Tourism Development and Economic Growth:
A Comparative Study for the G-6 Leaders

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Abstract:

Purpose: The paper investigates the relationship between tourism development and economic growth for the six richest countries globally for the period 1995-2017 by estimating a simultaneous system equations model. The purpose of this paper is to examine the long-run relationship between these variables by the use of the two-stage least squared methodology.

Design/Methodology/Approach: A structural system equation model is estimated for the G-6 leader countries and then we apply a Monte Carlo simulation method, in order to find out the predictive ability of the equation model.

Findings: The results of this study indicated that there is a positive relationship between tourism development and economic growth taking into account the negative effect of interest rates and the positive effect of investments, trade openness, and consumption on economic growth.

Practical Implications: The group of six leader countries is a group consisting of Canada, France, Germany, Italy, United Kingdom, and USA regarded as the most industrialized countries in the world.

Originality/Value: The study offers an in-depth insight into econometric modelling of economic growth.

Keywords: Tourism development, economic growth, system equation model, simulation.

JEL codes: O11; C22.

Paper type: Research study.

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1. Introduction

The investigation of empirical interrelation between tourism development and economic growth consists an important issue in the modern empirical literature. The recent revival of interest in the relationship between tourism development and economic growth examines the insights and the techniques of tourism growth models. Following the studies of Adamopoulos (2019), Maniatis (2018), a healthy economic system facilitates the tourism growth through innovation and entrepreneurship. A rapid increase in tourism industry in the last decades caused a relative increase in tourist arrivals and tourist expenditures in seasonal products taking into account the increase of domestic and foreign investments, the lower taxation and the improvement in travel services and transportation means (Katrakilidis *et al.,* 2017). The Group of the six leader countries is a group consisting of Canada, France, Germany, Italy, United Kingdom, and USA regarded as the most industrialized countries in the world and the most attractive tourist destinations in the last decade. The increase of tourist arrivals is the most representative measure of tourism development in conjunction with the relative increase of consumption of tourist products and services. Tourism development is mainly depended on economic and monetary state policy.

According to Maniatis' (2018) study "*along with the fast growth of the tourism industry, there is a parallel trigger of concerns such as environment sustainability, climate change, terrorism, tourism education, services quality and business ethics among others issues of main interest on tourism research".* Furthermore in tourism research, the main interest is concentrated at taxation policy and law, because tax law offers all facilities and chances to foreign investors to make investments and to expand their enterprises abroad. It also secures hospitality and entertainment for visitors.

The main issue is not only concentrated on analysing some theoretical determinants of economic growth, but also is referred to the statistical analysis of a system equation model based on basic econometric methodology. Surely, this paper examines such very powerful industrialized economies which are characterized by higher rates of economic growth facilitating the investments, trade of openness and tourism development. The model hypothesis predicts that tourism development promotes economic growth taking into account the negative effect of tax revenues and positive effect of investments, consumption and trade of openness on it. Endogenous growth theory predicts that trade liberalization promotes economic growth facilitating the transactions of goods and services, the efficiency of investments and causing positive externalities for firms (Rivera-Batiz and Romer, 1991). This empirical study has the following objectives:

- To examine the interrelation among economic growth, investments trade of openness and consumption, and tourism development;

- To make simulations by estimating a system equation model with Monte Carlo simulations method;
- To examine the predictive ability of the model by calculating the inequalities ratios indices of Theil;

2. Research Methodology

In order to test the long-run relationships, the following simultaneous equations system model is estimated by the *two-stage least squared* methodology.

