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DIRECT VS. CONNECTING FLIGHTS: ANALYZING PRICE DIFFERENCES AND INFLUENCING FACTORS

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Abstract

This study investigates the determinants of connecting flight pricing and the fare gap between direct and connecting international routes departing from Istanbul. Using a sample of 233 observations, the analysis focuses on two main dependent variables: the ticket price of connecting flights and the fare difference compared to direct alternatives. The primary explanatory variables include route detour (distance-based deviation) and time detour (additional travel time), while control variables such as airline star rating, direction of travel (East-bound dummy), and the market share of the dominant carrier at the transfer airport are incorporated to account for operational and competitive conditions. Regression results indicate that longer and more time-consuming connections are associated with higher connecting flight prices, but tend to reduce the fare gap in favor of connecting flights. Notably, route detour emerges as the strongest determinant across all models. Among control variables, East-bound routes are found to be generally cheaper, while higher airline service quality is associated with both higher ticket prices and narrower fare gaps. Furthermore, a higher market share of the dominant carrier at the transfer point tends to lower connecting fares but increases the fare gap relative to direct flights. The findings highlight the interplay between routing efficiency, service quality, and airport-level competition in shaping international airfares. The results provide valuable insights for airline revenue management strategies, passenger choice modeling, and airport-hub development policies.

Keywords: Detour Factor, Connection Quality, Airlines, Ticket Price
JEL Classification: L91, L93, M21

DİREKT Mİ AKTARMALI MI? FİYAT FARKLILIKLARI VE ETKİLEYEN FAKTÖRLERİN ANALİZİ

Öz

Bu çalışma, aktarmalı uçuş fiyatlandırmasının belirleyicilerini ve İstanbul çıkışlı direkt ve aktarmalı uluslararası rotalar arasındaki ücret farkını araştırmaktadır. Analiz, 233 gözlemden oluşan bir örneklem kullanarak iki ana bağımlı değişkene odaklanmaktadır: aktarmalı uçuşların bilet fiyatı ve direkt alternatiflere kıyasla ücret farkı. Birincil açıklayıcı değişkenler arasında rota sapması (mesafeye dayalı sapma) ve zaman sapması (ek seyahat süresi) yer alırken, havayolu yıldız derecelendirmesi, seyahat yönü (Doğu yönlü- Kukla) ve transfer havalimanındaki hâkim taşıyıcının pazar payı gibi kontrol değişkenleri operasyonel ve rekabetçi koşulları hesaba katmak için dahil edilmiştir. Regresyon sonuçları, daha uzun ve daha fazla zaman alan bağlantıların daha yüksek aktarmalı uçuş fiyatlarıyla ilişkili olduğunu, ancak ücret farkını aktarmalı uçuşlar lehine azaltma eğiliminde olduğunu göstermektedir. Özellikle, rota sapması tüm modellerde en güçlü belirleyici olarak ortaya çıkmaktadır. Kontrol değişkenleri arasında, Doğu yönlü rotaların genellikle daha ucuz olduğu görülürken, daha yüksek havayolu hizmet kalitesi hem daha yüksek bilet fiyatları hem de daha dar ücret farkları ile ilişkilendirilmektedir. Ayrıca, aktarma noktasındaki hâkim taşıyıcının daha yüksek pazar payı, aktarma ücretlerini düşürme eğilimindedir ancak doğrudan uçuşlara göre ücret farkını artırmaktadır. Bulgular, uluslararası uçak biletlerinin şekillenmesinde rota verimliliği, hizmet kalitesi ve havalimanı düzeyindeki rekabet arasındaki etkileşimi vurgulamaktadır. Sonuçlar havayolu gelir yönetimi stratejileri, yolcu seçimi modellemesi ve havaalanı-hub geliştirme politikaları için değerli bilgiler sağlamaktadır.

Anahtar kelimeler: Rota Sapma Faktörü, Bağlantı Kalitesi, Havayolu İşletmeleri, Bilet Fiyatları
JEL Sınıflaması: L91, L93, M21

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1. Introduction

The term 'air transportation' is used to describe the conveyance of passengers, cargo and mail between two specified points, for which airlines levy a fee upon users. The distance between two points where the transportation service is provided is referred to as the air transportation market (Ciliberto and Tamer, 2009). These markets occur at varying levels of scale, and are classified into the following categories: airport-pair markets, city-pair markets, country-pair markets and regional markets. Given the competitive nature of the air transportation market, it is of paramount importance to align the product components (airline product) with the specific characteristics of the market in question. In this context, price is the most significant product component. The nature of competition in the market can be either direct or indirect, contingent on the specific characteristics of the airline in question (Reiss and Spiller, 1989). In the event that two airlines operate within the same market, offering the same origin and destination points, direct competition exists. Conversely, an airline may provide a connecting service in a market where another airline offers direct flights, thereby giving rise to indirect competition.

