# Do the Important Macroeconomic Variables Affect on Aggregate Tourism Income in Iran?

**Hassan Heidari***, **Sahar Bashiri**

1. Associate Professer, Department of Economics,Urmia University, Urmia, h.heidari@urmia.ac.ir
2. Ph.D. Candidate, Department of Economics, University of Sistan and Baluchestan, Zahedan, sahar.bashiri01@yahoo.com

## Abstract

This paper investigates the long-run relationship among important macroeconomic variables including exchange rate, inflation, human education in tourism sector, number of tourism agencies and number of hotels on the aggregate tourism income in Iran. The Bounds testing approach to level relationship employed to investigate this relationship over the period of 1978-2010. Our results reveal that there are significant and under consideration effects of macroeconomic variables and aggregate tourism income. The results show that the number of hotels, investment made for training person in tourism sector, and the numbers of tourism agencies have positive effects on the income from foreign tourism. Therefore development of tourism infrastructure including hotels, training person in tourism sector and increase in number of agencies can attract foreign tourism. Exchange rate, inflation and dummy variable related to the imposed Iraq-Iran war have negative effects on the foreign tourism income.

**Key words:** Macroeconomic Variables, Aggregate Tourism income, Iran.

## 1. Introduction

Currently, tourism is one of the world's largest industries, and international tourism development can affect different aspects of country. In terms of Economics, international tourism will generate more income, and plays an important role in encouraging investment in infrastructure, and creating jobs.

Balaguer and Cantavella (2002) maintained that tourism sector has beneficial effects for a country’s economy due to its influence on the employment, business, income, cultural, fiscal sectors.

Demand of tourism is one of the most important factors in its development. It has a complex structure depends on the various factors and variables. The demand for tourism can be different according to the type of the country, administrative issues and the data. Therefore there has been increasing interest in research relating to explore and identify the impact of external factors that may play important role in increasing tourism revenues (see, e.g. Kwack, 1972; Little, 1980; Loeb, 1982; Pearce, 1985, Witt and Martin, 1987; Jenner and Smith, 1992; Syriopoulos, 1995; Archer and Fletcher, 1996; Walsh, 1996; Lim, 1997; Sinclair, 1998; Tse, 1999; Theobald, 2001; Naude and Saayman, 2004; Halicioglu, 2004; Naude, 2004; Gursoy and Rutherford, 2004; Kim et al, 2006; Zortuk, 2009; Belloumi, 2010; Arslanturk et al., 2011; Mahmoudinia et al, 2011; amoung others).

Due to the many advantages of diversity in terms of climate, natural attractions, history and ancient civilization, archeology and religion, architecture, and handicrafts, Iran has the great potential to become a global tourism hub, but Iran's share of world tourism receipts is very low. Thus, identifying the factors that are effective in increasing the incomes of foreign tourists is very important.

Although, there are a lot of empirical investigations about macroeconomic variables effects on aggregate tourism income with Iranian data (see, e.g. Habibi and Abbasinezhad, 2005; Taleb and Mohammad Khan Kheyrabadi, 2009; Taghavi and Gholipour, 2009; Kohansal and Hamraz, 2009a and b; Mirvase, 2009; Amin Beidokhti et.al., 2010; Rakhshani nasab and Zarabi, 2010; Taghvaei et.al, 2010; Karami dehkordi and Kalantari, 2011; Mahmoudinia et al., 2011; among others), but to the best of our knowledge, there is not any empirical study on assessing the long-run relationship between macroeconomic variables and the aggregate tourism income to level relationship. In this paper, we use bounds testing approach to invistigate the effect of macroeconomic variables including exchange rate, inflation, human education in tourism sector, number of tourism agencies and tourism substructure on the aggregate tourism income for Iran. The hypotheses that we are going to test are as follows:

- The numbers of hotels have significant positive effect on Iran’s tourism receipts.
- Investments made in training persons in tourism sector have significant positive effect on Iran’s tourism receipts.
- Exchange rate has significant negative effect on Iran’s tourism receipts.
- Inflation has significant negative effect on Iran’s tourism receipts.
- The numbers of tourism agencies have significant positive effect on Iran’s tourism receipts.

