THE BOUNDS TEST TO THE LEVEL RELATIONSHIP AND CAUSALITY BETWEEN FOREIGN DIRECT INVESTMENT AND INTERNATIONAL TOURISM: THE CASE OF TURKEY

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Introduction

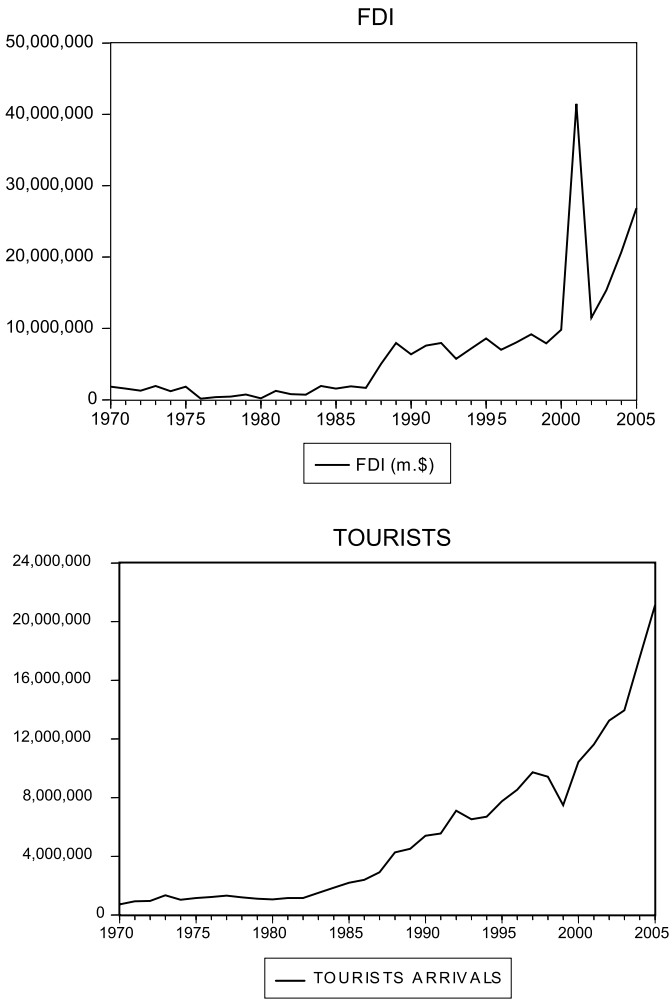
The importance of international tourism is well known irrespective of what the size of countries is or whether they are developed or not. It means greater integration intso the world economy which also brings benefits to the economies such as employment creation, foreign exchange earnings, government revenues, and income and employment multipliers [1]. There are various ways through which international tourism and export earning activities can generally contribute to the economy [10]. On the other hand, investments are critical for further development of international tourism. That is, investments provide secure and transparent framework that reduce risk in the tourism industry [3]. Thus, this brings an important question whether foreign direct investment (FDI) drives international tourism or not. [16] suggests that long-run relationship exists between FDI and tourism in China. They also find that FDI stimulates international tourism in the case of China. However, this relationship deserves further attention from researchers to be applied for countries other than China since searching the link between FDI and international tourism is quite new.

Having the importance of the topic, this paper investigates long-run equilibrium relationship between international tourism and FDI by bounds tests and then tests the direction of causality between them in the case of Turkey, which has a developing economy, strategic geographical location, and about 8,800 USD per capita income (GDP) in current prices [22]. Turkey had a highly volatile economy in the history, but its economy has started to stabilize during a one party period since 2002. Exports and imports of goods and services constituted 22 % and 27 % of GDP respectively in 2007. Inflation is about 5.73 % according to consumer prices. FDI inflows also showed a tremendous increase in the Turkish economy after 2002 as a result of successful economic policies of government as also can be seen from Figure 1. Net FDI inflows reached to a maximum of 22.19 million USD in the history, which consituted 3.38 % of GDP in 2007.

