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SUBSTITUTION EFFECT OF TOURISM DESTINATIONS IN TÜRKIYE: CASE STUDY OF IRANIAN TOURISTS

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ABSTRACT

This study investigates the substitution effect between the destinations of Iranian tourists who travel to Türkiye, distinguishing between Istanbul and other touristic cities. For this purpose, it uses the Dynamic Linear Regression model in the class of time-varying parameters described in a State Space framework. The data are monthly 2018-1 to 2023-2 the results show that there is a dynamic relationship between the "number of incoming Iranian tourists to Istanbul" and "the number of incoming Iranian tourists to other destinations". It seems that the opening of Istanbul's new airport and the diversification of flights to Turkish destinations have an important factor in the dynamics of the parameter. There is a substitution effect between Istanbul and other touristic destinations. Also, inflation (both Iran and Türkiye) affects Iranians' travel behavior to Türkiye due to two features: One is due to the decrease in the purchasing power of Iranians and the second is due to the change in the national currency of the two countries.

1. INTRODUCTION

During the last decade, there have been significant changes in the travel of Iranians to different cities in Türkiye. So that the share of Agri as the most important tourist destination for Iranians has decreased significantly, and on the other hand, the cities of Istanbul and Van have hosted a larger share of Iranians. Also, the city of Van, as one of the most important tourist destinations for Iranians entering Türkiye, has reached a share of less than 7% in the early years of 2010 to a share of 18.7% in 2022. Meanwhile, Istanbul has become the most important tourist destination for Iranians. The competition between Istanbul and other Turkish cities in attracting tourists (especially Iranian tourists) is growing (Duman & Kozak, 2009) So that this growth can be affected by various factors, some of which in the studies Asadi & Daryaei (2011), Duman (2016), Ozturk et al. (2017), Çetin et al. (2018), Acar & Tanrisevdi (2019) et cetera.

Substitution effect can be investigated between different tourism destinations, between different travel methods or between types of received services or tourism products. Considering what was said about the competition between Istanbul and other tourist destinations in Türkiye for Iranians, this study seeks to investigate the substitution effect between the most important tourist destination for Iranians in Türkiye (Istanbul) and other tourist destinations in that country. For this purpose, there are two specific innovations in this study. First of all, despite the number of studies conducted on Iranian tourists who travel to Türkiye, this study is the only study that compares Istanbul with other tourist destinations in that country. The second is

the research methodology, so that this study is the only study that used dynamic modeling to analyze substitution effects in the tourism economy. Recently, some studies have investigated the elasticity of tourism demand in Türkiye (Ozcan & Ucak, 2016; Dogru & Sirakaya, 2018; Ulucak et al., 2020), but the study of substitution effects specifically for incoming tourists from a specific country (according to database of Ministry of Culture and Tourism of Türkiye (Monthly Bulletins), during 2014-2022 always, Iran was been 3-6 rank in incoming tourists in terms of the number of incoming tourists to Türkiye) has not been investigated.

2. LITERATURE REVIEW

Empirical studies in the field of incoming tourists to Türkiye, especially the travel of Iranians to Türkiye, and the issue of destination choice can be divided into three categories: First category, only refers to the pull and push factors in the travel of Iranians to Türkiye, without making a distinction between the domestic destinations of Türkiye for Iranians. Asadi and Daryaei (2011) prioritizes pull factors for Iranian tourist that travel to Türkiye. The three factors of "destinations variety", "tourism expenditures" and "lack of access to some services" in Iran are most pull factors. Nikjoo and Ketabi (2015) investigated the push and pull factors for Istanbul and Antalya cities. They showed that there are differences between Istanbul and Antalya in

attracting Iranian tourists. So, the type of tourism for these cities is different in Iranian travels. Ozturk et al. (2017) surveyed the motivational factors among Iranian tourists in Antalya. Although they focused on all-inclusive packages, their results show that there is a difference between the choice of travel destination for Iranians and residents of other countries. Therefore, substitution between tourist destinations is also different for Iranians than tourists from other countries.