The rest of the paper is structured as follows: Section 2 outlines the model. Section 3 discusses the data. Section 4 presents the empirical results, and finally, section 5 concludes the paper.

## 2. The Model

Based on theoretical studies, many macroeconomic variables have important roles in changing the tourism revenues. However, according to the empirical studies by Taghavi and Gholipour (2009) and consult with the experts of the tourism industry including the public and private sectors, we postulate the relationship among macroeconomic variables and tourism revenues as bellow:

$$LINC_t = F(LHOT_t, LTRA_t, LER_t, INF_t, LAGE_t, DUM) \qquad (1)$$

Where $LINC_t$ is Iran's foreign income from foreign tourists at time $t$; $LHOT_t$ is the number of hotels at time $t$; $LTRA_t$ is the investment made for training person in tourism sector; $LER_t$ is exchange rate at time $t$; $INF_t$ Inflation at time $t$; $LAGE_t$ is the number of tourism agencies at time $t$ and $DUM_t$ is a dummy variable related to the imposed Iraq-Iran war. All the variables except $INF_t$ and $DUM_t$ are in logarithm form.

We employ Bounds testing approach to level relationship with in Autoregressive Distributed Lag (ARDL) modeling approach to investigate the long run relationship among these variables. ). The ARDL model can be specified as follows:

$$\begin{aligned}\Delta LINC_t &= C + \alpha_0 LINC_{T-1} + \beta_0 LHOT_t + \gamma_0 LTRA_t + \varphi_0 LER_t + \delta_0 INF_t + \mu_0 LAGE_t + \\ &\alpha_i \Delta LINC_{(t-1,t-2)} + \beta_i \Delta LHOT_{(t,t-1,t-2)} + \gamma_i \Delta LTRA_{(t,t-1,t-2)} + \varphi_i \Delta LER_{(t,t-1,t-2)} + \\ &\delta_i \Delta INF_{(t,t-1,t-2)} + \mu_i \Delta LAGE_{(t,t-1,t-2)} + DUM + \varepsilon_t \qquad (2)\end{aligned}$$

Where, $\Delta$ is the difference operator, and $\varepsilon_t$ is serially independent random errors with mean zero and finite covariance matrix. In equation (2), the null hypothesis of no long-run relationship ($H_0 = \alpha_0 = \beta_0 = \gamma_0 = \varphi_0 = \delta_0 = \mu_0 = 0$) against the alternative hypothesis of existence of a long-run relationship among the variables $H_1 = \alpha_0 = \beta_0 = \gamma_0 = \varphi_0 = \delta_0 = \mu_0 \neq 0$ is tested by conducting a F-test. The F-test has a non-standard distribution which depends upon: 1) whether variables included in the ARDL model are I(0) or I(1); 2) the number of regressors; 3) whether the ARDL model contains an intercept and/or a trend; and 4) the sample size. Two sets of critical values are reported in Pesaran et al., (2001). These critical values provide bounds for all classification of the regressors into purely I(1), purely I(0) or mutually cointegrated. However, these critical values are generated for sample sizes of 500 and 1000 observations and 20000 and 40000 replications, respectively. Narayan (2005), fortunately, provides two sets of critical values for sample size ranging from 30 to 80 and for the two popular cases one which assumes that all the regressors are I(1), and the other assuming that are I(0). It is important to note that the critical values based on large sample size deviates significantly from small sample size. In the case of long-run relationship, the Granger causality tests can be done under the Vector ECM (VECM). By doing so, the short run deviations of series from their long run equilibrium are also captured by including an Error Correction term. Therefore, the ARDL modeling approach involves estimating the following Error Correction Model (ECM). The ECM model of cointegrated variables in this paper can be specified as follows:

$$\begin{aligned}\Delta LINC_t &= \Delta C + \beta_1 \Delta LHOT_t + \beta_2 \Delta LTRA_t + \beta \Delta LTRA_{t-1} + \beta_3 \Delta LER_t + \beta_4 \Delta INF_t + \\ &\beta_4 \Delta INF_{t-1} + \beta_5 \Delta LAGE_t + \beta_5 \Delta LAGE_{t-1} + \Delta T + \beta_7 \Delta DUM + ECM_{t-1} + \varepsilon_t \qquad (3)\end{aligned}$$

Where, $ECM_{t-1}$ is the rate of adjustment of disequilibrium. Finally, according to the VECM for causality tests, having statistically significant $F$ and $t$ ratios for $ECM_{t-1}$ in the equation (3) would meet conditions to have causation from independent variables to dependent variable.

