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Serkan Yilmaz Kandir
Faculty of Economics and Administrative Sciences, Department of Business Administration, Cukurova University, Adana, Turkey

Erdinc Karadeniz
Faculty, Mersin University, Mersin, Turkey

Ahmet Erismis
Faculty of Business Administration, Cukurova University, Adana, Turkey

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Serkan Yilmaz Kandir

Faculty of Economics and Administrative Sciences, Department of Business Administration, Cukurova University, Adana, Turkey

Erdinc Karadeniz

Faculty, Mersin University, Mersin, Turkey

Ahmet Erismis

Faculty of Business Administration, Cukurova University, Adana, Turkey

ABSTRACT. In this study, exchange rate exposures of tourism firms, whose shares are traded in Borsa İstanbul (BIST), were investigated. In this manner, the data pertaining to eight tourism firms, whose shares are traded in BIST, were included in analyses for July 2002–June 2010. A regression model, which was developed by adding the exchange rate factor to the Fama-French three-factor model, was used in the study. Analysis results revealed that exchange rate risk is a crucial risk factor for three tourism firms. However, it was determined that the three tourism firms that are negatively affected by exchange rate risk have considerably larger open foreign currency positions than other tourism firms.

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INTRODUCTION

Volatility in foreign exchange markets has increased largely since 1973 when the Bretton-Woods system collapsed. Increased volatility made exchange rate a significant source of risk (Muller & Verschoor, 2006). *Exchange rate risk* is described as the possibility of changes in the exchange rate generating a difference in the present value of a firm by means of affecting future cash flows (Shapiro, 1977). The exchange rate impact in question becomes more powerful for firms that use foreign currency in their operations (Bartram, 2004; Nydahl, 1999). For instance, cash flows and firm value can become a function of exchange rates in firms that conduct foreign trade or operate in tourism sector.

The aim of this study is to investigate exchange rate exposure of tourism firms trading in Borsa Istanbul (BIST). In this context, the data pertaining to eight tourism firms whose stocks were traded in the period July 2002–June 2010 and which had continuous data were used. Many empirical studies examine the sensitivity of the financial sector to exchange rate risk. However, the sensitivity of Turkish tourism firms to the exchange rate risk has not been investigated very intensely, albeit a substantial part of their revenues is in foreign currency. In this respect, findings that will be attained from the study are considered to be important in the context that they satisfy this deficiency of literature concerning Turkish public tourism firms in particular. Also, it is expected that this work will also contribute to practitioners in the Turkish tourism sector in terms of offering information to enable them to determine the effects of exchange rate risk on firm performance.

Address correspondence to Serkan Yilmaz Kandir, Department of Business Administration, Cukurova University, 01330 Balcali, Saricam, Adana, Turkey. Email: skandir@cu.edu.tr

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LITERATURE REVIEW

In this article, studies examining exchange rate exposures of firms are summarized in two groups. In the first group, studies examining exchange rate risk in general are taken into consideration. In the second group, studies examining the exposure levels of tourism firms to exchange rate risk are summarized.

Studies Examining Exchange Rate Risk In General

With the increasing globalization of many firms, empirical studies maintain that managers are concerned with risk exposure. A number of empirical studies have examined the question of whether firms are exposed to exchange risk. Bodnar and Gentry (1993) found that there is not a significant relation between stock returns and the exchange rates in the United States, Canada, and Japan. Dumas and Solnik (1995) determined that exchange rate risk is an important risk factor in the United States, Germany, the United Kingdom, and Japan stock markets. Chow, Lee, and Solt (1997) stated that bond returns are sensitive to both short-term and long-term exchange rate changes in the United States for the 1977–1989 period. Choi, Hiraki, and Takezawa (1998) found that exchange rate risk is priced in Japan stock market for the 1974–1995 period. Allayannis and Ofek (2001) examined foreign exchange exposure of nonfinancial S&P 500 firms and found that the use of foreign currency derivatives significantly reduces the exchange rate exposure. Bartram (2007) investigated exchange rate exposure of stock prices and cash flows of U.S. firms, except in the financial sector, and found that a majority of U.S. firms are exposed to exchange rate risk. Muller and Verschoor (2007) examined the impact of exchange rate risk on stock returns of 3,634 firms operating and conducting foreign trade in seven Asian countries and found that most of the Asian firms are negatively affected by exchange rate risk. Jayasinghe and Tsui (2008) indicated that in the short-run, one fourth of Japanese manufacturing firms showed sensitivity to the U.S. dollar and an approximate portion showed sensitivity to the Japanese yen for 1992–2000 period. Nevertheless, they determined that, in the long term, 70% of Japanese manufacturing firms were influenced by exchange rate risk. Kolari, Moorman, and Sorescu (2008) investigated exchange rate exposures of U.S. firms and discovered that exchange rate risk negatively affects all stock returns of U.S. firms from 1973–2002. Huffman, Makar, and Beyer (2010) investigated the exchange rate exposures of 185 multinational corporations and stated that the number of firms exposed to exchange rate risk is higher when the Fama–French three-factor model is used. Katechos (2011) analyzed the relationship of 16 currencies with relevant stock markets for more than half of the foreign exchange markets in the world and found that foreign exchanges with high returns have directly proportional relationships with stock markets, whereas foreign exchanges with low returns have inversely proportional relationships with stock markets.