Economic growth Function:
$$GDP_t = a_0 + a_1\ TOUR\_ARR_{t-i} + a_2\ INV_{t-i} + a_3 OP_{t-i} + a_4\ CS_{t-i} + a_5\ TAX_{t-i} + u_{1t} \tag{1}$$

Investment Function:
$$INV = b_0 + b_1\ GDP_{t-i} + b_2 R_{t-i} + b_3\ IND_{t-i} + b_4 INV_{t-i} + u_{2t} \tag{2}$$

Trade of openness Function:
$$OP_t = c_0 + c_1 GDP_{t-i} + c_2\ R_{t-i} + c_3\ IND_{t-i} + c_4\ INV_{t-i} + c_5\ TOUR\_ARR_{t-i} + c_6 OP_{t-i} + u_{3t} \tag{3}$$

Consumption Function:
$$CS = d_0 + d_1 GDP_{t-i} + d_2 R_{t-i} + d_3 OP_{t-i} + d_4 CS_{t-i} + d_5\ TOUR\_ARR_{t-i} + d_6\ IND_{t-i} + u_{4t} \tag{4}$$

Tourist Arrivals Function:
$$TOUR\_ARR = e_0 + e_1 GDP_{t-i} + e_2\ TRAVEL_{t-i} + e_3\ TRANSP_{t-i} + e_4 TOUR\_ARR_{t-i} + u_{4t} \tag{5}$$

where *GDP* is the gross domestic product, *TOUR_ARR*$_t$ are tourist arrivals, *INV* are the investments, *R* is interest rate, *OP* is trade openness, *IND*$_t$ is the industrial production index, *CS* is the consumption, *TRAVEL* are travel services, *TRANSP*, are transport means services, *TAX*, are tax revenues, a_0, b_0, c_0, d_0, e_0, are constants terms, u_{1t}, u_{2t}, u_{3t}, u_{4t}, u_{5t} are the disturbance terms and a_1, a_2, a_3, a_4, a_5, b_1, b_2, b_3, b_4, c_1, c_2, c_3, c_4, c_5, c_6, d_1, d_2, d_3, d_4, e_1, e_2, e_3, e_4, are the estimated coefficients, *t* is the time period, *i* is the number of lags and *t-i* are the time lags.

The data that are used in this analysis are annual covering the period 1995-2017 for G-6 leader countries regarding 2010 as a base year. All time series data are transformed into their logarithms for better statistical estimations and are obtained from *World Bank online database,* (World Development Indicators) and *AMECO Statistical Database of European Union*. AMECO is the annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs (AMECO, 2018, https://ec.europa.eu). Based on the empirical studies of Katos *et al.* (1996), Katsouli (2006), Vazakidis (2006), Maniatis (2017; 2018), Adamopoulos (2019) this article tries to prove that tourism development, investments, trade openness and consumption have a positive effect on economic growth, but tax revenues have a negative effect on it (Thalassinos *et al.,* 2012).

Furthermore economic growth and industrial production have a positive effect on investments and trade openness, while interest rate has a negative effect on investments for G-6 leader countries. Economic growth has a positive effect on consumption and tourism growth, while interest rate has a negative effect on it. The interrelations between the examined variables of the system model are presented in Figure 1.

