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The spillover effects of financial system and tourism on the informal economies: Evidence from Turkey

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ABSTRACT

This article examines the impact of the financial system and tourism on the informal economy in Turkey, a country known for its emerging economy, its status as a sun-sea-culture destination, and its substantial informal sector. Time series data from 1960 to 2019 will be used to provide real-world evidence. Both dynamic and fully modified ordinary least squares estimations will be used, in line with second-generation econometric techniques that take into account structural breaks in the series for unit root and cointegration tests. The results highlighted an inverted U-shaped relationship between the financial system and the informal economy, in contrast to a U-shaped relationship between tourism volume and the informal economy. These outcomes imply the necessity of financial inclusion and the establishment of efficient mechanisms to minimize informality. Moreover, policymakers in Turkey should prioritize bolstering the number of firms in the sector, enhancing sustainability, and promoting local sourcing and certification systems. Additionally, policymakers should prioritize enhancing affordable financing sources for small-to-medium-sized enterprises, particularly those in the tourism sector, to facilitate their transition into the formal economy.

Contribution/ Originality: This study is the first attempt to assess the spillover effects of tourism and the financial system as two important service sectors in the informal economy in the case of Turkey, which has a considerable amount of informal economic activities.

1. INTRODUCTION

The role of tourism in economies has garnered considerable attention from researchers in the last two decades. Most countries have established that tourism significantly contributes to the growth of formal income. The relevant literature extensively tests the tourism-growth nexus through the tourism-led growth (TLG) hypothesis. Balaguer and Cantavella-Jordá (2002), Gunduz* and Hatemi-J (2005), Shahzad, Shahbaz, Ferrer, and Kumar (2017), Naseem (2021), and Kumar and Stauvermann (2023) found a significant positive impact of tourism on the income level of nations. Therefore, the research continues to progress, yielding a mix of results and findings. Alcalá-Ordóñez and Segarra (2023) provide a literature review of the published articles between 2005 and 2023 on the tourism-led growth hypothesis.

However, all field studies focus on tourism's effects on formal growth and formal income. Given that the growth of tourism is likely to influence legal income in these countries, it's reasonable to anticipate that it could also stimulate informal economic activities. Goldberg and Pavcnik (2003) argue that increased foreign competition (i.e., services

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trade) in developing countries is likely to result in an expansion of informal economic activities, mainly through the labor market. Therefore, one could argue that the tourism and finance sectors, which are involved in services trade and foreign competition, could potentially drive informal economic activities. The efficiency wage models developed by Shapiro and Stiglitz (1984); Bulow and Summers (1986) and Saint Paul and Verdier (1996) provide a framework for considering such an argument. These models are based on labor market laws and look at how changes in the services trade affect jobs moving from the formal to the informal sector (Goldberg & Pavcnik, 2003; Stallings & Peres, 2000).

On the other hand, Ngoasong and Kimbu (2016) argue that informal financial activities support development-led tourism activities. They show that informal microfinance institutions support development-led tourism entrepreneurship by providing microcredits to small tourism firms. Recent studies highlight the reducing effect of tourism on the informal economy (Salinas, Ortiz, Ponce, & Changoluisa, 2023; Xu & Lv, 2022).

Shahbaz, Benkraiem, Miloudi, and Tiwari (2019) and Fauzel and Seetanah (2023) conclude that the formal financial sector and tourism have a bidirectional relationship and reinforcing interactions. The authors think that this result is because of the pecking order framework, which says that when conditions are right, companies tend to use more equity and less debt to fund growth. On the other hand, according to Barton and Gordon (1988); Chen (2010) and Morck, Shleifer, and Vishny (1988) well-performing firms, as far as profitability is concerned, are likely to be less leveraged.

The relevant literature also links the financial sector to informal economies. Williams (2017) and Imamoğlu, Katircioğlu, and Payaslioğlu (2018) demonstrate that a direct impact of the financial system on informal activities could be attributed to the institutional theory. This theory proposes that informal activities are likely to arise following multiple factors, such as (1) bankruptcies and imperfections in the financial system; (2) asymmetry in finance-related companies; (3) the availability of illegal finance-related companies; and (4) institutional asymmetry as an outcome of legal institutional bankruptcies.

On the other hand, Capasso and Jappelli (2013) and Bose, Capasso, and Wurm (2012) contend that as financial services advance, efficient intermediaries are likely to enter the market, leading to a decline in borrowing costs and an increase in the opportunity cost of continuing to operate informally. Therefore, this argument suggests a negative correlation between the volume of informal activities and financial services. Capasso and Jappelli (2013) and Bose et al. (2012) suggest that higher borrowing costs are also sources of informality.

To the best of the author's knowledge, the literature has not thoroughly explored the interaction between the financial and tourism sectors in the informal economy. However, Lv (2020) study is the only one to investigate the spillover effect of tourism on informal economic activities. In light of this, the goal of this study is to look into how tourism growth affects the informal economy in Turkey, which is still a developing economy, while also taking into account the impact of the financial sector on this link. Lv (2020) looks at the part that tourism growth plays in informal economies. He does this by using data from 2000–2007 and a panel of countries that were chosen because they had enough of it. This paper hints at how important it is to study subnational samples and calls for more research. On the other hand, spillover effects of financial development and informal economy have been examined by Imamoğlu et al. (2018) and Katircioglu and Imamoglu (2020). According to the author's knowledge, the current investigation is the first attempt to evaluate the spillover effects of tourism and the financial system as major service sectors in informal economies.