The second category includes studies that have investigated the specific purpose of travel for a specific city in Türkiye. Duman (2016), Çetin et al. (2018), and Kaya and Gulcan (2021) investigated Iranian tourism demand in Van City, and resulted that Van could be substitution for other tourism destinations in Türkiye. Etemaddar et al. (2018) have focused on the purpose of the wedding celebration in the journey of Iranians to Türkiye. They stated that destinations with natural views are a suitable substitution for tourism destinations for holding wedding parties.

The third category is the studies that have been conducted only with purpose of investigating the substitution effect of tourism destinations. No study has specifically analyzed the effect of substitution of Iranian tourists to Türkiye. But some studies that have calculated tourism demand have also investigated substitution effects as a secondary objective. However, they have investigated these effects only using linear function and not dynamic modeling. In these studies, two points are important. Firstly, creating new tourist destinations and diversifying destinations is one of the goals of tourism management. Okuyucu (2013) has stated that creating additional locations in tourism is one of the goals of tourism managers in Türkiye. Second, in longer and more expensive trips, the elasticity of substitution is higher (Eugenio-Martin and Campos-Soria, 2007). Therefore, due to the neighborhood of Türkiye and Iran and also the size of these two countries, it is expected that Iranians' trip to some destinations in Türkiye have a different elasticity of substitution compared to each other (comparison of Istanbul and Van). Castillo-Manzano et al. (2015) estimated the substitution effect between the two types of transportation in Spain. They showed that the assumption of constant substitution rates and the use of linear functions is not a suitable assumption and dynamic modeling should be used to investigate the effects of substitution.

The substitution effect shows the tendency of consumers to substitute between their different choices (e.g., different destinations), due to difference in the elasticity of demand (Tribe, 1995). According to economic theory, when there are better substitutes for a product (or destination), the demand for that product (or destination) is the more elastic (McTaggart, Findlay and Parkin 1999). The issue of substitution effect can be found in consumer theory and demand theory. Price is a fundamental factor for change in consumer behavior and change in substitution effect (Varian, 2014). Therefore, in modeling the demand and explaining the problem of tourist selection, both price variables and the possible substitutes (alternative destinations) should be considered.

3. DATA AND METHODS

The model used in the research is in the class of time-varying parameters described in a State Space framework (West and Harrison, 1989). Dynamic models belong to the family of Time Varying Parameter models. Whenever there are new routes or changes in the route or mode of travel for tourists, non-dynamic models will not produce reliable results and the use of dynamic models will be more appropriate. Considering the developments in the access routes of Iranians to Türkiye cities as well as changes in price variables during recent years, the use of dynamic models will be preferred. Sometimes, volatility in international tourist arrivals is so high that it can significantly affect the GDP (Das et al., 2023). Therefore, dynamic modeling can be very valuable. The Dynamic Linear Regression (DLR) model used here can be mentioned as follows:

$$
\begin{aligned}
IstanbulTour_t &= \beta_0 + \beta_{1t}OtherTour_t + \beta_2 TRItoIRR_t + \beta_3 pop.direct_t + \beta_4 Inf_t \\
&\quad + \beta_5 Covid_t + \beta_6 Holiday_t + \sum_{i=7}^{17} \beta_7 Seas_{it} + \varepsilon_t
\end{aligned}
\tag{1}
$$

where

1. $IstanbulTour_t$ is the number of incoming Iranian tourists to Istanbul at time t.
2. $OtherTour_t$ is the number of incoming Iranian tourists to other cities in Türkiye at time t.
3. $TRYtoIRR_t$ is the Turkish Lira (TRY) to Iran Rial (IRR) rate at time t.
4. $pop.direct_t$ is the population of cities of departure from Iran (People who have direct access to Türkiye flights)
5. Inf_t is inflation in Iran market.
6. $Covid_t$ is a dummy variable for covid-19 (Coronavirus disease).
7. $Holiday_t$ is a travel period for Iranian (Nowruz and summer).
8. $Seas_{it}$ is a set of dummy variables for i = 7, . . . ,17 and time t (A total of 11 seasonal variables).
9. ε_t is the error term, which has a normal distribution with zero mean and variance σ².