Figure 1. *Graph of system equation model*
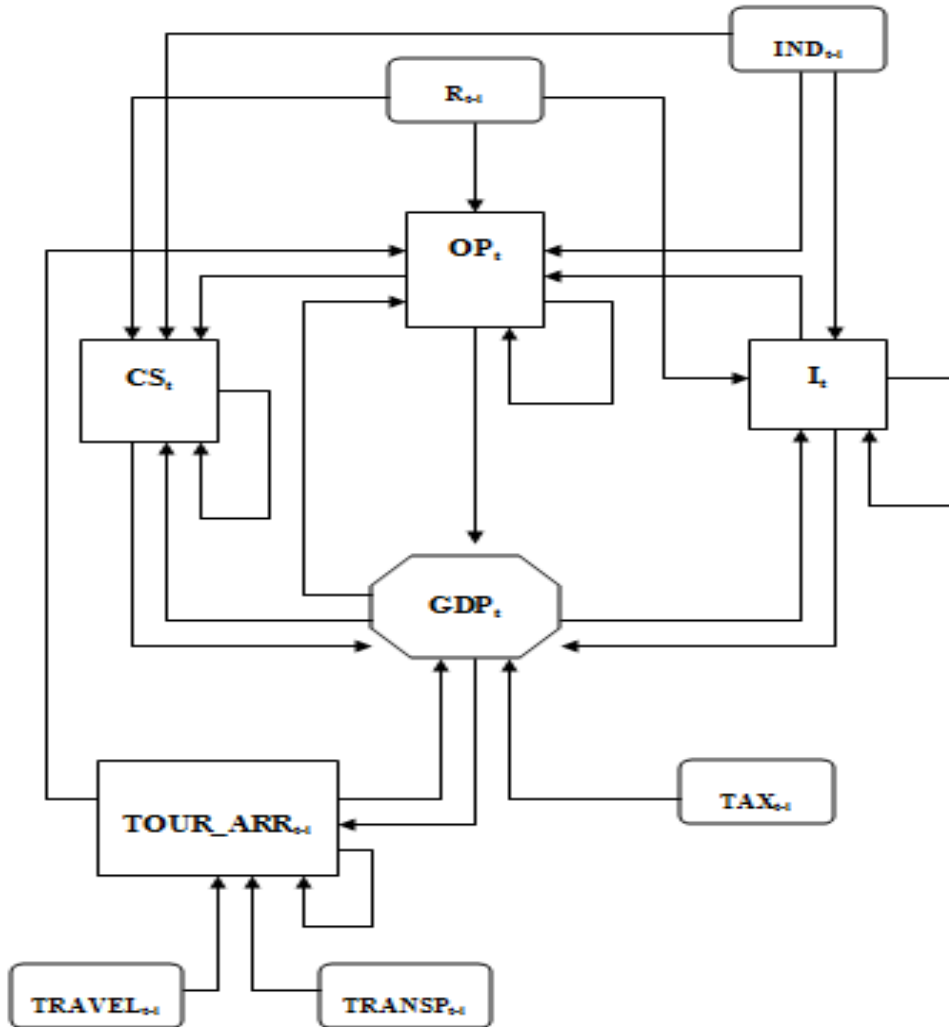
2.1 Data Analysis

The structural system equation model is consisted by five equations. The dependent variables are (GDP_t, I, OP_t, CS_t, TOUR_ARR) and the independent variables are

(GDP_{t-i}, OP_{t-i}, I_{t-i}, CS_{t-i} TAX_{t-i} R_{t-i}, IND_{t-i}, $TOUR\_ARR_{t-i}$, $TRAVEL_{t-i}$ $TRANSP_{t-i}$). Each equation is examined for statistical significance based on the statistical diagnostic tests such as possible existence of autocorrelation problem. The E-views 9.0 (2015) software package is used to conduct these tests.

Initially, two-stage least squares method is applied to estimate a linear regression model for statistical significance. This method defines that the regression line is fitted to the estimated values by minimizing the sum of squared residuals which indicates the sum of the vertical distances among each point and the relative point on the regression line. The smallest distances the better regression line is fitted. A regression model has a general form as follows:

$$Y_t = a + bX_t \tag{6}$$

Estimating a regression model with two-stage least squares methodology, we mainly have to find the estimations of the constant term ($\hat{a}$) and the slope of the equation ($\hat{b}$), namely to solve the following patterns (Seddighi *et al.,* 2000; Katos, 2004):

$$\hat{b} = \frac{n\sum X_t Y_t - \sum X_t \sum Y_t}{n\sum X_t^2 - (\sum X_t)^2} \text{ and } \hat{a} = \bar{Y}_t - \hat{b}\bar{X}_t \tag{7}$$

where $\bar{Y}$ is the average of values of Y (dependent variable) and $\bar{X}$ the average of values of X (independent variables). The final estimated model has the general form as in equation (8) (Katos, 2004):