Tourism industry is also a volatile one in Turkey, which tourism receipts have shown 9.6% decrease during July 2008 and July 2009. International tourist arrivals to Turkey coming and accommodating in the touristic establishments are well above 20 million per year as also can be seen from Figure 1 [21]. However, empirical studies on the contribution of international tourism to the economy of Turkey have provided mixed results. That is, some studies [4, 11] support the tourism-led growth hypothesis for Turkey while some [6] reject it. Furthermore, searching an empirical relationship between two highly volatile macroeconomic indicators (FDI and international tourism) in Turkey would be interesting and provide an important implication to policy makers.

There are important implications and motivations for doing this study: Research on searching the empirical relationship between international tourism and FDI is quite rare in the relevant literature. [16] find that FDI is a catalyst for international tourism in the case of China. However, there is a strong need to have more empirical works in the literature; therefore, this paper contributes to this literature by empirically investigating the level relationship and the direction of causality between the net FDI inflows and international tourism in a developing economy, Turkey. The importance of tourism to the Turkish economy is also well recognized in the relevant literature [4, 17, 18, 19, 20]. However, this has not found a wide application area in the empirical studies in the case of Turkey [4]. Furthermore, international trade plays an extremely important role amidst economic concerns. However, little

Fig. 1: International Tourist Arrivals and Net FDI Inflows to Turkey.



Source: TURKSAT, 2009.

mention is of international tourism, in spite of its importance among foreign expenditure items [7] and majority of empirical studies on tourism forecasting were built on tourism demand functions. As [15] mention several areas remain incomplete in this sort of studies and hence deserve further attention. On the other hand, [5] proves that FDI in Turkey is stimulated mainly by an improvement in the economy. He also suggests that there is a further need to investigate through which channels FDI in Turkey are stimulated. Therefore, this study will investigate empirical relationship between FDI and international tourism as [16] did a similar one in the case of China.

The paper proceeds as follows. Section 1 defines data and methodology of the study. Section 2 provides results and discussions and the paper concludes with Section 3.

1. Data and Methodology

Data used in this paper are annual that cover the period 1970 – 2005 and variables of the study are total number of international tourists visiting and

accommodating in Turkey and net FDI inflows. [4, 6] discuss about alternative measures for the volume of international tourism including tourism receipts and international tourist arrivals. This study uses international tourist arrivals for measuring tourism volume as in the studies of [4, 6] due to the fact that multicollinearity problem emerges when tourism receipts are used (since money income from touristic destinations can be a part of FDI). Data are taken from [21] and [22]. Both variables are in their natural logarithm to capture growth effects where FDI variable is at 2000 constant US $ prices.

The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) Unit Root Tests are employed to test the integration level and the possible co-integration among the variables [2, 13]. PP approach allows for the presence of unknown forms of autocorrelation with a structural break in the time series and conditional heteroscedasticity in the error term, which also computes a residual variance that is robust to auto-correlation, are applied to test for unit roots as an alternative to ADF unit root test.

To investigate a long-run relationship between each pair of variables under consideration, the bounds test within the ARDL (the autoregressive distributed lag) modeling approach was adopted in this study. This model was developed by [12] and can be applied irrespective of the order of integration of the variables (irrespective of whether regressors are purely I (0), purely I (1) or mutually co-integrated). The ARDL modeling approach involves estimating the following error correction models:

$$\Delta \ln Y_t = a_{0_Y} + \sum_{i=1}^{n} b_{i_Y} \Delta \ln Y_{t-i} + \sum_{i=0}^{n} c_{i_Y} \Delta \ln X_{t-i} + \\ + \sigma_{1_Y} \ln Y_{t-1} + \sigma_{2_Y} \ln X_{t-i} + \varepsilon_{1t} \quad (1)$$

$$\Delta \ln X_t = a_{0_X} + \sum_{i=1}^{n} b_{i_X} \Delta \ln X_{t-i} + \sum_{i=0}^{n} c_{i_X} \Delta \ln Y_{t-i} + \\ + \varpi_{1_X} \ln X_{t-1} + \varpi_{2_X} \ln Y_{t-i} + \varepsilon_{2t} \quad (2)$$

In equations (1) and (2), Δ is the difference operator, Y_t is dependent variable, X_t is independent variable and ε_{1t} and ε_{2t} are serially independent random errors with mean zero and finite covariance matrix.