## 3. Data and Its Properties

We use annual time series data during the period of 1978-2010. The data were obtained from Statistical Centre of Iran (SCI), World Development Indicator (WDI) and Central Bank of Iran (CBI).

Summary statistics for the series are given in Table 1. The large value of the Jargue-Bera statistic implies that $LHOT$ and $INF$ series are not normally distributed.

**Table 1: Summary Statistics for Variables**

| | $LINC$ | $LHOT$ | $LTRA$ | $LER$ | $INF$ | $LAGE$ |
|---|---|---|---|---|---|---|
| Mean | 5.350833 | 6.246421 | 4.532769 | 7.662002 | 18.78906 | 5.795871 |
| Median | 4.955827 | 6.091310 | 5.634790 | 7.940228 | 17.34507 | 5.609472 |
| Maximum | 7.745003 | 7.908755 | 8.227910 | 9.268704 | 49.68153 | 8.216088 |
| Minimum | 3.295837 | 5.796058 | 1.000000 | 4.248495 | 4.017857 | 3.828641 |
| Std.dev | 1.599683 | 0.499191 | 2.864626 | 1.524538 | 8.623114 | 1.492360 |
| Skewness | 0.220470 | 2.213617 | -0.278280 | -0.687672 | 1.360145 | 0.147859 |
| kurtosis | 1.502345 | 8.085681 | 1.361990 | 2.400280 | 6.168950 | 1.437554 |
| Jarque-bera | 3.351422 (0.187175) | 62.51377 (0.000000) | 4.115148 (0.127764) | 3.095445 (0.212732) | 23.98305 (0.000006) | 3.476944 (0.175789) |

Source: Authors calculation

### 1-3- Standard Unit Root tests

In order to determine stationary properties of the series, we employ several tests such as Augmented Dickey Fuller (ADF), Philips-Perron (PP), Kwiatkowski et al (KPSS) and Ng-Perron (NP) tests. Table 2 presents the summery results of these tests.

**Table 2: Results of standard unit root tests**

| | ADF | PP | KPSS | NP |
|---|---|---|---|---|
| $LINC$ | I(1) | I(1) | I(0) | I(1) |
| $LHOT$ | I(1) | I(1) | I(0) | I(1) |
| $LTRA$ | I(1) | I(1) | I(0) | I(1) |
| $LER$ | I(0) | I(0) | I(0) | I(1) |
| $INF$ | I(0) | I(0) | I(0) | I(0) |
| $LAGE$ | I(1) | I(1) | I(0) | I(1) |

Source: Authors calculation

As it is clear from the Table 2, the results of these standard unit root tests aren't the same. These results, however, are biased in favor of identifying data as integrated in the presence of structural break.

To carry out a test of no structural break against an unknown number of breaks in the variables under investigation, we use the endogenously determined multiple break tests that developed and applied by Bai and Perrron (1998, 2003). Table 3 presents results of different structural break tests for the series under consideration. These results confirm that we have at least one break in the series.

**Table 3: The Result of Structural Break Tests**

| | *LINC* | *LHOT* | *LTRA* | *LER* | *INF* | *LAGE* |
|---|---|---|---|---|---|---|
| SupF | √ | √ | √ | √ | × | √ |
| SupF Conditional | √ | × | × | × | × | × |
| UDmax-WDmax | √ | √ | √ | √ | × | √ |
| BIC-LWZ | √ | √ | √ | √ | √ | √ |
| Sequential | × | × | × | √ | × | × |

Note: √ indicates the presence of structural break.
Source: Authors calculation

Therefore we use Zivot and Andrews (1992) and Lee and Strazicich (2003) tests to carry out unit root tests with presence of one and two structural breaks in the series under consideration. The results are shown in Table 4.