Since this research seeks to analyze the substitution effect between Istanbul and other cities for Iranians entering Türkiye, then number of incoming Iranian to Istanbul is as the endogenous variable, which is indicated by $IstanbulTour_t$. The exogenous variables are number of incoming Iranian tourists to other cities $(OtherTour_t)$, the Turkish Lira to Iran Rial rate $(TRYtoIRR_t)$ and inflation rate in Iran (Inf_t). the effective exchange rate is an important factor in the substitution between tourist destinations (Candela & Figini, 2012), also exchange rate affect the tourism trade balance. The tourism trade is also affected by the number of incoming tourists. Bilateral exchange rate between countries is important (Dogru et al., 2019). Factors that create high intra-regional substitution are among the important factors affecting the competition of destinations. For example, the change in relative currencies between two countries (origin and destination) affects the level of demand and attraction of more/less tourists (Barati, 2023). If the substitution rate between one region (Istanbul) and other regions is high, then that tourist destination (Istanbul) can maximize its tourism receipts by increasing prices (Syriopoulos, 1990). Therefore, the relative exchange rate is important in calculating the substitution effect between tourist destinations. The inflation in Iran in recent years, in addition to reducing the value of the national currency, has severely reduced the purchasing power of Iranian households, so that

travel costs for Iranians have increased significantly. This factor has significant effects on the choice of travel destination and the behavior of tourists (Barati, 2022). Also, after the opening of Istanbul's new airport in 2018, more direct flights have been launched between different cities in Iran and Istanbul, which has increased the competition between other Turkish cities and Istanbul in terms of attracting Iranian tourists. Economic policies (such as the development of air transportation, price management, improving household purchasing power, etc.) are very important in tourism demand (Işık et al., 2019). Table 1 shows some new transportation routes between the cities of Iran and Türkiye. The cities of Hakkari, Agri, and Van, as the cities where Iranians mainly travel by land, behave differently than the cities of Ankara, Antalya, and Izmir (as important tourist destinations for Iranians). Istanbul has now become the most important tourist destination for Iranians. As a result, the travel pattern of Iranians to different cities in Türkiye is affected by some infrastructure measures (especially transportation infrastructure). The impact of tourism infrastructures, especially transportation infrastructures, on the travel pattern of Iranians has been investigated by Barati (2019a, 2019b).

According to Castillo-Manzano et al. (2015), in order to check elasticity, all variables, except virtual variables, are written in logarithmic form and modeled. The difference between the Linear Regression (LR) model and DLR model is that the DLR model coefficients in DLR change with time. Therefore, the sub index t is used for the coefficients. The $β_t$ stands for the substitution effect between Iranian tourists entering Istanbul and Iranians entering other cities.

The data were collected monthly from January, 2018, to February, 2023 (a total sample of 62 observations per variable). The statistics of IstanbulTour and OtherTour collected from the Ministry of Culture and Tourism of Türkiye (Monthly Bulletins), The statistics of Inf collected from Iran Statistics Center and the statistics of TRYtoIRR collected from Central Bank of Iran.