Again in equations (1) and (2), the F-test is used for investigating a level (long-run) relationship between dependent variable and its regressors. In the case of a long-run relationship, the F-test indicates which variable should be normalized. In Equation (1), when Y is the dependent variable, the null hypothesis of no long run relationship is H_0: $\sigma_{1Y} = \sigma_{2Y} = 0$ and the alternative hypothesis of long run relationship is H_1: $\sigma_{1Y} \neq \sigma_{2Y} \neq 0$. On the other hand, in Equation (2), when X is the dependent variable, the null hypothesis of no long run relationship is H_0: $\varpi_{1Y} = \varpi_{2Y} = 0$ and the alternative hypothesis of long run relationship is H_1: $\varpi_{1Y} \neq \varpi_{2Y} \neq 0$.

In the presence of a long run equilibrium relationship based on the bounds test, the Granger causality tests should be carried out under the vector error correction model (VECM) when the variables under consideration. By doing so, the short-run deviations of series from their long-run equilibrium path are also captured by including an error correction term [8, 9]. On the other hand, in the absence of co-integration, then, the Granger causality tests should be done under vector autoregressive (VAR) model. The VAR model can be specified as equation (3) where Y is the dependent variable, and the VECM can be specified as equation (4) where X is the dependent variable:

$$\Delta \ln Y_t = \alpha_0 + \varphi_{11}^{p}(L) \Delta \ln Y_t + \varphi_{12}^{q}(L) \Delta \ln X_t + \mu_{1t} \quad (3)$$

$$\Delta \ln X_t = \alpha_1 + \varphi_{21}^{p}(L) \Delta \ln X_t + \varphi_{22}^{q}(L) \Delta \ln Y_t + \\ + \delta ECT_{t-1} + \mu_{2t} \quad (4)$$

Where

$$\varphi_{ij}^{p}(L) = \sum_{n=1}^{P_{ij}} \varphi_{ijn} L^1 \quad (5)$$

$$\varphi_{ij}^{q}(L) = \sum_{n=1}^{Q_{ij}} \varphi_{ijn} L^1 \quad (6)$$

$$\varphi_{21}^{p}(L) = \sum_{i=1}^{P_{21}} \varphi_{21,i}^{p} L^i \quad (7)$$

$$\varphi_{22}^{p}(L) = \sum_{i=0}^{P_{22}} \varphi_{22,i}^{p} L^i \quad (8)$$

In equations (3) and (4), Δ denotes the difference operator and L denotes the lag operator where, for example, (L) $\Delta \ln Y_t = \Delta \ln Y_{t-1}$. ECT_{t-1} is the lagged error correction term derived from the long-run equilibrium model. Finally, μ_{1t} and μ_{2t} are serially independent random errors with mean

zero and finite covariance matrix. Finally, according to the VAR model for causality test, having statistically significant F value in equation (3) and according to VECM for causality test, having statistically significant both F and t ratios for ECT_{t-1} in equations (4) would be enough condition to have causation from X to Y and from Y to X respectively.

2. Empirical Results

Table 1 gives ADF and PP unit root test results for tourist arrivals and net FDI inflows to Turkey. Tourist arrivals is non-stationary both in ADF and PP tests at level but stationary at first difference, that is integrated of order one, I (1). However, both ADF and PP tests suggest that FDI variable is integrated of order zero, I (0).

Now having the fact that FDI variable is stationary at level while tourist arrivals are stationary at first difference for Turkey, long-run equilibrium relationship will be now investigated by using the bounds test within the ARDL modeling approach. Table 3 gives results of the bounds test between tourist arrivals and net FDI inflows for Turkey under three different scenarios as also suggested by [12] that are with restricted deterministic trends (FIV), with unrestricted deterministic trends (FV) and without deterministic trends (FIII). Intercepts in these scenarios are all unrestricted (for detailed information, please refer to [12]. Critical values for F and t statistics are presented in Table 2 as taken from [12] to be used in this study.