The choice of Turkey for such a nexus deserves attention. Tourism has been significant foreign exchange revenue for the Turkish economy over the years, which reduces persistent current account deficits. Turkey, with 45.8 million tourists, ranks 6th worldwide as far as international tourist arrivals are concerned (UNWTO, 2021). Tourism in Turkey generated 41.4 billion USD (United States dollars) in 2019, which is 16.31 percent of total exports in 2019. International tourism arrivals in Turkey totaled over 49 million in 2023.

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According to the findings of Medina and Schneider (2018) Turkey's volume of informal economies was 30.90 percent of the formal GDP (gross domestic product) in 2015, and the average between 1991 and 2005 was 35.31 percent. We can say that roughly one-third of Turkey's gross national product goes into the informal economy every year. Therefore, it would be fitting to expect that tourism growth will likely impact the size of informality in Turkey, and the financial sector is a significant contributor to this nexus. This whole system makes it interesting to investigate it in the case of Turkey.

The study is organized as follows: Section 2 describes the academic setting of the empirical model; Section 3 describes data and methodology; Section 4 presents results and discussions; and Section 5 concludes the study.

2. THEORETICAL FRAMEWORK

This study argues that tourism growth drives informal economies, and the financial sector significantly moderates this relationship. Thus, the nexus can be proposed as:

$$IE_t = \left(FD_t^{\beta_1}, FD_t^{2\beta_2}, TD_t^{\beta_3}, TD_t^{2\beta_4}, RER_t^{\beta_4}\right) \quad (1)$$

Where IE refers to the volume of the informality while FD (financial development) and TD (tourism development) refer to the proxies for financial development and the tourism sector, respectively, and RER is the real exchange rate. The terms β_1, β_2, β_3, β_4, and β_5 are the coefficients of the related regressors. Squared terms of FD and TD variables are added to the model to observe if an inverted U-shaped relationship and spillover effects exist between IE and FD. and between IE and TD, respectively. Then, the response of the informal activities is in the same direction for the initial stages of FD and TD, according to this argument. In contrast, this response becomes adverse at further steps for FD and TD following peak points (Imamoğlu et al., 2018). Finally, according to previous literature studies, RER is added to Equation 1 as it is a significant force behind tourism activity (Balaguer & Cantavella-Jordá, 2002). Currency depreciation is expected to likely increase the volume of informal activities.

Equation 1 can then be rewritten in a logarithmic regression form to capture the growth effects of regressors:

$$ln\, I\, E_t = \beta_0 + \beta_1\, ln\, F\, D_t + \beta_2\, ln\, F\, D_t^2 + \beta_3\, ln\, T\, D_t + \beta_4\, ln\, T\, D_t^2 + \beta_5\, ln\, R\, ER_t + \varepsilon_t \quad (2)$$

Where at period t, the term "ln" stands for the logarithm of the series under consideration and ε is the error disturbance.

3. DATA AND METHODOLOGY

3.1. Data

This article uses an annual dataset that covers the period from 1960 to 2019. The time span of the econometric analysis is restricted to 2019 because of the release of recent data statistics. The informal economies' size (IE) as a share of GDP, the number of tourists as a measure of tourism development (TD), the composite financial index as a measure of financial development (FD), and the real effective exchange rate index (RER, 2010 = 100) are some economic series. The variables, except IE and FD, were obtained from the literature (Medina & Schneider, 2018) tells us to use the Multiple Indicators Multiple Causes (MIMIC) methods to get an idea of the dependent variable, which is the size of the informal economy. The composite financial index, on the other hand, is made in the same way as other studies by Levine, Loayza, and Beck (2000) and Beck, Demirgüç-Kunt, and Levine (2000) It uses similar financial series like broad money supply (M2), liquid liabilities (M3), domestic credits by the banking sector (DC), domestic credits provided to the private sector (DCP), and (5) the ratio of commercial to total bank assets (A). The following mechanism is then used:

$$FD = f(A, DC, DCP, M2, M3) \quad (3)$$

The money supply, domestic credits provided by the banking sector, and domestic credits provided to the private sector are extracted from the World Bank (2023) while the ratio of commercial to total bank assets and liquid liabilities is obtained from the Banks Association of Turkey (2020).

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Table 1 presents the descriptive statistics of the series under consideration.

Table 1. Descriptive statistics of series.