$$\hat{Y}_t = \hat{a} + \hat{b}X_t \tag{8}$$

The estimation of a regression model is mainly based on some basic specification tests (Vazakidis, 2006). The null hypothesis (H_0) defines that there is no statistical significance in estimated coefficients of the independent variables of the examined model, when the value of probabilities is larger than 5% level of significance, while the alternative (H_1) defines that there is statistical significance when the value of the probability is lower than 5% level of significance. If the assumptions of these specification tests are not violated then there are not any problems of statistical significance in coefficients and the linear model is very well estimated in accordance with the statistical theory. This means that the independent variables of the estimated models have a direct effect on the dependent variable of the model.

2.2 Sensitivity Analysis

In order to apply simulation policies we have to estimate the inequality ratio indices of Theil. The best predictive ability of the system equation model is achieved by estimating the inequality ratio indices of Theil as follows:

$$U = \frac{\sqrt{\frac{1}{T} \sum \left(x_t^{sim} - x_t\right)^2}}{\sqrt{\frac{1}{T} \sum (x_t^{sim})^2} + \sqrt{\frac{1}{T} \sum (x_t)^2}} \tag{9}$$

The smaller dynamic multipliers and inequality ratio indices the better the predictive ability of the system equation model (Katos, 2004).

3. Empirical Analysis

The significance of the empirical results is dependent on the variables under estimation. The number of fitted time lags and the usage of first order autoregressive term was selected for the best estimation results and for the existence of statistical significance in each equation model. Based on several studies (Vazakidis, 2006; Maniatis, 2018; Adamopoulos, 2019) the model of economic growth is mainly characterized by the direct effect of trade openness, investments, consumption, and tourist arrivals, while there is an indirect effect of interest rate and industrial production index. Tables 1-5 present the empirical results for the simultaneous equations system model estimated by the two-stage least squared method for the G-6 countries, DW is the Durbin-Watson test statistic for auto-correlation and R^2 is the determination coefficient.

Estimating the system equation model with the two-stage least squared methodology we can infer that there is statistical significance in the coefficients of the independent variables based on probabilities and t-student distribution test statistics, so we accept the alternative hypotheses. Their estimated values have the expected statistical sign based on economic theory. The coefficient of determination in each equation is very high (0,99), so the model is very well adjusted.

The same conclusion is easily confirmed by studying probabilities and test statistics. All probability values are lower than 10% and estimated coefficients are statistically significant. Durbin Watson test statistic indicates that there is a possible problem of autocorrelation, while there is a possible existence of multicollinearity problem due to the highest values of the coefficients of determination.

Generally, examining the economic interrelation between dependent and independent variables we can infer that investments, trade openness, consumption and tourist arrivals have a positive direct effect on economic growth (equation 1),

economic growth has a positive direct effect on investments (equation 2), on trade openness (equation 3), on consumption (equation 4), and on tourist arrivals (equation 5), while interest rate has a negative indirect effect on investments (equation 2), on trade openness (equation 3), and on consumption (equation 4). Finally, industrial production has a positive direct effect on investments (equation 2), on trade openness (equation 3), and on consumption (equation 4) while tax revenues have a negative indirect effect on growth (equation 1).

Estimating the system equation model with the two-stage least squared methodology we can see that that there is statistical significance in the coefficients of the independent variables based on probabilities and t-student distribution test statistics. Their estimated values have the expected statistical sign based on economic theory. All probability values are lower than 5% level of significance, so we accept the alternative hypotheses. Exceptions are presented only in some probabilities, but there is not any problem in statistical signs of the estimated coefficients. In these cases we cannot reject the alternative statistical hypotheses. As seen in Tables 1-5, Durbin Watson test statistics indicate that there is a possible problem of autocorrelation. The simultaneous system equations model is adapted to each country in a general specific form taking into account the specification test. An appropriate number of time lags of the examined variables is selected in order to determine the endogenous variables of the system equations model and to achieve the best identification of it.