**Table 4: Zivot and Andrews (ZA) and Lee and Strazicich (LS) Unit Root Tests Results**

| Variables | ZA | LS |
|---|---|---|
| *LINC* | I(1) | I(0) |
| *LHOT* | I(1) | I(0) |
| *LTRA* | I(1) | I(0) |
| *LER* | I(0) | I(0) |
| *INF* | I(0) | I(0) |
| *LAGE* | I(1) | I(0) |

Source: Authors calculation

These results show that in the presence of one possible structural break, the series are not in the same order of integration. But in the presence of two possible structural breaks, the series are in the same order of integration. We use Bounds testing approach to level relationship developed by Pesaran et al. (2001) to address this issue.

## 4. Empirical Results

As the ZA test results confirm different order of integration for variables under investigation, we employ Bounds testing approach to level relationship with in Autoregressive

Distributed Lag (ARDL) modeling approach to investigate the long run relationship among these variables. Table 5 presents critical values for F-statistic at 1, 5 and 10 percent.

**Table 5: F- statistic Critical Values for Bounds Test**

| K=5 | 10% | | 5% | | 1% | | F-statistic |
|---|---|---|---|---|---|---|---|
| | I(0) | I(1) | I(0) | I(1) | I(0) | I(1) | |
| $F_V$ | 3.157 | 4.412 | 3.818 | 5.253 | 5.347 | 7.242 | 7.811595 |
| $F_{IV}$ | 2.907 | 4.010 | 3.504 | 4.743 | 4.850 | 6.473 | 15.55381 |
| $F_{III}$ | 2.578 | 3.858 | 3.125 | 4.608 | 4.537 | 6.370 | 13.74367 |

Source: Authors calculation

Note: $F_V$, represents the F statistic of the model with unrestricted intercept and trend, $F_{IV}$, represents the F statistic of the model with unrestricted intercept and restricted trend, and $F_{III}$, represents the F statistic of the model with unrestricted intercept and no trend.

As the critical F-statistics are bigger than the I(1) critical values in Table 5, we can reject the null hypothesis at the 5% level. This means that there is a long-run relationship between private investment and its determinants.

The estimation results of the ARDL model and long-run coefficient are presented in Table 6.

**Table 6: Estimated Long- run Coefficient Using the ARDL(1,0,2,1,2,2) Model**

| Variables | Coefficient | Standard Error | T-Ratio[Prob |
|---|---|---|---|
| $LHOT$ | 0.37185 | 0.14184 | 2.6216[0.019] |
| $LTRA$ | 0.44746 | 0.11570 | 3.8674[0.002] |
| $LER$ | -0.71549 | 0.14122 | -5.0664[0.000] |
| $INF$ | -0.016018 | 0.007434 | -2.1546[0.048] |
| $LAGE$ | 1.4566 | 0.30516 | 4.7733[0.000] |
| $c$ | 1.8560 | 1.2396 | 1.4973[0.155] |
| $T$ | -0.14752 | 0.031406 | -4.6973[0.000] |
| $Dum$ | -0.96584 | 0.21726 | -4.4456[0.000] |
| R-Squared = 0.99229 adjusted-R-Squared= 0.98458 DW-statistic= 2.088 | | | |

Source: Authors calculation

The results reveal that $LHOT$ , $LTRA$ and $LAGE$ have positive effects on the $LINC$ . Our results show that one percent increase in the number of hotels, investment made for training person in tourism sector, and the number of tourism agencies leads to an increase in income from foreign tourism by 0.37% ,o.44% and 1.46% in the long-run, respectively. However, $LER$ , $INF$ and $Dum$ have negative effects in foreign tourism income, where one percent increase in the exchange rate, inflation and dummy variable related to the imposed Iraq-Iran war leads to a 0.71%, 0.02% and 0.96% decrease in the foreign tourim income in the long run, respectively .