The hub-and-spoke network structure, which emerged subsequent to the liberalisation of airline markets, has enabled airlines to facilitate the transportation of passengers from peripheral airports to hub airports, from where they can then be conveyed to their final destinations (Maligetti et al., 2008). Two key features of hub-and-spoke networks are spatial concentration and temporal concentration (Reynolds-Feighan, 2001). A hub-and-spoke carrier concentrates its networks in a spatially concentrated manner around one or a small number of hubs. In terms of temporal concentration, the airline operates a daily schedule of synchronised flights through these hubs (Graham, 1995; Reynolds-Feighan, 2000). The objective of such structures is to optimise the number and quality of connections offered. The common network characteristics used to weight the importance of destinations include travel time, flight time, layover (or connection) time, number of stops, and travel distance as a proportion of non-stop travel distance (routing factor or detour factor).

The use of hub and spoke networks has led to a notable shift in the aviation industry, with direct flights from medium-sized airports to other medium-sized airports being increasingly replaced by indirect flights via a central airport or hub (Burghouwt and De Wit, 2005). It should be noted that stopovers are not exclusive to medium-sized airports. In addition, airports situated between two distinct hub airports have also become prevalent for non-direct flights. The cost and demand advantages of these hub-and-spoke networks have been extensively discussed in other studies (Button, 2002; Pels, 2001).

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The pricing of airline tickets is a complex process that considers a multitude of factors. These include the number of airlines operating in the market, direct and indirect competitors, the customer profile in the market, and the airline's business model (Morrison and Winston, 1990; Piermartini and Fache Rousová, 2008). The influence of various factors on ticket prices in origin-destination markets has been extensively investigated by scholars, with these issues remaining the subject of ongoing debate (Ren et al., 2014; Sengupta and Wiggins, 2014; Truong et al., 2020). In contrast, the phenomenon of price competition on indirect routes (connecting flights) has been the subject of comparatively limited investigation.

The objective of this paper is to identify the factors that are believed to influence the pricing of connecting flight routes. Section 2 presents a concise review of the literature. Section 3 outlines the methodology employed in this study. Section 4 presents the findings of the model constructed within the scope of the study. Sections 5 and 6 present a discussion and conclusion, respectively.

2. Theoretical Background

The term "flight route" is used to describe the area of the market in which airlines compete. Airlines attract demand from passengers who wish to travel between two points on their flight routes (Yaşar and Gerede, 2023). This competition, which initially appears to be confined to airlines operating flights on the same routes, is not so limited when viewed from a broader perspective. A significant proportion of the demand originates from transfer traffic, which is made possible by hub-and-spoke network structures (Alderighi et al., 2007).

The concept of indirect connectivity is frequently linked to that of a hub. It is not uncommon for passengers arriving from secondary airports to pass through a hub in order to reach their final destination, whether that be a primary airport or an international one. Consequently, hubs serve as transfer points, thereby enhancing the potential of the network. They offer travellers a diverse range of potential destinations, even in the absence of direct connections (Maligetti et al., 2008). The fundamental prerequisite for indirect connectivity is the existence of a sufficient geographical and temporal density of flights (Reynolds-Feighan, 2001). Nevertheless, airports that are not hubs may also facilitate connections for transfer passengers. Indeed, transfers may occur between two flights operated by different airlines and lacking coordination. Such opportunities are not only feasible but also economically viable. The advantage of high traffic density at the route level would be equally captured if each route in the hub network was operated by a different carrier (Starkie, 2007).

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The temporal and spatial concentrations in a hub-and-spoke network are two crucial factors influencing the total travel time and, consequently, the demand. The temporal configuration of an airline network is defined as the arrangement of the airline flight schedule at an airline's 'station', resulting in a specific number and quality of indirect connections offered through that airline's station. The number and quality of indirect connections through the station can be increased by a process of densification of the flight schedule over time. This may be achieved by the adoption of a wave system structure in the airline flight schedule (Burghouwt and De Wit, 2005; Burghouwt and Veldhuis, 2006).

In general, the passenger's choice between routes operated by alternative carriers is dependent on a number of factors, including frequency, price and a range of other quality-related parameters (Bruinsma et al., 2000). Nevertheless, the criteria by which passengers make their decisions can be distilled into three principal factors. The first factor is the connectivity offered by a particular route, with passengers seeking to reach their final destination in the shortest possible time. The existing literature corroborates the assertion that the central role in determining the market share captured by hubs is played by total travel times and route frequencies (Hansen, 1990). The second factor is the total cost of travel, which is typically dominated by air fares. The third factor is service quality, including punctuality, the availability of ancillary services and congestion at the intermediate airport (Redondi et al., 2011).