Descriptive statistics	IE	FD	FD2	TD	TD2	RER
Mean	4.178	3.464	12.089	16.072	263.137	0.725
Median	4.192	3.371	11.365	16.322	266.409	0.631
Maximum	4.361	4.110	16.891	19.250	370.545	1.207
Minimum	3.785	2.982	8.894	11.723	137.426	0.330
Std. dev.	0.114	0.298	2.120	2.218	70.249	0.263
Skewness	-1.200	0.623	0.779	-0.241	-0.073	0.353
Kurtosis	5.044	2.657	2.822	1.882	1.761	1.691
Jarque-Bera	22.364	3.754	5.527	3.334	3.503	4.974
Probability	0.000	0.153	0.063	0.189	0.173	0.083
Sum	225.627	187.074	652.784	867.891	14209.410	39.157
Sum sq. dev.	0.691	4.698	238.145	260.631	261550.000	3.653
Observations	59	59	59	59	59	59

3.2. Estimation Process

This study employs the generalized least squares (GLS)-based unit root tests, that is introduced by Carrion-i-Silvestre, Kim, and Perron (2009) and takes into account multiple breakpoints in the series. Omitting breakpoints from unit root tests might yield biased results; P_t, MP_t, $MZ_\alpha, MBS, and\ MZ_t$. Omitting breakpoints from unit root tests might yield biased results. Maki (2012) cointegration test has been adopted for cointegration as the next step after conducting unit root tests for stationary nature, in order to search for any long-term relationship in Equation 1. The cointegration tests are investigated under four different model estimates that vary with respect to allowing breaks in intercept, coefficient, and trend. Next, the long-term coefficients in Equation 2, has been estimated by using the dynamic ordinary least squares (DOLS) and fully modified ordinary least squares (FMOLS) approaches. Estimations are done under the framework of three different scenarios for robustness checks of results: (1) Case I: without intercept and trend; (2) Case II: with intercept; and (3) Case III: with trend.

4. RESULTS

As a first step, Figure 1 shows the logarithmic trend of a series that demonstrates persistent volatility. Because of this, it makes sense to use these volatility levels in the GLS-based unit root tests.

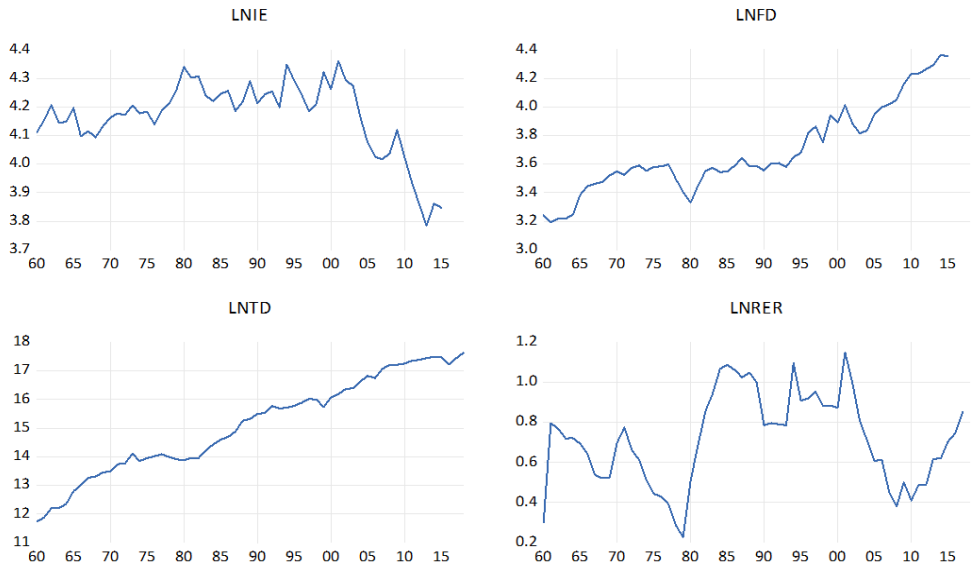

Figure 1. Trends in the main indicators.

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Table 2 presents the results of unit root tests. The results suggest three significant breakpoints over time. It is observed that all of the series are non-stationary at level forms; the null hypothesis that the series are non-stationary cannot be rejected. However, they become stationary after computing the first differences; therefore, it can be concluded that the variables of this study are integrated of order one, I (1).

Table 2. Unit root tests.

Series	Levels					Break points
	P_T	MP_T	MZ_α	MBS	MZ_t	
lnIE	6.01 [5.94]	6.08 [5.94]	-22.56 [-22.97]	0.14 [0.14]	-3.35 [-3.42]	2001; 2007; 2009
lnFD	10.10 [5.40]	10.22 [5.40]	-13.39 [-24.55]	0.19 [0.14]	-2.57 [-3.51]	1998; 2001; 2003
lnFD2	9.37 [5.40]	9.53 [5.40]	-14.38 [-24.55]	0.18 [0.14]	-2.66 [-3.51]	1998; 2001; 2003
lnTD	10.40 [6.74]	10.40 [6.74]	-21.82 [-32.44]	0.14 [0.12]	-3.23 [-3.99]	1973; 1983; 1985
lnTD2	9.61 [46.74]	9.76 [6.74]	-23.11 [-32.44]	0.14 [0.12]	-3.34 [-3.99]	1973; 1983; 1985
lnRER	12.66 [5.76]	12.01 [5.76]	-16.23 [-31.72]	0.17 [0.12]	-2.79 [-3.97]	1979; 1984; 2001
ΔlnIE	3.50* [5.54]	3.61* [5.54]	-25.62* [-17.32]	0.13* [0.16]	-3.57* [-2.89]	-
ΔlnFD	3.64* [5.54]	3.60* [5.54]	-25.74* [-17.32]	0.13* [0.16]	-3.57* [-2.89]	-
ΔlnFD2	3.62* [5.54]	3.63* [5.54]	-25.58* [-17.32]	0.13* [0.16]	-3.56* [-2.89]	-
ΔlnTD	3.41* [5.54]	3.51* [5.54]	-25.91* [-17.32]	0.13* [0.16]	-3.59* [-2.89]	-
ΔlnTD2	3.41* [5.54]	3.52* [5.54]	-25.89* [-17.32]	0.13* [0.16]	-3.59* [-2.89]	-
ΔlnRER	3.41* [5.54]	3.54* [5.54]	-25.77* [-17.32]	0.13* [0.16]	-3.58* [-2.89]	-