Least squares estimator and maximum likelihood estimator cannot be applied to estimate $β_{-1t}$. Therefore, it is used to recursive estimation algorithms and here is applied Generalized Random Walk model in a State Space framework:

$$\begin{pmatrix} x_t \\ x^*_t \end{pmatrix} = \begin{pmatrix} \alpha_1 & \alpha_2 \\ 0 & \alpha_3 \end{pmatrix} \begin{pmatrix} x_{t-1} \\ x^*_{t-1} \end{pmatrix} + \begin{pmatrix} \mu_t \\ \mu^*_t \end{pmatrix} \qquad (2)$$

$$\beta_{1t} = (1 \quad 0) \begin{pmatrix} x_t \\ x^*_t \end{pmatrix} \qquad (3)$$

- The $β_{1t}$ is a smoothed signal component consisting of the first state x_t; and x^*_t is a second state variable (Castillo-Manzano et al., 2015); α_{-i} are fixed values (i=1,2,3). If all of α_{-i} be equal to One μ_{-t}=0 then the model is the Integrated Random Walk (IRW). In R-Studio software for estimate IRW and DLR model used to *dlm* package.

Fig. 1 shows the trend of Iranians entering Istanbul during the five-year period (2018-2022). As it is clear, seasonal changes in this variable are quite evident (even during the covid-19 restrictions and from February 2020 onwards, there are still

peak tourism periods similar to other years). Table 1 shows events that can indicate the effects of substitution of different tourism destinations in Türkiye. These are a factor to create dynamics in the model Coefficients.
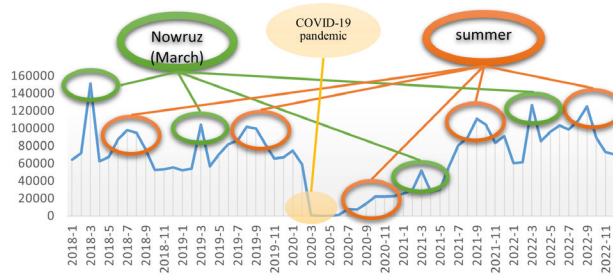

Fig. 1: Seasonality in incoming Iranian to Istanbul during the period 2018-2022

Table 1: Actions between Iran and Türkiye transport connection during the period 2018-2023

Launched Routes	Start Date	City
The first phase of Istanbul's new airport	October 2018	Istanbul
Full *opening of Istanbul's new airport*	March 2019	Istanbul
Flight between Rasht and Izmir (three days during Nowruz)	March 2019	Izmir
Flight between Tabriz and Adana	July 2019	Adana
Flight between Isfahan and Izmir	August 2019	Izmir
Tehran-Van-Ankara-Istanbul train	July 2019	Istanbul
Flight between Urmia and Istanbul	February 2020	Istanbul
Flight between Mashhad and Istanbul	July 2021	Istanbul
Flight between Ahvaz and Istanbul	November 2021	Istanbul
Flight between Tehran and Van	January 2022	Van
Flight between Gorgan and Istanbul	January 2023	Istanbul
Flight between Kerman and Istanbul	February 2023	Istanbul

4. RESULTS AND DISCUSSION

In order to verify whether there is a relationship between the dependent variable and the independent variables, before estimating the model, it will be useful to first check their degree of dependence using a matrix of scatterplots. Creating a matrix of scatterplots help to identify the existence of some degree of dependence among the variables. Due to the importance of OtherTour variable, here only the relationship between OtherTour and IstanbulTour is depicted in Fig 2. As can be seen, there is a positive relationship between these two variables. Therefore, choosing OtherTour in research modeling is an acceptable assumption. The same argument can be used for other variables as well, but because other variables are not specifically analyzed here, matrix of scatterplots related to them have been avoided.
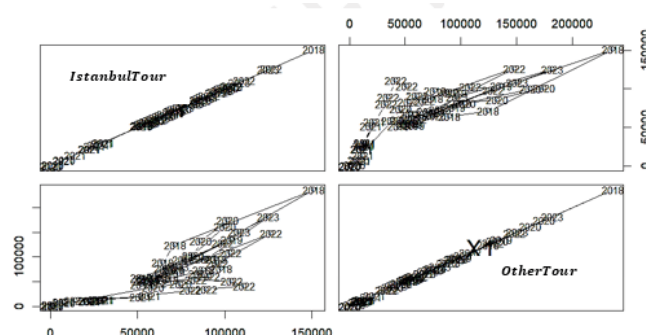