A further significant issue in this context is the endogeneity of price with unobservable product characteristics. In order to address such endogeneity, Berry and Jia (2010) adopt the use of instrumental variables. In particular, the percentage of competing routes offering direct flights, the average distance of competing routes, the number of competing routes, and the number of all carriers are employed as instrumental variables. This is a common strategy that allows for the exploitation of competing product attributes and the competitive nature of the market environment, which, although not directly related to passenger utility, have a direct impact on airline pricing. Furthermore, Berry and Jia (2010) consider price dispersion within the market to be a valid instrumental variable. This is because price dispersion is indicative of the level of price competition and potential cost discrepancies between airlines. Similarly, Evans and Kessides (1993) employed a comparable methodology to ascertain the influence of airline pricing on passenger utility within the US market.

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3. Methodology

The objective of this study is to examine the impact of factors identified as determinants of ticket prices on connecting flights offered by traditional airlines. In this context, a total of 233 connecting flight routes operated by various airlines offering hub airports as transit points were analyzed in comparison with 26 direct flight routes departing from Istanbul. These routes consist of the routes with the highest number of passengers departing from Istanbul.

Istanbul has been chosen as the reference point for direct flights in this study due to its geographical location and its central role in air transportation. Located at the crossroads of Asia, Europe and Africa, Istanbul hosts a large number of intercontinental direct flights and serves as a global hub. Istanbul Airport, in particular, is heavily used by many carriers, especially Turkish Airlines, and has an extensive direct flight network (Georgieva et al., 2015). In this context, direct routes departing from Istanbul provide a structurally and operationally appropriate and highly representative reference for comparison with connecting flights.

Once the flight routes and connecting options had been determined, a model was constructed by identifying the variables that are thought to affect ticket prices. The model was used to determine hypotheses and to test their effects on ticket prices. Table 1 presents a list of the direct flight routes in question.

Table 1. Flight routes identified within the scope of the research

Eastbound Routes		Westbound Routes	
Bangkok	Mumbai	New York JFK	Houston
Kuala Lumpur	Shanghai	Los Angeles	Sao Paulo
Phuket	Beijing	Chicago	
Ho Chi Min	Jakarta	San Francisco	
Singapore	Manila	Washington	
Seul	Male	Atlanta	
Tokyo	Taipei	Toronto	
Hong Kong	Delhi	Boston	

Source: Author.

The research data set comprises a series of connecting flight options, presented as alternative routes to those depicted in the aforementioned table. Figure 1 illustrates the geographical representation of direct and connecting flights.

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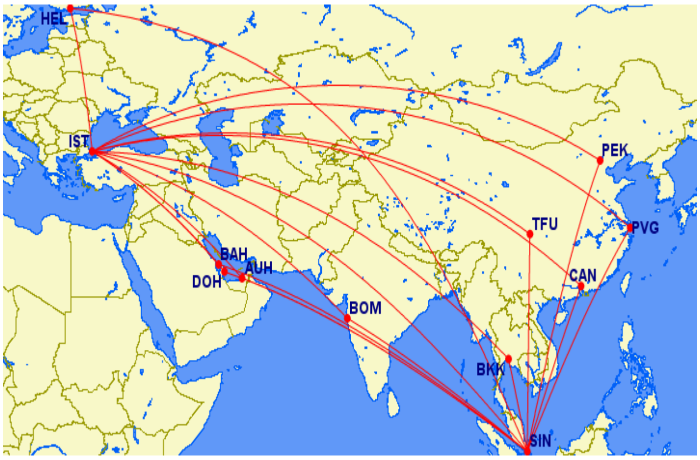
Figure 1. Direct and connecting route map



Source: Author.

Figure 1 illustrates the Istanbul-Singapore route, which is serviced by direct flights operated by Turkish Airlines. Conversely, Etihad, Emirates, Qatar Airways and Thai Airways also offer connecting flights on the Istanbul-Singapore route, representing an alternative to the Istanbul-Singapore route. These airlines utilise Abu Dhabi, Dubai and Bangkok as connecting points. In the study, the factors that are believed to influence the price of connecting tickets and the price differential between direct flights are evaluated using four distinct models. The models created in the course of the research are as follows.