Note: [i]* denotes statistical significance at 0.05 level. [ii]Break points years are determined through the tests. [iii] |Critical values has shown in brackets are obtained from Carrion-i-Silvestre et al. (2009).

Then, it is possible that Equation 1 in this article can still be a cointegration model; therefore, Maki cointegration results are presented in Table 3, showing that there exist level relationships (cointegration) in that equation. This outcome is because the null hypothesis of "no cointegration" can be rejected according to all model options in Table 3, except the first model. Therefore, estimating the long-term coefficients of Equation 2 would be robust.

Table 3. Cointegration tests.

Number of break points	Test statistics [Critical values]	Break points
$T_{B.} \leq 1$		
Model 0	-4.38 [-6.47]	2010
Model 1	-4.56 [-6.78]	2010
$T_{B.} \leq 2$		
Model 0	-6.56 [-7.12]	1993; 2010
Model 1	-7.85* [-7.47]	2004; 2010
$T_{B.} \leq 3$		
Model 0	-6.79 [-7.72]	1993; 1998; 2010
Model 1	-9.18* [-8.24]	1982; 2004; 2010
$T_{B.} \leq 4$		
Model 0	-7.63 [-8.35]	1993; 1998; 2004; 2010
Model 1	-9.46* [-8.79]	1982; 1988; 2004; 2010
$T_{B.} \leq 5$		
Model 0	-8.73 [-8.87]	1983; 1993; 1998; 2004; 2010
Model 1	-9.59* [-9.41]	1982; 1988; 1998; 2004; 2010

Note: [i]* denotes statistical significance at 0.05 significance level. [ii] Critical values has shown in brackets are obtained from Maki (2012).

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Table 4 through Table 9 present the long-run estimations of long-run coefficients in Equation 2 and the diagnostic test results for robustness checks. Firstly, the DOLS and FMOLS estimations for all variables of consideration show that the estimated coefficients of FD are positively significant while the estimated coefficients of squared-FD are negatively significant, as expected. It denotes the response of informal activities to a change in financial activities, initially in the same direction. However, once this reaction reaches a peak, it shifts in the opposite direction. Therefore, this finding confirms the existence of an inverted U-shaped interaction between informal economic activities and financial development in Turkey. The inverted U-shaped relationship between financial sector development and the volume of the informal economy has been found in Turkey by Katircioglu and Imamoglu (2020); on the other hand, the same result has been found in European Union countries in the study of Imamoğlu et al. (2018). It is important to note that during the early period of financial development, the informal sector can expand or emerge. This can occur for various reasons, including restricted access to formal financial institutions, the high costs or complexity of entering the formal sector due to regulations and taxes, or the challenge of establishing formal businesses.

We can control the size of the informal economy with advanced financial development. Some argue that an increase in financial development leads to more formal economic growth. Firstly, improved access to finance may explain a causal relationship between formalization and financial development. As financial development progresses, more individuals and enterprises gain access to banking, credit, and insurance, thereby increasing the desirability and feasibility of formalization. Secondly, another factor could be the implementation of enhanced regulations. There can also be policies from various governments, such as tax incentives for small businesses or easy enrollment in the system. Third, more businesses and workers benefit from formalization because it opens up more market opportunities and better financial tools and legal rights. Thus, formalization will lead to increased incentives.

To sum up, initially, informality increases due to weak financial institutions and structures that support the growth of formality; many have to venture into the informal sector. However, as the financial systems develop, the number of people and companies shifts from the informal economy to the formal one, decreasing the volume of the informal sector.

Table 4. DOLS and FMOLS estimations for all variables of consideration.