The interrelation between the examined variables of estimated equation model for G-6 leader countries is described in Figure 1 above. As we can infer from the graphs of the system equation models, the direct and indirect relations between the examined variables are distinctly based on theoretical economic hypotheses of the estimated system equation model for G-6 leader countries. The theoretical conclusions of the estimated system equation model for G-6 countries are completely verified, based on economic theory.

The simultaneous system equations model is adapted to each country in a general specific form taking into account the specification test. An appropriate number of time lags of the examined variables is selected in order to determine the endogenous variables of the system equations model and to achieve the best identification of it (Polyakova *et al.,* 2019; Thalassinos *et al.,* 2015). The results of the estimated system equations model indicated that:

- Tourism development in conjunction with the development of investments, trade openness and consumption have a positive direct effect on economic growth for G-6 leaders.
- Tax revenues have a negative direct effect on economic growth for Germany, Italy and USA.
- Industrial production has a positive indirect effect on economic growth through investments for Italy and France

through trade openness for Canada and Italy, and through consumption for France and Germany.

- Interest rate has a negative indirect effect on economic growth through investments for Canada, Germany, UK and USA, through trade openness for France and Italy, through consumption for Canada, Italy, UK and USA.
- Tourism development has greater positive and direct effect on economic growth for Canada, Italy, UK and USA.
- Trade openness has a positive direct effect on consumption for Italy.
- Travel services have a positive indirect effect on economic growth through tourist arrivals for Canada, Italy and USA.
- Transport services have a positive indirect effect on economic growth through tourist arrivals for Italy and UK.
- Tourist arrivals have a positive direct effect on trade openness for Italy.

Table 1. *Regression results for Equation (1) with 2-SLS*

	Canada	France	Germany	Italy	UK	USA
Constant	- 0.0555	-0.0990	-0.0344	-0.0284	-0.0791	-0.0185
	(0.1759)	(0.0001)	(0.2154)	(0.1802)	(0.0550)	(0.1701)
LTOUR_ ARR$_{t-i}$	0.1350	0.3984	0.0678	0.0503	0.1796	0.1413
	(0.0207)$_t$	(0.0000)$_t$	(0.2096)$_{t-3}$*	(0.0697)$_{t-2}$	(0.0065)$_{t-4}$	(0.0000)$_t$
LINV$_{t-i}$	0.4146	0.3407	0.2874	0.2409	0.6198	0.2902
	(0.0000)$_t$	(0.0000)$_t$	(0.0000)$_t$	(0.0000)$_t$	(0.0000)$_t$	(0.0000)$_t$
LOP$_{t-i}$	0.0839	0.1563	0.0672	0.0542	0.1132	0.0444
	(0.1418)$_{t-1}$*	(0.0000)$_{t-4}$	(0.1745)$_t$*	(0.0648)$_t$	(0.1184)$_{t-2}$*	(0.0229)$_{t-3}$
LCS$_{t-i}$	0.4189	0.2124	0.8617	0.6508	0.2348	0.6168
	(0.0001)$_t$	(0.0002)$_{t-2}$	(0.0000)$_t$	(0.0000)$_t$	(0.0000)$_t$	(0.0000)$_{t-1}$
LTAX$_{t-i}$			-0.1851	-0.1235		-0.0911
			(0.0303)	(0.0404)$_{t-1}$		(0.0000)$_{t-1}$
R^2	0.9970	0.9980	0.9972	0.9975	0.9963	0.9996
DW	1.2018	1.9079	1.6985	1.2457	2.2663	1.7612