Model 1

$CFTP_i$=$\beta_1 Route\ Detour_i$+$\beta_2 Time\ Detour_i$

Model 2

$CFTP_i$=$\beta_1 Route\ Detour_i$+$\beta_2 Time\ Detour_i$+ $\beta_3\ DEAST_i + \beta_4\ ASTAR_i + \beta_5\ MSC_i$

Model 3

PG_i= $\beta_1 Route\ Detour_i$+$\beta_2 Time\ Detour_i$

Model 4

$PGAPKM_i$= $\beta_1 Route\ Detour_i$+$\beta_2 Time\ Detour_i$+ $\beta_3\ DEAST_i + \beta_4\ ASTAR_i + \beta_5\ MSC_i$

$CFTP_i$ and PG_i are dependent variables while others are independent variables. Variables in the models are follows:

- $CFTP_i$ = Represents the ticket price of connecting flights compared to direct flights. Reflects the total cost in USD that the passenger incurs by connecting.

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- PG_i= Refers to the difference in ticket price between direct and connecting flights. Indicates the economic advantage/disadvantage that the passenger gains or incurs by choosing a connecting flight.
- $\beta_1 Route\ Detour_i$ = It is a proportional variable that indicates how much distance deviation the detour route involves compared to the direct route.
- $\beta_2 Time\ Detour_i$ = The proportion (in hours) between the total duration of the connecting flight and the direct flight duration. It shows how much more time the passenger has spent in temporal terms.
- $\beta_4\ DEAST_i$ = A dummy variable indicating whether the flight route is eastbound or not. It takes the value 1 if the route is eastbound and 0 otherwise. It is included to control for the possible effect of geographical direction on ticket prices.
- $\beta_4\ ASTAR_i$ = Refers to the number of stars the connecting airline has according to the Skytrax rating (between 1-5). Used to explain the impact of service quality on pricing.
- $\beta_5\ MSC_i$ = Indicates the market dominance of the connecting airline at the connecting airport. Controls the impact of market concentration and competitive conditions on prices.

Table 2. Example data set within the scope of the research

Direct Route (1)	Price of (1)	Flight Time of (1)	Connecting Routes (2)	Price of (2)	Diff. (1)-(2)	Airline	Flight Time of (2)	Time Diff. (1)-(2)	Route Detour	Dummy East	Airline Star	MSC
IST-BKK	490	9,15	IST-SGN-BKK	807	-317	VN	14	4,85	0,18	1	4	0,39
IST-BKK	490	9,15	IST-DEL-BKK	396	94	6E	17,45	8,3	0,001	1	4	0,39
IST-BKK	490	9,15	IST-KWI-BKK	458	32	KU	12,5	3,35	0,048	1	3	0,24
IST-LAX	655	13,75	IST-FRA-LAX	647	8	LH	16,95	3,2	0,014	0	4	0,6
IST-LAX	655	13,75	IST-WAW-LAX	617	38	LO	17,55	3,8	0,0001	0	3	0,44

This table illustrates sample observations used in the analysis comparing direct and connecting flight alternatives departing from Istanbul. For each observation, the direct route (1) and the connecting route (2) are provided along with their ticket prices and flight durations. Key variables include the price difference between the two options, time difference, route detour ratio, directional dummy variable (East=1), airline star rating, and the market share of the carrier at the transfer airport (MSC). These variables serve as inputs in the proposed regression models.

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The data on connecting ticket prices, which is the dependent variable in the model, are obtained in U.S. Dollar terms by selecting the same days and dates prospectively from websites such as Skyscanner and Google Flights that offer comparative ticket prices of multiple airlines. In the selection of flights, weekdays were preferred instead of peak demand periods. In addition, campaign prices are not included in the ticket price analysis.

One of the independent variables used in the study is related to *Detour Factors*. This variable is calculated separately on a route-by-route basis for the length of the flight and the ratio of direct flight to connecting flight is calculated. In order to calculate the detour factor variable, the length of the direct flight and the length of the connecting flight have been divided by each other.

In addition, there is a dummy variable between the independent variables. This is the *DEAST* variable. The values differ according to the east-west extension of the flight. For example, if the flight in question is Istanbul-Singapore, the *DEAST* variable will be assigned a value of 1. For the Istanbul-Washington flight, the value will be 0. The another independent variable used in the study is Airline Star (*ASTAR*). The data presented here is obtained from the Skytrax website and reflects the service quality of the airline in question and the values obtained from passenger surveys on an annual basis. The last independent variable whose effect is analyzed within the scope of the research is the airline market share at the connecting airport (*MSC*). This variable is included in order to understand whether the relevant airline reflects its market power to its prices.