Explanatory variables	Dynamic OLS			Fully modified OLS		
	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3
Constant	-	-3.048 (0.494)	-5.763 (0.210)	-	-0.231 (0.920)	-2.125 (0.217)
Trend	-	-	0.015 (0.199)	-	-	0.025*** (0.000)
lnFD	5.301*** (0.000)	6.822** (0.011)	8.488*** (0.003)	3.452*** (0.000)	3.686** (0.038)	5.524*** (0.000)
lnFD2	-0.805*** (0.000)	-1.019*** (0.007)	-1.256*** (0.002)	-0.519*** (0.000)	-0.551** (0.026)	-0.823*** (0.000)
lnTD	-0.585** (0.021)	-0.552** (0.038)	-0.522** (0.031)	-0.210 (0.171)	-0.233 (0.198)	-0.290** (0.029)
lnTD2	0.018** (0.018)	0.017** (0.026)	0.013* (0.082)	0.006 (0.172)	0.007 (0.199)	0.003 (0.325)
lnRER	0.337*** (0.000)	0.289** (0.018)	0.262** (0.020)	0.194*** (0.001)	0.191*** (0.006)	0.171*** (0.000)
R^2	0.889	0.892	0.900	0.613	0.602	0.652
$\bar{R}^2$	0.782	0.779	0.787	0.581	0.560	0.606
SE of reg.	0.055	0.055	0.054	0.074	0.076	0.072
LR var.	0.003	0.004	0.003	0.007	0.009	0.004

Note: *, **, and *** standing for significance level at 10, 5, and 1%, respectively.

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Table 5. DOLS and FMOLS estimations for financial sector development.

Explanatory variables	Dynamic OLS			Fully modified OLS		
	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3
Constant	-	-4.136* (0.098)	0.350 (0.873)	-	-6.846*** (0.008)	-2.673 (0.211)
Trend	-	-	0.007*** (0.001)	-	-	0.006*** (0.007)
lnFD	2.308*** (0.000)	4.655*** (0.001)	2.367* (0.056)	2.510*** (0.000)	6.386*** (0.000)	4.245*** (0.000)
lnFD2	-0.313*** (0.000)	-0.644*** (0.002)	-0.374** (0.0026)	-0.373*** (0.000)	-0.918*** (0.000)	-0.664*** (0.000)
lnTD	-	-	-	-	-	-
lnTD2	-	-	-	-	-	-
lnRER	-	-	-	-	-	-
R^2	0.453	0.521	0.674	0.458	0.452	0.549
$\bar{R}^2$	0.330	0.398	0.580	0.447	0.430	0.522
SE of reg.	0.069	0.065	0.054	0.085	0.086	0.079
LR var.	0.010	0.008	0.004	0.042	0.019	0.010

Note: *,**, and *** standing for significance level at 10, 5, and 1%, respectively.

Table 6. DOLS and FMOLS estimations for financial sector development and real exchange rate.

Explanatory variables	Dynamic OLS			Fully modified OLS		
	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3
Constant	-	0.702 (0.801)	1.523 (0.509)	-	-1.555 (0.474)	-1.051 (0.627)
Trend	-	-	0.005** (0.024)	-	-	0.002 (0.332)
lnFD	2.261*** (0.000)	1.861 (0.245)	1.625 (0.215)	2.440*** (0.000)	3.325*** (0.009)	3.136** (0.012)
lnFD2	-0.309*** (0.000)	-0.254 (0.257)	-0.259 (0.158)	-0.367*** (0.000)	-0.490*** (0.006)	-0.480*** (0.006)
lnTD	-	-	-	-	-	-
lnTD2	-	-	-	-	-	-
lnRER	0.156*** (0.003)	0.167** (0.016)	0.055 (0.451)	0.227*** (0.000)	0.204*** (0.002)	0.157** (0.002)
R^2	0.696	0.697	0.757	0.653	0.638	0.657
$\bar{R}^2$	0.574	0.563	0.639	0.639	0.616	0.628
SE of reg.	0.055	0.055	0.050	0.068	0.071	0.070
LR var.	0.005	0.005	0.003	0.009	0.009	0.009

Note: **, and *** standing for significance level at 10 and 5 respectively.

Secondly, in contrast to the findings regarding the IE and FD nexus, the estimated coefficients of TD consistently show negative significance, while the estimated coefficients of squared-TD consistently show positive significance across various model estimations and combinations. This finding indicates that the informal economy's size initially reacts in the opposite direction to changes in the volume of tourism activity. However, once this reaction reaches a peak, it begins to trend in the same direction. Therefore, this finding confirms the existence of a U-shaped interaction between informal economic activities and tourism in Turkey. The result aligns with the findings of Lv (2020). Simply, it indicates that the size of the informal sector first decreases in the early stages of tourism development and then increases as tourism rises. When tourism commences, its initial effects may result in heightened bureaucratization of enterprises and processes. This is because obtaining financing, licenses, or partnerships requires investment in formal structures. The government has implemented incentives to capitalize on the opportunities presented by the declining informal economy. Tourism is a sensitive sector, and governments often engage in its control and development. They encourage the formalization of this sector by providing various incentives, such as tax exemptions, awards, or assistance in establishing formal business establishments. Hence, as the sector of tourism develops and gradually gains the status of an established industry, the proportion of the informal sector may increase once again. High levels of informality may be attributed to an oversaturated market. When the consolidated and official sector of tourism

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reaches saturation or a high concentration of competition, there may be a limited window of opportunities for niche players in the formal market. Consequently, some individuals may opt to conduct their operations informally. Another reason may be the difficulty of implementing new regulations. Thus, as tourism grows fast, it will be even more challenging for governments to control all forms of economic activities. This leads to the emergence of underground business activities, which either pay little or no taxes or operate without licenses. Finally, the sector may transition to independent work as a means of augmentation. Given that the tourism sector operates in a seasonally harsh and highly competitive environment, hiring employees without registration could potentially increase informal employment and boost business profitability, even at the cost of tax and insurance payments. During different stages of tourism development, the share of the informal sector is believed to form a U-shaped curve. Initially, firms operate in the formal sector due to their access to financing, regulations, and other aspects of economic formality. However, as sectoral development progresses, informal activities may intensify over time due to factors such as the need for cheaper labor and subcontractors to maintain business operations in a highly competitive environment. On the other hand, the effect of tourism on the informal economy exerts mainly an inverted-U kind of relationship from the estimation that considers the single effect of the tourism sector, financial services with the tourism sector, and the tourism sector with the real exchange rate, presented in Table 7, Table 8, and Table 9, respectively.

