0.170368

Determinant resid covariance (dof adj.)	3.17E-08
Determinant resid covariance	4.86E-09
Log likelihood	376.5074
Akaike information criterion	-7.732602
Schwarz criterion	-4.481992

APPENDIX IV: Granger Causality Test

Pairwise Granger Causality Tests

Sample: 1987Q1 2007Q1

Lags: 8

Null Hypothesis:	Obs	F-Statistic	Probability
GR does not Granger Cause Y/L	72	4.31006	0.00045
Y/L does not Granger Cause GR		1.48464	0.18409
RERA does not Granger Cause Y/L	72	1.07597	0.39339
Y/L does not Granger Cause RERA		0.77272	0.62814
RERA does not Granger Cause GR	73	1.49464	0.18003
GR does not Granger Cause RERA		1.08133	0.38952

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