Studies Examining Exchange Rate Risk of Tourism Firms

Empirical studies investigating tourism firms' exposures to exchange rate risk cover different periods in different countries. Iorio and Faff (2000) examined the exchange rate risk for 35 diverse sectors in the Australian market and they found that exchange rate risk is significant for only three sectors. Furthermore, the tourism sector arises as one of these three sectors. Chang (2002) examined the exchange rate risk with regard to the Taiwan stock market on an industrial basis during the Asian crisis period and found that the Taiwan dollar depreciating vis-à-vis the U.S. dollar created a positive impact for firms, most of them being export oriented, including the tourism sector. Chang (2009) emphasized that fluctuations in exchange rates are a crucial source of risk in terms of management of hotels operating internationally and found that as domestic money weakens, demand for tourism increases and thereby, occupancy rates of hotels rise. Lee and Jang (2010) compared exchange rate exposures of local and international firms.

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Their findings revealed that local tourism firms are more exposed to exchange rate risk when it is compared with international tourism corporations. According to their findings, as percentage of sales with foreign currency unit increases, exchange rate risk increases as well. Lee and Jang (2011) investigated exchange rate exposures of 18 tourism firms in the United States for the period between 2001 and 2008. According to their findings, 78% of tourism firms were exposed to risk stemming from movements in exchange rates. Local tourism firms without foreign currency revenues were also exposed to exchange rate risk due to financing and investment activities.

DATA AND METHODOLOGY

This study compares eight tourism firms whose stocks had continuous data and were traded on BIST July 2002 to June 2010. Nevertheless, other data required for regression models were also used. In this context, the sample incorporates all firms traded on BIST from July 2002 to June 2010. However, some stocks, which did not fit in the criteria determined, were excluded from the sample. Accordingly, firms with negative shareholders' equity were excluded from the sample in line with Fama and French (1995). Also, firms with more than one group of stocks were excluded from the study in line with Strong and Xu (1997). The basic model used in the study requires the addition of variations in exchange rate to the *Federally Facilitated Marketplace* (FFM) that were originally developed by Fama and French (1992, 1993). In its original form, the FFM is a model that also uses Small Minus Big (SMB) and High Minus Low (HML) as explanatory variables in addition to market risk premium.

$$R_i - R_f = \alpha_i + b_i(R_m - R_f) + s_i(SMB) + h_i(HML) + \varepsilon_i \quad (1)$$

- SMB: Return difference between small and big stock portfolios,
- HML: Return difference between high B/M and low B/M stock portfolios,
- $R_m - R_f$: Excess return of the market portfolio.

It is possible to develop a model that also takes into account exchange rate risk by adding a factor with regard to exchange rate risk into FFM. In this study, an equally weighted currency basket was generated from dollars and euros, considering that tourism firms intensively transact on dollar and euro bases. The mentioned currency basket was denominated as "BASKET" and added to FFM. This new model developed was called Augmented FFM (AFFM), and it was utilized to assess exposure to exchange rate risk in a limited number of applied studies (Kolari et al., 2008; Huffman et al., 2010);

$$R_i - R_f = \alpha_i + b_i(R_m - R_f) + s_i(SMB) + h_i(HML) + r_i(BASKET) + \varepsilon_i \quad (2)$$

The AFFM regression model was estimated for the eight tourism firms included in the sample. The Breusch–Godfrey Lagrange multiplier test (Breusch, 1978; Godfrey, 1978) tested the existence of an autocorrelation problem in regression models. The White test was utilized in examining the heteroskedasticity problem (White, 1980). Autocorrelation was determined in two regression models, and Newey-West heteroskedasticity and autocorrelation-consistent standard errors were utilized to correct estimations (Newey & West, 1987). The heteroskedasticity problem was determined in a regression model and White heteroskedasticity-consistent standard errors were drawn on (White, 1980).