Fig. 2: Scatterplot matrix of *IstanbulTour* and *OtherTour*

Examining the dynamics of the model parameters (here, $β_{-1t}$ is checked) shows the existence of change by time. Therefore, it is necessary to use

the dynamic linear regression model and consider the parameters in such a way that they change with time (Fig. 3). Although in the long term β_{1t} tends to a constant value, it cannot be considered stable in the short term. By comparing Fig. 3 and Table 1, it seems that the opening of Istanbul's new airport (The first months of the period under review) and diversification of flights to other cities, except Istanbul (The third to eighth month of the second year under review) are the most important reasons for the change in the parameter over time.
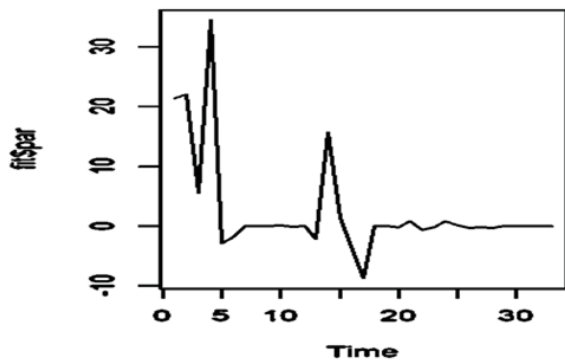

Fig. 3: Seasonality in incoming Iranian to Istanbul during the period 2018-2022

The results of DLR model are shown in Table 2 (seasonal virtual variables are not shown in this table). According to these results, except the pop. direct, other variables are significant. The non-significance of the pop.direct indicates that the increase in the number of flight origins does not necessarily lead to an increase in the number of inbounds to Istanbul, and Iranians who wish to travel to Istanbul, even if there is no direct flight from their city to Istanbul, they will travel there through other cities. Therefore, the policy of multiplying the number of departure cities for flights to Istanbul (and maybe other cities) is not a correct action and should be done with caution.

The substitution rate between Iranian tourist destination cities in Türkiye has risen over time, so that in all of 2018, the rate was above 10. The parameter related to OtherTour variable is significant, so the substitution effect is confirmed. Based on previous studies (Kozak, 2001; Evren et al., 2020; Ünal, 2021), substitution between Istanbul and other Turkish cities can be significant. This study also confirms the results of other studies, so that the substitution effect between other cities and Istanbul has been positive. This means that other cities are competitors of Istanbul in attracting Iranian tourists.

Table 2: Results of the DLR model proposed in (1).

Variables	estimate	Pr(>|t|)	
Intercept	-9.33	0.017	**
OtherTour	0.90	<2e-16	***
TRYtoIRR	0.96	<7e-06	***
pop.direct	0.05	0.795	
Inf	0.16	0.046	**
Covid	-0.93	0.0002	***
Holiday	0.73	0.031	**
Model adjusted R-squared: 0.9579		<2.2e-16	***

Two countries, Iran and Türkiye, are among the countries with the highest rate of inflation. Also, the value of the national currency of these countries has decreased drastically in recent years. The comparison of the national currency of these countries shows that until 2021, the Iranian Rial (IRR) has always been more valuable than the Turkish Lira (TRY), but in 2022, this trend has been reversed. The change in IRR to TRY has a positive and significant effect on Iranians' trips to Türkiye. In fact, the decrease in the value of a country's currency compared to other countries (here, the decrease in the value of the Turkish Lira compared to the Iranian Rial) can increase the number of incoming tourists to the country (increasing Iranian travel to Türkiye). This change in the behavior of tourists and their willingness to travel usually accompanied by a time delay (due to the need to plan the trip). Therefore, until the middle of 2022, an increase in the number of Iranian trips to Türkiye (however small) can be expected. The change in the Iranians trips to Türkiye has increased slightly, while the change in their travel destinations seems to be more. This change can be caused by substitution effects. Since the total number of Iranian trips abroad has not changed significantly, this means that Türkiye has replaced other Iranian travel destinations as a cheap trip for Iranians (because inflation in Iran reduces the purchasing power of Iranians and makes them move towards cheaper destinations). It is noteworthy that inflation in Iran has also affected the purchasing power of households, so that short trips have replaced long trips, and the length of the trip has also shortened (Barati, 2022; Soltani et al., 2019). The positive and significant effect of Inf is indicative of this result.