Table 2. *Regression results for Equation (2) with 2-SLS*

	Canada	France	Germany	Italy	UK	USA
Constant	-0.0717	0.0012	-0.1586	-0.3978	-1.2492	-0.7239
	(0.2417)	(0.8450)	(0.0870)	(0.0146)	(0.2751)	(0.0933)
LGDP$_{t-i}$	0.7956	0.8900	0.4804	0.7479	0.9733	0.3248
	(0.0000)$_t$	(0.0000)$_{t-1}$	(0.0034)$_{t-2}$	(0.0000)$_{t-1}$	(0.0000)$_{t-1}$	(0.0854)$_{t-2}$
LR$_{t-i}$	-0.0175		-0.0578	-0.1039	-0.2929	-0.2569
	(0.2596)$_{t-3}$*		(0.0097)$_{t-1}$	(0.0357)$_{t-2}$	(0.2388)$_t$*	(0.0392)$_{t-2}$
LIND$_{t-i}$		0.7346		0.7986		
		(0.0000)$_t$		(0.0000)$_{t-2}$		
LINV$_{t-i}$	0.3334	0.3392				
	(0.0163)$_{t-1}$	(0.0344)$_{t-1}$				
R^2	0.9909	0.9870	0.8122	0.7781	0.9265	0.8473
DW	1.2891	1.1911	0.9064	1.6774	0.9945	0.6930

Table 3. *Regression results for Equation (3) with 2-SLS*

	Canada	France	Germany	Italy	UK	USA
Constant	0.6961 (0.0000)	0.2924 (0.0020)	0.3243 (0.0001)	0.4630 (0.0000)	0.4166 (0.0039)	0.7064
$LGDP_{t-i}$	0.5761 $(0.0000)_t$	0.9260 $(0.0000)_{t-1}$	0.8782 $(0.0023)_t$	0.8035 $(0.0000)_{t-2}$	0.6625 $(0.0147)_{t-2}$	0.8390 $(0.0000)_{t-2}$
$LIND_{t-i}$	0.7243 $(0.0000)_t$			0.5992 $(0.0002)_t$		
$LINV_{t-i}$						0.3297 $(0.0570)_t$
LR_{t-i}		-0.1312 $(0.0000)_t$		-0.0817 $(0.0094)_{t-1}$		
$LTOUR\_ARR_{t-i}$				0.5052 $(0.0027)_{t-1}$		
LOP_{t-i}			0.5307 $(0.0002)_{t-1}$		0.4632 $(0.0244)_{t-1}$	
R^2	0.9803	0.9806	0.9743	0.9234	0.9745	0.9552
DW	1.2348	1.8767	1.6007	1.1394	2.2175	1.1974

*Note: *not significant probability at 1%, 5% ,10%, levels of significance.*

Table 4. *Regression results for Equation (4) with 2-SLS*

	Canada	France	Germany	Italy	UK	USA
Constant	-0.1278 (0.0002)	0.0199 (0.0000)	0.0175 (0.0000)	-0.2779 (0.0003)	-4.0850 (0.0006)	-0.2530 (0.0110)
$LGDP_{t-i}$	0.9710 $(0.0000)_t$	0.3525 $(0.0003)_{t-1}$	0.1800 $(0.0903)_{t-1}$	0.8188 $(0.0000)_{t-2}$	0.8238 $(0.0042)_{t-1}$	0.8360 $(0.0000)_{t-2}$
LR_{t-i}	-0.0272 $(0.0008)_t$			-0.0450 $(0.0034)_t$	-0.8896 $(0.0006)_{t-1}$	-0.0941 $(0.0014)_{t-3}$
$LIND_{t-i}$		0.3884 $(0.0000)_t$	0.1241 $(0.0016)_t$			
LOP_{t-i}				0.2155 $(0.0200)_{t-1}$		
LCS_{t-i}		0.6714 $(0.0000)_{t-2}$	0.7086 $(0.0000)_{t-1}$		0.4687 $(0.0026)_{t-3}$	
R^2	0.9961	0.9986	0.9964	0.9804	0.9658	0.9913
DW	0.8663	1.4001	1.5922	1.1459	0.9017	1.1180