Tab. 1: ADF and PP Tests for Unit Root

Statistics (Levels)	ln T	Lag	ln FDI	lag
τT (ADF)	-1.81	(0)	-3.30***	(4)
$\tau\mu$ (ADF)	0.19	(0)	-0.58	(4)
τ (ADF)	3.88	(0)	1.19	(2)
τT (PP)	-1.76	(1)	-3.57**	(1)
$\tau\mu$ (PP)	0.27	(1)	-0.84	(1)
τ (PP)	4.19	(1)	1.11	(13)
Statistics (First Differences)	Δln T	Lag	Δln T	lag
τT (ADF)	-6.60*	(0)	-5.74*	(1)
$\tau\mu$ (ADF)	-6.53*	(0)	-5.65*	(1)
τ (ADF)	-0.79	(3)	-2.26**	(3)
τT (PP)	-6.59*	(2)	-10.65*	(3)
$\tau\mu$ (PP)	-6.50*	(2)	-9.78*	(1)
τ (PP)	-4.91*	(3)	-9.67*	(1)

Source: own

Note: T represents total tourist arrivals to Turkey; FDI is net inflows of foreign direct investment. τT represents the most general model with a drift and trend; $\tau\mu$ is the model with a drift and without trend; τ is the most restricted model without a drift and trend.

Numbers in brackets are lag lengths used in ADF test (as determined by AIC set to maximum 3) to remove serial correlation in the residuals. When using PP test, numbers in brackets represent Newey-West Bandwith (as determined by Bartlett-Kernel).

*, ** and *** denote rejection of the null hypothesis at the 1%, 5% and 10% levels respectively.

Tests for unit roots have been carried out in E-VIEWS 6.0.

Tab. 2: Critical Values for ARDL Modeling Approach

	0.10		0.05		0.01	
k = 2	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
F_{IV}	3.38	4.02	3.88	4.61	4.99	5.85
F_{V}	4.19	5.06	4.87	5.85	6.34	7.52
F_{III}	3.17	4.14	3.79	4.85	5.15	6.36
t_{V}	-3.13	-3.63	-3.41	-3.95	-3.96	-4.53
t_{III}	-2.57	-3.21	-2.86	-3.53	-3.43	-4.10

Source: Pesaran et al. (2001): pp. 300-301 for F-statistics and pp. 303-304 for t ratios.

Note: k is the number of regressors for dependent variable in ARDL models, FIV represents the F statistic of the model with unrestricted intercept and restricted trend, FV represents the F statistic of the model with unrestricted intercept and trend, and FIII represents the F statistic of the model with unrestricted intercept and no trend. tV and tIII are the t ratios for testing $\sigma_{1Y} = 0$ in Equation (1) and $\varpi_{1Y} = 0$ in Equation (2) respectively with and without deterministic linear trend.

Results in Table 3 suggest that the application of the bounds F-test using the ARDL modeling approach does not suggest the existence of a level relationship (long-run relationship) between tourist arrivals and net FDI inflows when tourist arrivals are dependent variable since the null hypothesis of H_0: $\sigma_{1Y} = \sigma_{2Y} = 0$ is accepted. On the other hand, the bounds F-test suggest the existence of a level relationship between tourist arrivals and net FDI inflows when net FDI inflows are dependent variable since the null hypothesis of H_0: $\varpi_{1Y} = \varpi_{1Y} = 0$ is rejected according to F_{III} and F_{IV} scenarios. On the other hand, the results from the application of the bounds t-test in each ARDL model are less clear-cut and do not generally allow the imposition of the trend restrictions in the models since they are not statistically significant except F_{III} scenario when net FDI inflows are dependent variable [see 12].

On the basis of the bounds test results for long run relationship, the Granger causality tests require a VAR (vector auto-regressive) model in the case of (FDI / T) where total tourist arrivals are dependent variable and a VEC (vector error-co-

Tab. 3: Bounds Test for Cointegration

	With Deterministic Trends			Without Deterministic Trend		
Variables	F_{IV}	F_{V}	t_{V}	F_{III}	t_{III}	Conclusion
						H_0
T and FDI						
FT (T / FDI)	3.37[a]	2.83[a]	-3.38[b]	1.42[a]	-1.65[a]	Accepted
FFDI (FDI / T)	5.89[c]	4.96[b]	-3.17[b]	6.10[c]	-3.56[c]	Rejected