Finally we did some diagnostic tastes for the fitted ARDL model. For instance in order to check instability of the estimated model, we used the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) tests, Figure 1. This tests show a stable ARDL model.

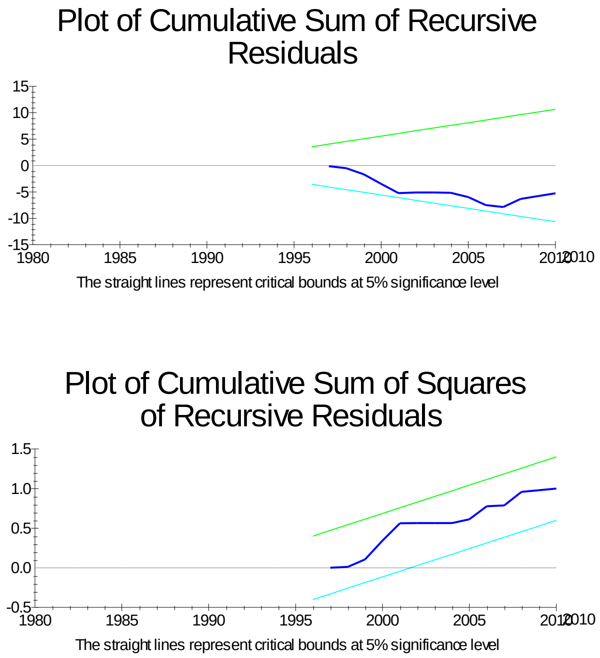


**Figure 1: CUSUM and CUSUMQ tests**

Source: Authors calculation

## 5. Conclusion

This paper investigates the long-run relationship among important macroeconomic variables including exchange rate, inflation, human education in tourism sector, number of tourism agencies and number of hotels on the aggregate tourism income in Iran. The Bounds testing approach to level relationship employed to investigate this relationship over the period of 1978-2010. Our results reveal that there are significant and under consideration effects of macroeconomic variables and aggregate tourism income. The results show that the number of hotels, investment made for training person in tourism sector, and the numbers of tourism agencies have positive effects on the income from foreign tourism. Therefore development of tourism infrastructure including hotels, training person in tourism sector and increase in number of agencies can attract foreign tourism. Exchange rate, inflation and dummy variable related to the imposed Iraq-Iran war have negative effects on the foreign tourism income.

## References

[1] Amin Beidokhti A., Zargar Seyed M., Nazari M. (2010). A strategic marketing mix to tourist industry. Journal of Strategic Management Studies, 1(3), 49-68. (In Persian)

[2] Archer, B. H., and J. E. Fletcher. (1996). The economic impact of tourism in the Seychelles. Annals of Tourism Research, 23(1), 32-47.

[3] Arslanturk, Y., Balcilar, M, and Ozdemir, Z. (2011). Time- varying linkages between tourism receipts and economic growth in a small open economy. Economic modeling, 28, 664-671.

[4] Belloumi, M. (2010). The relationship between tourism receipts, real effective exchange rate and economic growth in tunisia. International journal of tourism research, 12, 550-560.

[5] Gursoy, D., and Rutherford, D. (2004). Host attitudes toward tourism: An improved structural model. Annals of Tourism Research, 31(3), 495–516.

[6] Habibi F. and Abbasinezhad H. (2005). Identification and Estimation of Iran"S tourism demand function (with Cross Section and Time Series Datas). Tahghighat-E-Eghtesadi, (70), 91-115. (In Persian)

[7] Halicioglu, F. (2004). An ARDL Model of International Tourist Flows to Turkey. Global Business and Economics Review, Anthology, 614-624.

[8] Jenner, P., and Smith, C. (1992). The Tourism industry and the environment. The Economic Intelligence Unit, Special Report, no. 2453, London, UK.

[9] Kim HJ, Chen MH, Jang SC. (2006). Tourism expansion and economic development: the case of Taiwan. Tourism Management, 27, 925–933.