The data used in the study includes price and route information for direct and connecting international flights departing from Istanbul. The routes in the sample were selected from destinations with high passenger demand and widely preferred on a global scale. Information on prices, flight times, transfer points, Skytrax star ratings of airlines and airlines with the highest market share at the connecting airports were collected systematically. The data is sourced from skyscanner, google flights, OAG and is current as of July 2025. In addition, for each connecting flight, metrics such as route detour, time detour and market share of the dominant carrier in the relevant markets were calculated and used in the analysis.

Once the requisite data had been obtained and the requisite calculations performed on a linear basis, a multiple regression analysis was conducted in order to ascertain the significance of the model and the effects of the coefficients.

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4. Findings and/or Discussion

This section presents the findings of the research. The presentation of findings begins with a description of the statistical data, followed by an examination of the correlations and regression results. The descriptive statistics presented in Table 3 provide an overview of the basic statistical measures for each variable. These measures assist in the comprehension of the overall distribution and dispersion of the data. The table presents the minimum and maximum values, the mean for each variable.

Table 3. Descriptive statistics

	N	Min.	Max	Mean
CFTP	233	208,00	1897,00	694,8627
PG	233	-1242,00	675,00	29,7082
Route Detour	233	,00	,67	,1375
Time Detour	233	1,80	21,45	6,3039
DEAST	233	,00	1,00	,7210
ASTAR	233	3,00	5,00	3,8884
MSC	233	,03	,96	,4682

Descriptive statistics of the data set used in the study are presented in Table 3. In the dataset with a total of 233 observations, connecting flight ticket prices (CFTP) ranged between 208 and 1897 USD, with a mean value of 694.86 USD. The PG variable, which represents the price difference between direct and connecting flights, ranges from -1242 to 675, indicating that some connecting flights can be significantly more expensive or cheaper than direct flights. Route deviation rate (*Route Detour*) averages 0.1375, with some flights having almost no distance deviation (min = 0) from the direct route. The time difference (Time Detour) of connecting flights compared to direct flights was calculated as 6.30 hours on average. Approximately 72% of the observations were eastbound flights (DEAST = 1). The average Skytrax star rating of airlines operating connecting flights is 3.89, ranging from 3 to 5 stars. Finally, the market share (MSC) of carriers at connecting airports ranges from a minimum of 3% to a maximum of 96%, with an average of 46.8%. These indicators show that the variables included in the modeling have a wide variance and represent different flight structures. Subsequent to the presentation of the descriptive statistics, Table 4 illustrates the correlations between independent variables.

Table 4. Correlations

		(1)	(2)	(3)	(4)	(5)
1	Route Detour	1				
2	Time Detour	,451**	1			
3	DEAST	,091	-,162**	1		

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4	ASTAR	,262**	,149*	,054	1	
5	MSC	-,123	,149*	-,230**	,192**	1

The pairwise relationships between the variables used in the study were analyzed through the correlation matrix in Table 4. There is a positive and significant relationship between Route Detour, which represents the distance deviation of the connecting route, and Time Detour, which represents the time difference of connecting flights compared to direct flights ($r = 0.451$, $p<0.01$). There is a negative and significant relationship between DEAST variable (eastbound flight) and Time Detour ($r = -0.162$, $p<0.01$). ASTAR (airline star rating) shows a significant and positive relationship with Route Detour ($r = 0.262$, $p<0.01$). MSC (market share of dominant carrier) shows a significant negative relationship with DEAST ($r = -0.230$, $p<0.01$) and a significant positive relationship with ASTAR ($r = 0.192$, $p < 0.01$). There is no significant relationship between MSC and Route Detour. Overall, there is not a high level of multicollinearity between the variables, but there are some directional and significant relationships. Table 5 presents the estimation results for the models, derived from the correlation data.

Table 5. Model estimation results

Variables	**CFTP Model 1**	**CFTP Model 2**	**PG Model 3**	**PG Model 4**
Route Detour	,576***	,451***	-,431***	-,315***
Time Detour	,258***	,158**	-,191***	-,089
DEAST		,-248***		,230***
ASTAR		,273***		-,262***
MSC		-,248***		,181***
Constant	-1,864***	-1,799***	1,382***	1,452***
F	41,326	28,545	19,968	14,759
Sig.	0,000	0,000	0,000	0,000
R^2	,264	0,386	,148	,245
Adj R^2	,258	0,373	,141	,229
Durbin Watson	1,36	1,454	1,117	1,125
VIF Range	1,255	1,093 – 1,491	1,255	1,093 – 1,491
* *p < .10*				
** *p < .05*				
*** *p < .01*				

The table presents the estimation results of four different models, with each model analysed in turn. In each case, the dependent variables and their relationships with the independent variables are considered. The dependent variables employed in the models are CFTP and PG, whereas the independent variables are Route Detour, Time Detour, DEAST, ASTAR, MSC. The main factors affecting the price difference between direct and connecting flights were analyzed

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through four regression models. Model 1 and Model 2 consider the connecting flight price (CFTP) as the dependent variable, while Model 3 and Model 4 explain the price difference (PG).