Although this paper has not specifically investigated the effect of tourism seasonality, the significance of Holiday and Seas variables can be related to the seasonality of tourism. Iranians' trip to Istanbul is highly seasonal.

Estimation is achieved by means of the Kalman Filter have showed in Fig 4. The Kalman filter produces estimates of the current state variables. In here, the Kalman filter shows the dynamic changes in the system along with the existence of substitution effects between tourism destinations in Türkiye. The increasing trend over time in Fig 4 indicates the presence of dynamics in β_t. The dlmFilter function is used to calculate Kalman filter in R software (Petris, 2009; Petris et al., 2007; Piccoli, 2015).
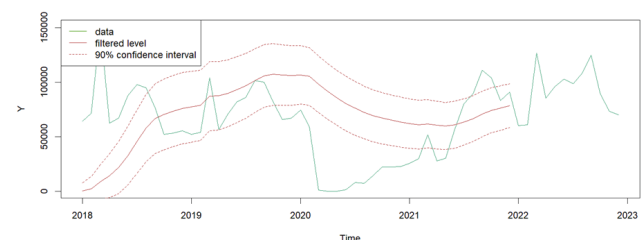

Fig. 4: Kalman filter applies to compute filtered values of the state vectors for Iranians have traveled to Istanbul

5. CONCLUSIONS

This study aims to investigate the substitution effect between the destinations of Iranian tourists

who travel to Türkiye (different touristic cities in Türkiye), distinguishing between Istanbul and other touristic cities. The results show the level of competition between Istanbul and other destinations in Türkiye. For this purpose, R software and dlm package have been used. The results show that there is a dynamic relationship between the variables, so it is necessary to use DLR. The dynamic of the parameter related to the variable of OtherTour disturbs the conventional linear regression results. It seems that the opening of Istanbul's new airport has acted as a turning point and an important factor in the dynamics of the parameter. Of course, the diversification of flights from different cities in Iran to other cities in Türkiye (except Istanbul) can also be effective in this dynamic. Also, there is a substitution effect between destinations and Iranians who travel to Türkiye tend to visit other touristic cities (except Istanbul) in their next trips. Several important conclusions can be drawn from the model results. First, the increase in the number of flight destinations does not necessarily lead to an increase in the number of tourists incoming to Istanbul. In fact, the whole of Iran should be considered as the origin and not its cities (those interested in traveling to Istanbul, despite the distance of their residence and cities with direct flights to Istanbul, will still travel this path and "distance between cities" cannot be an important factor in reducing the number of trips to Istanbul). Second, inflation in Iran (and of course inflation in Türkiye) affects Iranians' travel behavior to Türkiye due to two features: One is due to the decrease in the purchasing power of Iranians and the second is due to the change in the national currency of the two countries (Turkish Lira (TRY) to Iran Rial (IRR) rate).

According to the results of this study, it is recommended that Turkish policymakers stop the policy of expanding the number of flight points (cities) from Iran to Istanbul and instead focus on the policy of diversifying attractions and destinations, stabilizing the national currency and using cooperation and focus on coordination between objectives (rather than competition between them). Also, researchers in this field will benefit more from dynamic behavior in modeling.

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