[10] Kwack, S. (1972). Effect of Income and Price on Travel Spending Abroad, 1960 II-1967 IV., International Economic Review, 13(2) 245-256.

[11] LIM, C. (1997). An Econometric Classification and Review of International Tourism Demand Models. Tourism Economics, 3, 69-81.

[12] Loeb, P. (1982). International Travel to the United States: An Econometric Estimation. Annals of Tourism Research, 9, 7-20.

[13] Little. J. S. (1980). International Travel to the United States: An Economic Evaluation. Annals of Tourism Research.

[14] Karami dehkordi M.,Kalantari Kh. (2011). Identification of Rural Tourism Problem In Chaharmahal -&- Bakhtiari province using grounded theory technique. Journal of Rural Research, 2(3 (7)), 1-7. (In Persian)

[15] Kohansal M.R. and Hamraz, S. (2009a). Analysis and Prediction of the Persian Gulf in the tourism pattern using ARIMA. Proceedings of the International Conference on the Persian Gulf. (In Persian)

[16] Kohansal M.R. and Hamraz, S. (2009b). Factors affecting tourism Persian Gulf coastal cities (case study of Bandar Abbas), Proceedings of the International Conference on the Persian Gulf. (In Persian)

[17] Mahmoudinia, D., Salimi Soderjani, E., Pourshahabi, F. (2011). Economic Growth, Tourism Receipts and Exchange Rate in MENA zone: Using Panel Causality Technique. Iranian Economic Review, 15(29), 129-146.

[18] Mirvase, S. (2009). Factors in attracting domestic and foreign tourists in Qeshm. Proceedings of the International Conference on the Persian Gulf. (In Persian)

[19] Naude, W. and Saayman, A. (2005). The Determinants of Tourism Arrivals in Africa: A Panel Data Regvession Analysis. Tourism Economics, Touris, 3, 365-391.

[20] Pearce, D. (1985). Tourism and environmental research: A review. International Journal of Environmental Studies, 25, 247–255.

[21] Pesaran, M. H., SHIN, Y. and Smith, R. J. (2001). Bounds Testing Approaches to the Analysis of Level Relationship. Journal of Applied Econometrics, 16, 289-326.

[22] Rakhshani nasab H.R., Zarabi A. (2010). Challenges and opportunities of ecotourism development in Iran, Geographic Space, 9(28):41-55. (In Persian)

[23] Sinclair, M. T. (1998). Tourism and economic development: A survey. The Journal of Development Studies, 34, 1–51.

[24] Syriopoulos, T. (1995).A dynamic model of demand for Mediterranean tourism. International Review of Applied Economics, 9, 318–336.

[25] Taghvaei M., Mousavi Seyed A.,Gholami Bimorgh Y.(2010). An investigation of developing religious tourism (a case study: Nurabad Mamasani town). Geographic Space, 10(31), 39-64. (In Persian)

[26] Taleb, M. and Mohammad Khan Kheyrabadi M. (2009). Developing rural tourism, a case study of villages on the river bank of Zayandeh rood. Nameh-Ye Olum-E Ejtemai, 16(35), 47-75. (In Persian)

[27] Theobald, W.F. (2001). Global Tourism, Second Ed. Butterworth & Heinemann, Oxford.

[28] Tse, R. Y. C. (1999). A Simuitaneus Model of Tourism Flow, Spending and Recipts. Tourism Economic, 5 (3).

[29] Walsh, Mary. (1996). Demand Analysis in Irish Tourism. Journal of the Statistical and Social Inquiry Society of Ireland. 1-31.

[30] Witt, S. & Ch. Martin. (1987). International Tourism Demand Models Inclusion of Marketing Variables. Tourism Management.

[31] Zivot, E and Andrews, DWK. (1992). Further evidence on the great crash, the oil-price shock, and the unit root hypothesis. J. Bus. Econ. Stat. 10(3), 251-270.

[32] Zortuk, M. (2009). Economic Impact of Tourism on Turkey's Economy: Evidence from Cointegration Tests, International Research Journal of Finance and Economics, 25, 231-239.

[33] http:www.wto.org