In order to assess the validity of the regression models, multicollinearity and autocorrelation tests were conducted. When the Variance Inflation Factor (VIF) values for all models are analyzed, this value is 1.255 in Model 1 and Model 3. In Model 2 and Model 4, VIF values vary between 1.093 and 1.491 according to the variables. All these values are well below the generally accepted threshold value of 5, indicating that there is no significant multicollinearity problem in the models. According to the Durbin-Watson (DW) test results, DW = 1.360 in Model 1, DW = 1.454 in Model 2, DW = 1.117 in Model 3 and DW = 1.125 in Model 4. These values should be carefully evaluated for the risk of autocorrelation in terms of closeness to the ideal value of 2. The DW values for Models 1 and 2 are in the range of 1.36-1.45, which is within acceptable limits. However, the relatively lower DW values in Model 3 and Model 4 (1.117 and 1.125) suggest that there may be a weak risk of positive autocorrelation among the residual terms. Nevertheless, the risk of autocorrelation systematically distorting the model structure is quite low due to the cross-sectional nature of the data. This is also supported by the low level of correlations between independent variables.

According to the results of Model 1, the variables Route Detour ($\beta = 0.576$, $p < 0.01$) and Time Detour ($\beta = 0.258$, $p < 0.01$) are both positive and statistically significant. This result indicates that longer distance and time-consuming connecting flights have higher prices. The explanatory power of the model is also quite high ($R^2 = 0.264$). When control variables were added to Model 2 (DEAST, ASTAR, MSC), the explanatory power increased (Adj. $R^2 = 0.373$) while maintaining the significance of all key variables. In particular, eastbound flights (DEAST, $\beta = -0.248$, $p < 0.01$) were associated with lower ticket prices. The quality level of the airline operating the connecting flight (ASTAR, $\beta = 0.273$, $p < 0.01$) led to higher prices, while the market share of the dominant carrier at the connecting airport (MSC, $\beta = -0.248$, $p < 0.01$) had a negative effect.

In Model 3, which is based on the price difference, the Route Detour and Time Detour variables yield negative and significant results this time ($\beta = -0.431$ and $\beta = -0.191$, respectively, $p < 0.01$). This suggests that the more inefficient (longer) connecting flights become, the cheaper they tend to be compared to direct flights. When control variables are added in Model 4, DEAST shows significant positive ($\beta = 0.230$), ASTAR negative ($\beta = -0.262$) and MSC positive ($\beta = 0.181$) effects. In particular, the negative effect of ASTAR suggests that connecting flights

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offered by higher quality (starred) airlines may reduce the price difference in favor of direct flights.

5. Conclusion, Discussion and Recommendations

This study empirically analyzes the determinants of ticket prices of connecting flights and price differences between direct and connecting flights on international flights departing from Istanbul. The main independent variables, route detour and time detour, have produced significant results for both types of models. The findings suggest that connecting flights, which involve more distance and time, are more expensive than direct flights; however, the price difference (direct minus connecting) decreases or reverses in these cases. In particular, the route detour variable shows a strong negative effect on the price difference, indicating that there is often a price advantage when a passenger chooses a longer connecting route. The control variables included in the study also provide important findings. Eastbound flights (DEAST) were generally associated with lower ticket prices, while airline quality level (Skytrax star rating) both increased connecting flight ticket prices and reduced the direct-stop price differential. Moreover, the market share of the dominant carrier at the connecting airport had a positive effect on the price difference, while it had a decreasing effect on connecting flight prices. This suggests that carriers with high market share may engage in competitive pricing and reduce the price gap with direct flights.

The findings of this study reveal that route and time deviations are determinants of the pricing of connecting flights in international air transportation. This finding is in line with the findings of Boeh and Beamish (2011) and Meire and Derudder (2022) that price competition is achieved by offering connecting flights at generally lower costs. However, while time detour also has a significant impact on prices, it is not as strong as route detour. This suggests that the time factor is a secondary consideration in pricing and that for some travelers, time flexibility may be substituted by price sensitivity (Borenstein and Rose, 1994). As a matter of fact, routes that offer low time efficiency are compensated by low prices in order to steer consumer preference (Brueckner, Lee and Singer, 2013).