Table 5. *Regression results for Equation (5) with 2-SLS*

	Canada	France	Germany	Italy	UK	USA
Constant	0.0322 (0.0661)	0.0337 (0.0069)	0.0637 (0.0000)	0.1247 (0.0000)	0.0103 (0.5870)	0.0996 (0.0006)
$LGDP_{t-i}$	0.0180 $(0.7205)*_{t-1}$	0.1347 (0.0759)	0.5950 $(0.0426)_{t-3}$	0.9617 $(0.000)_{t-4}$	0.4994 $(0.0005)_t$	0.8159 $(0.0006)_{t-4}$
$LTRAVEL_{t-i}$	0.4226 $(0.0163)_{t-3}$			0.5594 $(0.0056)_{t-3}$		0.5273 $(0.0922)_t$
$LTRANSP_{t-i}$				0.5405 $(0.0012)_{t-3}$	0.3373 $(0.1228)_t*$	
$LTOU\_ARR_{t-i}$	0.9145 $(0.0000)_{t-1}$	0.4534 $(0.0530)_{t-1}$	0.7109 $(0.0000)_{t-1}$		0.6718 $(0.0001)_{t-1}$	0.2401 $(0.2752)_{t-3}$
R^2	0.6889	0.7501	0.9802	0.8556	0.9423	0.8610
DW	2.3215	1.5445	2.0763	0.9984	1.7227	0.5930

3.1 Sensitivity Analysis Results

Estimating the system equation models with Monte Carlo simulation methodology we can infer that the estimated simulated values are very close to actual values, so the models are very well simulated. The results of estimated inequality ratio indices of Theil, suggested that there is a good predictive ability of simulated system equation models (Table 6, Figure 2). Based on U-Theil indices for each dependent variable of the estimated equation models, we can classify G-6 leader countries as follows:

For U-Theil index of GDP_t
- 0.0264 < 0.0282 < 0.0353<0.0775<0.1410<0.2828
  (USA<FRA<GER<UK<ITA<CAN)

For U-Theil index of I_t
- 0.0765<0.0804<0.0888<0.1371<0.1990<0.3838
  (FRA<USA<GER<UK<ITA<CAN)

For U-Theil index of OP_t
- 0.0086<0.0122<0.0163<0.0164<0.0185<0.0703
  (ITA<FRA<USA<GER<UK<CAN)

For U-Theil index of CS_t
- 0.0285<0.0447<0.0568<0.0581<0.2590<0.29
  (GER<FRA<USA<ITA<CAN<UK)

For U-Theil index of $TOUR\_ARR_t$
- 0.0340<0.1175<0.1514<0.1523<0.2142<0.2401
  (GER<FRA<UK<USA<ITA<CAN)

Comparing the values of U-Theil indices for all dependent variables, namely Gross Domestic Product, trade openness, investments, consumption and tourist arrivals we can infer that:

- U-Theil index for Gross Domestic Product, trade openness, investments and consumption and tourist arrivals has the lowest value in USA, while the largest in Canada.
- U-Theil index for investments has the lowest value in France, while the largest in Canada.
- U-Theil index for trade openness has the lowest value in Italy while the largest in Canada.
- U-Theil index for consumption and investmets has the lowest value in Germany while the largest in UK.
- U-Theil index for tourist arrivals has the lowest value in Germany while the largest in Canada.
- The smaller inequality ratio indices the better the predictive ability of the system equation model.

- Germany and France have the best simulated equation models comparing the U-Theil indices for the dependent variables in each one of the G-6 countries.