Table 7. DOLS and FMOLS estimations for tourism sector development.

Explanatory variables	Dynamic OLS			Fully modified OLS		
	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3
Constant	-	2.241 (0.286)	2.383 (0.258)	-	1.974 (0.296)	1.970 (0.292)
Trend	-	-	0.009 (0.511)	-	-	-0.010 (0.574)
lnFD	-	-	-	-	-	-
lnFD2	-	-	-	-	-	-
lnTD	0.515*** (0.000)	0.256 (0.240)	0.275 (0.260)	0.561*** (0.000)	0.311 (0.196)	0.272 (0.262)
lnTD2	-0.015*** (0.000)	-0.008 (0.227)	-0.011 (0.170)	-0.018*** (0.000)	-0.010 (0.156)	-0.007 (0.460)
lnRER	-	-	-	-	-	-
R^2	0.391	0.430	0.445	0.290	0.171	0.192
$\bar{R}^2$	0.254	0.274	0.284	0.276	0.137	0.142
SE of reg.	0.073	0.007	0.071	0.097	0.106	0.106
LR var.	0.710	0.011	0.011	0.046	0.049	0.047

Note: *** standing for significance level at 10, respectively.

Table 8. DOLS and FMOLS estimations for both financial and tourism sector development.

Explanatory variables	Dynamic OLS			Fully modified OLS		
	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3
Constant	-	3.069 (0.451)	-0.982 (0.771)	-	-0.542 (0.798)	-3.165** (0.088)
Trend	-	-	0.025** (0.012)	-	-	0.024*** (0.002)
lnFD	2.177* (0.054)	0.473 (0.850)	3.933* (0.092)	3.481*** (0.000)	3.852** (0.022)	6.540*** (0.000)
lnFD2	-0.332** (0.049)	-0.098 (0.778)	-0.592** (0.072)	-0.552*** (0.000)	-0.603*** (0.010)	-0.988*** (0.000)
lnTD	0.005 (0.807)	0.061 (0.785)	-0.097 (0.588)	-0.185 (0.226)	-0.201 (0.233)	-0.360** (0.015)
lnTD2	-0.001 (0.906)	-0.001 (0.862)	-0.001 (0.794)	0.006 (0.169)	0.007 (0.175)	0.006 (0.114)
lnRER	-	-	-	-	-	-
R^2	0.688	0.698	0.762	0.472	0.472	0.511
$\bar{R}^2$	0.491	0.490	0.584	0.439	0.428	0.459
SE of reg.	0.060	0.060	0.054	0.085	0.086	0.084
LR var.	0.005	0.005	0.003	0.008	0.008	0.005

Note: *,**, and *** standing for significance level at 10, 5, and 1%, respectively.

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Table 9. DOLS and FMOLS estimations for financial sector development and real exchange rate.

Explanatory variables	Dynamic OLS			Fully modified OLS		
	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3
Constant	-	8.159*** (0.000)	7.905*** (0.000)	-	3.926*** (0.005)	4.061*** (0.006)
Trend	-	-	0.016 (0.141)	-	-	0.001 (0.924)
lnFD	-	-	-	-	-	-
lnFD2	-	-	-	-	-	-
lnTD	0.506*** (0.000)	-0.465* (0.058)	-0.365 (0.124)	0.538*** (0.000)	0.032 (0.855)	0.021 (0.909)
lnTD2	-0.015*** (0.000)	0.012* (0.076)	0.005 (0.461)	-0.017*** (0.000)	-0.001 (0.717)	-0.001 (0.772)
lnRER	0.114 (0.271)	0.367*** (0.000)	0.371*** (0.000)	0.207** (0.016)	0.349*** (0.000)	0.374*** (0.000)
R^2	0.476	0.717	0.745	0.523	0.525	0.504
$\bar{R}^2$	0.267	0.592	0.622	0.503	0.496	0.462
SE of reg.	0.072	0.053	0.051	0.080	0.081	0.084
LR var.	0.012	0.005	0.004	0.022	0.018	0.019

Note: *,**, and *** standing for significance level at 10, 5, and 1%, respectively.