As observed in this study, the fact that eastbound international flight routes generally have lower ticket prices can be explained by the intense competition in the region and the prominent role of low-cost carriers (LCCs). Moreover, Zhang et al. (2008) found that low-cost carriers in the Asia-Pacific region have reduced competition and prices at airports. This result is in line with the findings of this study and explains the negative effect of the dummy variable on prices in

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our study. In other words, airlines are forced to offer lower prices on eastbound routes due to LCC-induced competitive pressure.

The findings of this study suggest that airlines with high service quality scores both increase ticket prices and reduce the price difference between connecting flights and direct flights. This result is in line with the findings in the literature that quality shapes price perception and high service quality carriers implement premium pricing strategies. Zeithaml (1988) stated that consumers perceive high-priced products as an indicator of quality and drew attention to this interaction between quality and price perception, especially in the service sector.

In this study, it is observed that the higher market share of the dominant carrier at the hub airport decreases the price of connecting flights while at the same time increasing the price difference with direct flights. Borenstein (1989) argues in his study that dominant carriers provide cost advantages based on economies of scale by conducting intensive operations at hub airports, and therefore, they are able to offer connecting flights at lower costs.

The competitive landscape of the airline industry is shaped by the dynamics of flight operations. From a narrow viewpoint, it would appear that competition is limited to airlines operating on the same routes. However, from a broader perspective, the scope of competition is more extensive, encompassing connecting flights. In light of the aforementioned circumstances, this study concentrates on the discrepancy in ticket prices between direct and connecting flights, as well as the factors that influence the pricing of connecting flights. The findings of the study corroborate the impact of the variables that define the quality of the connection on the price of the ticket. Conversely, the total travel time, which is a determining factor in the tariff component of the airline product, is another variable that affects the ticket price and the difference.

From the perspective of the passenger, the objective is to reach the desired destination in the shortest possible time, with the fewest possible stops and at the lowest possible cost. It is also important to consider the passenger profile, as sensitivity to price or quality may result in a trade-off between price and the desire to fly in less time. Nevertheless, in general terms, when comparable conditions are presented, the preference will be for the shortest possible journey and the most affordable ticket price. In this context, airline companies factor these considerations into their pricing and tariff structures.

The research makes a number of theoretical and practical contributions to the field. In terms of theoretical contributions, numerous studies have been conducted, particularly on direct flight routes and the factors influencing the variability in ticket prices on these routes. Nevertheless,

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it is evident that there is a paucity of research that compares direct and connecting options. It is anticipated that this study will make a significant contribution to the existing literature on this topic, based on the findings obtained. In terms of practical contributions, it is anticipated that the findings will prove useful to decision-makers, particularly in the context of tariff planning processes.

It should be noted that this study is subject to a number of limitations. The first limitation of the study is that it was conducted exclusively on long-distance lines. An analysis of passenger transfers indicates that the majority of journeys are made on long-haul routes with a hub-and-spoke network structure. This is due to the fact that short-haul layovers result in a significantly greater increase in total travel time than direct flights, which in turn leads to a reduction in the efficiency of layovers. Consequently, the study is confined to long-haul routes. Nevertheless, future research could examine the situation on medium- and short-haul routes, with a view to making comparisons. Another limitation of the study is that direct routes are limited to traditional airlines. Traditional airlines engage in competition with other airlines of a similar scale on long-haul routes, where they compete on the basis of their network structures and extensive flight networks. Conversely, low-cost carriers (LCCs) provide point-to-point flights, offering passengers the option of a passenger-responsible transfer. Consequently, low-cost carriers (LCCs) are not included in the study, while traditional airlines are.

In future research, the monitoring of seasonal effects can be facilitated by the utilisation of more comprehensive data sets. Furthermore, new models can be developed by considering the characteristics of the connecting airport, and the effects of this can be examined. Furthermore, the impact of certain input variables that are beyond the control of airline companies (such as fuel prices) can also be assessed. In light of these considerations, machine learning and artificial intelligence techniques can be employed to derive diverse models based on larger data sets.

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References

Alderighi, M., Cento, A., Nijkamp, P., & Rietveld, P. (2007). Assessment of new hub-and-spoke and point-to-point airline network configurations. *Transport Reviews, 27*(5), 529-549.

Berry, S.T., Jia, P. (2010). Tracing the woes: an empirical analysis of the airline industry. *Am. Econ. J.: Microecon. 2*(3), 1–43.