Table 6. *Estimations of inequalities ratios indices for G-6 countries (U-Theil index)*

G-6 countries	U-Theil GDP	U-Theil I	U-Theil OP	U-Theil CS	U-Theil TOUR_ARR
CANADA	0.2828	0.3838	0.0703	0.2590	0.2401
FRANCE	0.0282	0.0765	0.0122	0.0447	0.1175
GERMANY	0.0353	0.0888	0.0164	0.0285	0.0340
ITALY	0.1410	0.1990	0.0086	0.0581	0.2142
UK	0.0775	0.1371	0.0185	0.2900	0.1514
USA	0.0264	0.0804	0.0163	0.0568	0.1523

Figure 2. *Graph of U-Theil index*
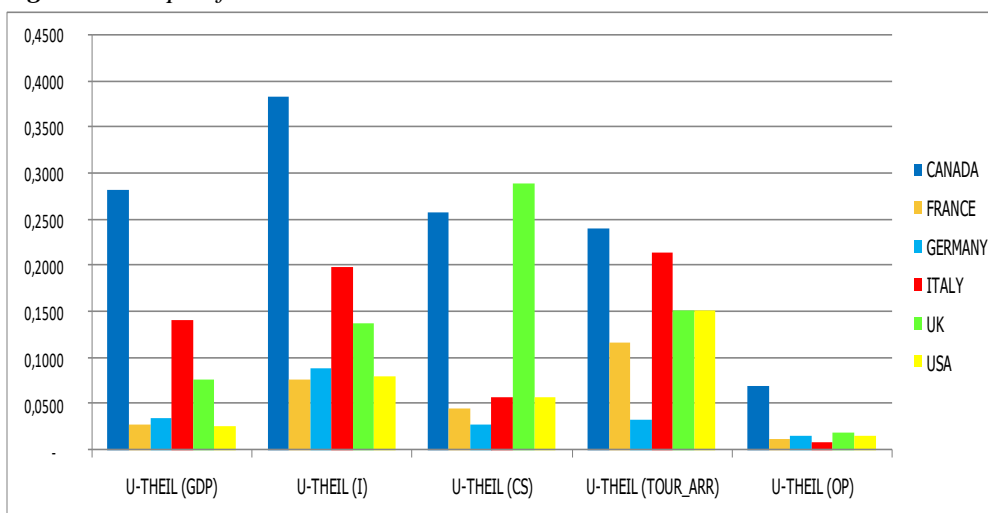
4. Conclusions

The purpose of this paper is to examine the relationship between tourism development and economic growth for G-6 leader countries for the period 1995-2017 estimating a simultaneous system equations model using the two-stage least squared methodology. This model is consisted by five linear equations which represent the effect of tourism development on economic growth taking into account the empirical studies of Katos *et al.* (1996), Katsouli (2006), Vazakidis (2006), Jamieson *et al.* (2016), Maniatis (2017; 2018), Adamopoulos (2019).

The results of the estimated system equations model indicated that tourism development in conjunction with the development of investments, trade openness, and consumption have a positive direct effect on economic growth for G6 leaders,

while tax revenues has a negative direct effect on economic growth for Germany, Italy and USA. Tourism development has greater positive and direct effect on economic growth for Canada, Italy, UK and USA. Industrial production has a positive indirect effect on economic growth through investments for Italy and France, through trade openness for Canada and Italy, and through consumption for France and Germany. Interest rate has a negative indirect effect on economic growth through investments for Canada, Germany, UK and USA, through trade openness for France and Italy, through consumption for Canada, Italy, UK and USA.

Furthermore, the empirical results of Monte Carlo simulation method indicated that the system equation models for all G-6 leader countries are very well simulated, since the simulated values are close to actual values of the examined variables. Comparing the values of U-Theil indices for all dependent variables we can infer that Germany and France have the best simulated equation models. The smaller inequality ratio indices the better the predictive ability of the system equation model.

Many empirical studies examining the main determinants of economic growth differ relatively to the sample period, the examined countries and the estimation methodology. The empirical results of this paper are in line with the studies of Maniatis (2018) and Adamopoulos (2019). However, more interest should be focused on the comparative analysis of empirical results for many other countries in future research.

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