Moreover, the estimation results suggest that the real exchange rates positively affect the size of Turkey's informal economy. This can happen because changes in economic conditions (for example, a decline in export competitiveness and an increase in costs of production in the formal economy) force operating businesses and employees into the informal economy due to the ability to evade taxes or being able to afford compliance costs. This only shows that exchange rates expose how the formal-informal sectors interact not directly but through the lens of employment, competitiveness, and regulation compliance. This finding denotes that business firms are likely to operate informally at higher levels of exchange rates. The link between the informal economy and exchange rate movements is exciting and deserves attention from policymakers. It is evident that exchange rate volatility is a significant force behind macroeconomic fundamentals in Turkey, and informal economic activity is one of them.

Therefore, estimation results confirm a reversed U-shaped association between informal activities and overall finance and activities. It turns out that when the financial markets are just getting started, the size of Turkey's informal economies changes at the same rate. But after a certain point, the informal economies start to react to changes in the financial sectors in the opposite way. The results suggest an inverted U-shaped interaction between the financial system and the informal economy, while, in contrast, a U-shaped interaction exists between tourism volume and the informal economy.

5. CONCLUSION

This study examines the effects of the tourism and finance sectors on the size of informal economies in Turkey. Results from annual data show that there exists a long-term relationship between informal economies and the tourism and finance sectors. This study confirms the existence of an inverted U-shaped long-term link between informal economies and the financial system. During the initial stages of the finance sector's development, weak financial institutions and structures contribute to an increase in informality, forcing many individuals to venture into the informal sector. However, as the financial systems develop, people and companies shift from the informal economy to the formal one to benefit from its advantages, such as having greater access to credit. In contrast, the nature of the long-term connection between informal economies and the tourism sector is U-shaped. During different stages of tourism development, the share of the informal sector forms a U-shaped curve. At the beginning of the sectoral development, the firms intend to work in a formal economy; in further stages of development, the firms shift to informality. Initially, firms operate in a formal economy due to the availability of financing and regulations. However, in later stages of sectoral development, firms begin to operate partially or entirely informally to maintain their

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business in a fiercely competitive environment. They do this by evading taxes by not declaring their total revenues, avoiding social security contributions by hiring part-time workers, among other strategies. Since tourism and finance are the total service-providing sectors, the long-term link between informal economies and the overall service of tourism and finance is an inverted U-shaped nexus.

These outcomes imply the necessity of financial inclusion and the establishment of efficient mechanisms to minimize informality. Furthermore, suggesting low-interest loans, collateral-free credit, tax incentives for formal businesses, and simplifying the business registration process can enhance the incentive to transition from informal to formal. Therefore, the implementation of these policies will enhance Turkey's financial accessibility while concurrently fostering a more robust, organized, and formal financial sector. The goal is to make formalization more appealing to informal businesses and the general public, thereby facilitating their entry into the formal system and reaping its benefits. This approach would reduce the size of the informal economy, improve economic growth, increase tax revenue, and achieve financial stability.

It would be better to support long-lasting and official tourism businesses, push tourism quality certification programs, make sure businesses are licensed and registered, and give formal tourism businesses low-interest loans, grants, or subsidies to cut down on the number of illegal ones. Lastly, policymakers should take a comprehensive approach to formality that includes making it easier to get money, enforcing rules, and giving people reasons to move from doing business informally to doing business officially. This will encourage formalization, create jobs, and improve the quality of employment in the tourism sector.

The conclusion of this study provides a valuable contribution for policymakers. It is clear what role informal economies play and how they connect to other areas, like financial growth. However, the tourism industry, which is also a service-based industry, plays a very important role because it is connected to the informal economy. Turkey is a major tourist market, ranking 5th globally in terms of international tourist arrivals. This study shows that the size of informal economic activity starts to increase significantly at the further stages of tourism growth. So, since tourism is a big industry that brings in foreign currency, it will need to be regulated in order to keep illegal activities like unofficial work and using subcontractors without permission under control

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REFERENCES

Alcalá-Ordóñez, A., & Segarra, V. (2023). Tourism and economic development: A literature review to highlight main empirical findings. *Tourism Economics, 31*(1), 13548166231219638. https://doi.org/10.1177/13548166231219638

Balaguer, J., & Cantavella-Jordá, M. (2002). Tourism as a long-run economic growth factor: The Spanish case. *Applied Economics, 34*(7), 877-884. https://doi.org/10.1080/00036840110058923

Banks Association of Turkey. (2020). *Statistical reports.* Retrieved from http://www.tbb.org.tr

Barton, S., & Gordon, P. (1988). Corporate strategy and capital structure. *Strategic Management Journal, 9*(6), 623-632.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2000). A new database on the structure and development of the financial sector. *The World Bank Economic Review, 14*(3), 597–605.

Bose, N., Capasso, S., & Wurm, M. (2012). The impact of banking development on the size of the shadow economy. *Journal of Economic Studies, 39*(6), 620–638. https://doi.org/10.1108/01443581211274584

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Bulow, J., & Summers, L. (1986). A theory of dual labor markets with application to industrial policy. *Discrimination, and Keynesian Unemployment, Journal of Labor Economics, 4*(3), 376-414. https://doi.org/10.1086/298116

Capasso, S., & Jappelli, T. (2013). Financial development and the underground economy. *Journal of Development Economics, 101*, 167–178. https://doi.org/10.1016/j.jdeveco.2012.10.005

Carrion-i-Silvestre, J. L., Kim, D., & Perron, P. (2009). GLS-based unit root tests with multiple structural breaks under both the null and the alternative hypotheses. *Econometric Theory, 25*(6), 1754–1792. https://doi.org/10.1017/s0266466609990326

Chen, M.-H. (2010). The economy, tourism growth and corporate performance in the Taiwanese hotel industry. *Tourism Management, 31*, 665–675. https://doi.org/10.1016/j.tourman.2009.07.011

Fauzel, S., & Seetanah, B. (2023). Does financial development spur tourism growth? A dynamic time series analysis for the case of an SIDS. *Journal of Policy Research in Tourism, Leisure and Events, 15*(1), 52-68.