Boeh, K., & Beamish, P. (2011, December 1). *Connecting flights: The time sink that kills profits.* Harvard Business Review. https://hbr.org/2011/12/connecting-flights-the-time-sink-that-kills-profits

Borenstein, S. (1989). Hubs and high fares: Dominance and market power in the U.S. airline industry. *RAND Journal of Economics, 20*(3), 344–365.

Borenstein, S., & Rose, N. L. (1994). Competition and price dispersion in the US airline industry. *Journal of Political Economy, 102*(4), 653–683.

Brueckner, J. K., Lee, D., & Singer, E. S. (2013). Airline competition and domestic US airfares: A comprehensive reappraisal. *Economics of Transportation, 2*(1), 1–17.

Bruinsma, F., Rietveld, P., Brons, M. (2000). Comparative study of hub airports in Europe: ticket prices, travel time and rescheduling costs. *Journal of Economic and Social Geography, 91*, 278-292.

Burghouwt, G., & De Wit, J. (2005). Temporal configurations of European airline networks. *Journal of Air Transport Management, 11*(3), 185-198.

Burghouwt, G., & Veldhuis, J. (2006). The competitive position of hub airports in the transatlantic market. *Journal of Air Transportation, 11*(1).

Button, K. (2002). Debunking some common myths about airport hubs. *Journal of Air Transport Management 8*, 177–188.

Ciliberto, F., & Tamer, E. (2009). Market structure and multiple equilibria in airline markets. *Econometrica, 77*(6), 1791-1828.

Evans, W., Kessides, I. (1993). Localized market power in the U.S. airline industry. *Rev. Econ. Statist. 75*(1), 66–75.

Georgieva, A. D., Düzgün, M., & Tanyaş, M. (2015). The importance of Istanbul Grand Airport (Iga) for Turkey and its influence on widely Regional Air Traffic around. *Research in Logistics & Production, 5*(3), 239-254.

Graham, B. (1995). *Geography and Air Transport*. Wiley, Chichester.

Hansen, M. (1990). Airline competition in a hub-dominated environment: an application of noncooperative game theory. *Transportation Research B 24*(1), 27–43.

Meire, S., & Derudder, B. (2022). The time cost of saving money: Detouring and connecting time losses in the virtually interlined European airport network. *European Transport Research Review, 14*. https://doi.org/10.1186/s12544-022-00551-4

Morrison, S. A., & Winston, C. (1990). The dynamics of airline pricing and competition. *The American Economic Review, 80*(2), 389-393.

Pels, E. (2001). A note on airline alliances. *Journal of Air Transport Management 7,* 3–7.

Piermartini, R. and Fache Rousová, L. (2008). *Liberalization of Air Transport Services and Passenger Traffic*. WTO Staff Working Paper ERSD-2008-06, Available at SSRN: http://dx.doi.org/10.2139/ssrn.1315204

Redondi, R., Malighetti, P., & Paleari, S. (2011). Hub competition and travel times in the world-wide airport network. *Journal of Transport Geography, 19*(6), 1260-1271.

Reiss, P. C., & Spiller, P. T. (1989). Competition and entry in small airline markets. *The Journal of Law and Economics, 32*(2, Part 2), S179-S202.

Ren, R., Yang, Y., & Yuan, S. (2014). *Prediction of airline ticket price*. University of Stanford, 1-5.

Reynolds-Feighan, A. (2000). The US airport hierarchy and implications for small communities. *Urban Studies 37*, 557–577.

Reynolds-Feighan, A. (2001). Traffic distribution in low-cost and full service carrier networks the US air transportation market. *Journal of Air Transport Management 7*, 265–275.

Sengupta, A., & Wiggins, S. N. (2014). Airline pricing, price dispersion, and ticket characteristics on and off the internet. *American Economic Journal: Economic Policy, 6*(1), 272-307.

Starkie, D. (2007). *The dilemma of slot concentration at network hubs*. In:Czerny, A., Forsyth, P., Gillen, D., Nieneier, H.-M. (Eds.), How to Make Slot Markets Work. Ashgate Aldershot, London.

Truong, D., Pan, J. Y., & Buaphiban, T. (2020). Low cost carriers in Southeast Asia: how does ticket price change the way passengers make their airline selection?. *Journal of Air Transport Management, 86*, 101836.

Yaşar, M. & Gerede, E. (2023). Evaluation of rival pairs' competitive actions: The case of Turkish international airline market. *Akademik Yaklaşımlar Dergisi, 14*(2), 753-781.

Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *Journal of marketing, 52*(3), 2-22.

Zhang, A., Hanaoka, S., Inamura, H., & Ishikura, T. (2008). Low-cost carriers in Asia: Deregulation, regional liberalization and secondary airports. *Research in Transportation Economics, 24*(1), 36-50.