Source: own

Note: Akaike Information Criterion (AIC) and Schwartz Criteria (SC) were used to select the number of lags required in the co-integration test. Both gave the same level of lag order, VAR= 1. F_{IV} represents the F statistic of the model with unrestricted intercept and restricted trend, F_{V} represents the F statistic of the model with unrestricted intercept and trend, and F_{III} represents the F statistic of the model with unrestricted intercept and no trend. t_{V} and t_{III} are the t ratios for testing $\sigma_{1Y} = 0$ in Equation (1) and $\varpi_{1Y} = 0$ in Equation (2) respectively with and without deterministic linear trend. [a] indicates that the statistic lies below the lower bound, [b] that it falls within the lower and upper bounds, and c that it lies above the upper bound.

rrection) model in the case of (FDI / T) where FDI is dependent variable. There are methods for lag length selection in the recent literature such as AIC (Akaike Information) and SIC (Schwartz Information Criterion). However, due to the limited number of observations in this study, maximum lag is set to 3 and both VAR and VEC models were estimated for each lag length. [14] also point out that it would be best to run the test for a few different lag structures and make sure that the results were not sensitive to the choice of lag length.

to mention that international tourism expansion in Turkey stimulates net FDI inflows; thus, as [5 and 6] mention, one of the channels for FDI growth (that also leads to an improvement in the balance of payments) in Turkey is international tourism development as empirically found in the present study. The finding of this study contradicts with the finding of [16] where they suggest unidirectional causation from FDI to international tourism in the case of China. Thus, in opposite to the findings of [16], the results of the present study reveal that international touri-

Tab. 4: Granger Causality Tests

Lag Level	1		2		3		
Null Hypothesis	F – Stat	t_{ECTt-1}	F – Stat	t_{ECTt-1}	F – Stat	t_{ECTt-1}	Result
T and FDI							
FDI does not Granger cause T	0.51	-	0.47	-	0.48	-	T ⇒ FDI
T does not Granger cause FDI	7.80*	-3.12*	5.02*	-3.00*	3.95**	-3.12*	

Source: own

Note: 1. *, and ** significance at 1% and 5% levels respectively.

Results in Table 4 suggest unidirectional causation from international tourist arrivals to net FDI inflows growth in the case of Turkey. F statistics in the VAR models are not statistically significant in any lag length where both F and t statistics in the VEC models are statistically significant in all of the lag lengths. Therefore, there is strong evidence that a growth in international tourist arrivals stimulates a growth in net FDI inflows to Turkey.

3. Conclusions

This paper empirically investigated long run equilibrium relationship between international tourism and net FDI inflows growth by using the bounds test in the case of Turkey. Results suggest that these two variables are in a level or long run relationship only when net FDI inflows are dependent variable in the ARDL model. Furthermore, the results of causality test using VEC models suggest unidirectional causation from international tourism growth to net FDI inflows growth in Turkey. It is important

sm is a catalyst for foreign direct investment in the long run of the Turkish economy. The present study implicates that the Turkish authorities should promote international tourism since both its economy and foreign based investments will be positively inluenced from the development of this “foreign exchange” earning sector. Finally, this issue deserves further attention from researchers for comparison purposes since [16] and the present study give different conclusions.

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ABSTRACT

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Research on searching the empirical relationship between international tourism and foreign direct investment (FDI) is quite rare in the relevant literature. [16] find that FDI is a catalyst for international tourism in the case of China. However, more empirical works are needed in the literature; therefore, this paper contributes to this literature by empirically investigating the level relationship and the direction of causality between the net FDI inflows and international tourism in a developing economy, Turkey. The present study employs the bounds test for long run equilibrium relationship as developed by [12] and Granger causality tests under vector error correction modeling with that respect. Results suggest that both variables are in long-run equilibrium relationship only when FDI is dependent variable under the ARDL (auto-regressive distributed lag) modeling approach. Results did not reveal any long run equilibrium relationship amongst these variables when international tourism variable is dependent in the bounds test of [12]. Final investigation in the present study is that international tourist arrivals to Turkey stimulates an expansion in the net FDI inflows. Thus, in opposite to the findings of [16], the results of the present study reveal that international tourism is a catalyst for foreign direct investment in the long run of the Turkish economy. The present study implicates that the Turkish authorities should promote international tourism since both its economy and foreign based investments will be positively inluenced from the development of this "foreign exchange" earning sector. This study shows that there is a huge need for further attention for this debate from the other researchers.

Key Words: *FDI, International Tourism, Bounds Test, Turkey.*

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