Goldberg, P. K., & Pavcnik, N. (2003). The response of the informal sector to trade liberalization. *Journal of Development Economics, 72*, 463–496. https://doi.org/10.3386/w9443

Gunduz*, L., & Hatemi-J, A. (2005). Is the tourism-led growth hypothesis valid for Turkey? *Applied Economics Letters, 12*(8), 499-504. https://doi.org/10.1080/13504850500109865

Imamoğlu, H., Katircioğlu, S., & Payaslioğlu, C. (2018). Financial services spillover effects on informal economic activity: Evidence from a panel of 20 European countries. *The Service Industries Journal, 38*(11-12), 669-687. https://doi.org/10.1080/02642069.2017.1423056

Katircioglu, S., & Imamoglu, H. (2020). Spillover effects of financial development on the informal economic activity: Empirical evidence from Turkey. *International Journal of Islamic and Middle Eastern Finance and Management, 13*(3), 471-482. https://doi.org/10.1108/imefm-02-2019-0054

Kumar, R. R., & Stauvermann, P. J. (2023). Tourism and economic growth in the Pacific region: Evidence from five small island economies. *Journal of the Asia Pacific Economy, 28*(3), 894-921. https://doi.org/10.1080/13547860.2021.1944796

Levine, R., Loayza, N., & Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics, 46*(1), 31-77. https://doi.org/10.1016/s0304-3932(00)00017-9

Lv, Z. (2020). Does tourism affect the informal sector? *Annals of Tourism Research, 80*, 102816. https://doi.org/10.1016/j.annals.2019.102816

Maki, D. (2012). Tests for cointegration allowing for an unknown number of breaks. *Economic Modelling, 29*(5), 2011-2015. https://doi.org/10.1016/j.econmod.2012.04.022

Medina, L., & Schneider, F. (2018). *Shadow economies around the world: What did we learn over the last 20 years?* IMF Working Papers, No: 18/17.

Morck, R., Shleifer, A., & Vishny, R. W. (1988). Management ownership and market valuation: An empirical analysis. *Journal of Financial Economics, 20*, 293-315. https://doi.org/10.1016/0304-405x(88)90048-7

Naseem, S. (2021). The role of tourism in economic growth: Empirical evidence from Saudi Arabia. *Economies, 9*(3), 117. https://doi.org/10.3390/economies9030117

Ngoasong, M. Z., & Kimbu, A. N. (2016). Informal microfinance institutions and development-led tourism entrepreneurship. *Tourism Management, 52*, 430-439. https://doi.org/10.1016/j.tourman.2015.07.012

Saint Paul, G., & Verdier, T. (1996). Inequality, redistribution and growth: A challenge to the conventional political economy approach. *European Economic Review, 40*(3), 719-728. https://doi.org/10.1016/0014-2921(95)00083-6

Salinas, A., Ortiz, C., Ponce, P., & Changoluisa, J. (2023). Does tourism activity reduce the size of the informal economy? Capturing long-term heterogeneous linkages around the world. *Tourism Economics, 29*(2), 305-347. https://doi.org/10.1177/13548166211049857

Shahbaz, M., Benkraiem, R., Miloudi, A., & Tiwari, A. K. (2019). Tourism-induced financial development in Malaysia: New evidence from the tourism development index. *Tourism Economics, 25*(5), 757-778.

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Shahzad, S. J. H., Shahbaz, M., Ferrer, R., & Kumar, R. R. (2017). Tourism-led growth hypothesis in the top ten tourist destinations: New evidence using the quantile-on-quantile approach. *Tourism Management, 60*, 223-232. https://doi.org/10.1016/j.tourman.2016.12.006

Shapiro, C., & Stiglitz, J. E. (1984). Equilibrium unemployment as a worker discipline device. *The American Economic Review, 74*(3), 433-444.

Stallings, B., & Peres, W. (2000). *Growth, employment and equity. The impact of the economic reforms in Latin American and Caribbean economic commission for Latin American and Caribbean.* Washington: Brookings Institution Press.

UNWTO. (2021). *United nations' world tourism organization.* Retrieved from http://www.unwto.org

Williams, C. C. (2017). *Entrepreneurship in the informal sector: An institutional perspective.* London: Routledge.

World Bank. (2023). *World development indicators.* Retrieved from http://www.worldbank.org

Xu, T., & Lv, Z. (2022). Does too much tourism development really increase the size of the informal economy? *Current Issues in Tourism, 25*(6), 844-849. https://doi.org/10.1080/13683500.2021.1888898

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