Some prestudies need to be performed for generating factors based on the Book to Market (B/M) ratio and firm size, which possesses great importance for applying AFFM. Summarizing these prestudies will be useful.

Firm size and B/M ratio factors were regarded as portfolio construction criteria in generating HML and SMB portfolios. January–December, which are normal activity periods of firms, were not employed in generating portfolios. The declarations of annual balance sheets are generally completed in the first six

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months of the following year (Fama & French, 1992). Thus, portfolio construction periods began at the end of June of every t year and ended at the end of June of every $t + 1$ year. In this direction, financial statement data of $t - 1$ year were matched with June stock return data of t year. Calculation of stock returns depends on the time period between July of each year t and June of each year $t + 1$.

Firm size is a factor whose impact on stock returns was observed in previous studies. Market value, which is a criterion of firm size, was used in portfolio construction by multiplying the number of shares outstanding by stock price. In line with Fama and French (1995), the market value of each stock pertaining to each t year was obtained by means of calculating market values in June of the respective year. After calculating market values in June, all stocks having return data were sorted from smallest to largest according to market values of respective firms as of June of every t year at the first stage. At the second stage, stocks subjected to sorting were included in two stock portfolios. The median value was the basis for making this distinction. Although stocks with market values equal to or less than the median value were included in the small-portfolio group, stocks with market values greater than the median value were included in the large-portfolio group. Finally, returns of both portfolios were converted into monthly time series. Monthly portfolio returns were attained by means of calculating value-weighted averages of returns of stocks appearing in each portfolio.

B/M ratio is another important factor hypothesized to impact stock returns. In line with Fama and French (1995), the B/M ratio of each firm was obtained by means of proportioning shareholders' equity of $t - 1$ year to market value of December, $t - 1$ year again. B/M ratios calculated in this way were used for generating portfolios for the period beginning from July, t year up to June $t + 1$. Calculation of returns of portfolios generated according to B/M ratio consists of three stages. At the first stage, all stocks were sorted from lowest to highest according to B/M ratios of the respective firms. At the second stage, these ranked stocks were included in three stock portfolios including the group at the bottom at 30%, the middle group at 40%, and the one at the top at 30%. At the final stage, returns of all three portfolios were converted into monthly time series. Monthly portfolio returns were attained through calculating value-weighted averages of returns of stocks appearing in each portfolio.

The next step followed in portfolio construction is to generate intersection portfolios. Six intersection portfolios were generated based on Fama and French (1995). Intersection portfolios were generated annually and they were designed to intersect two different-sized portfolios and three B/M portfolios. Stocks included in intersection portfolios can be displayed as follows:

- SL = Small group in terms of firm size. Low group in terms of B/M ratio.
- SM = Small group in terms of firm size. Middle group in terms of B/M ratio.
- SH = Small group in terms of firm size. High group in terms of B/M ratio.
- BL = Big group in terms of firm size. Low group in terms of B/M ratio.
- BM = Big group in terms of firm size. Middle group in terms of B/M ratio.
- BH = Big group in terms of firm size. High group in terms of B/M ratio.

Value-weighted stock returns were used in calculating returns of intersection portfolios. Returns for these six portfolios were calculated for July of each t year through June of $t + 1$ year. The final step required for generating SMB and HML factors is to generate SMB and HML portfolios by utilizing intersection portfolios. SMB and HML portfolios were generated as follows (Charoenrook & Conrad, 2005):

- SMB $= 1/3(SL + SM + SH) - 1/3(BL + BM + BH)$
- HML $= \frac{1}{2}(SH + BH) - \frac{1}{2}(SL + BL)$

Of the data utilized in the regression model summarized here, monthly data belonging to BIST-100 index were obtained from the stock

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market database, located on the BIST official site.[1] The data used in calculating risk premiums and representing risk-free interest rates were obtained from the official site of the Under Secretariat of the Treasury as "Annually Compounded Interest Rates of Treasury Discounted Auctions" and were included in analyses by converting them into monthly values.[2] Financial statement data required for calculating firm size and book values were compiled from the BIST official site.[3]

The last explanatory variable (BASKET) used in AFFM is constituted from the U.S. dollar and the euro as equally weighted. The mentioned variable represents the average of monthly changes in exchange rates referred to as Turkish lira equivalent to 1 U.S. dollar and 1 euro. Exchange rate data were obtained from the official site of Central Bank of the Republic of Turkey.[4]

EMPIRICAL RESULTS

The data are summarized before analysis results regarding models. Returns of intersection portfolios, market portfolio, SMB, HML, and BASKET portfolios are summarized in Table 1.

When return and risk data appearing in Table 1 is examined, it is observed that risk and return structures of tourism firms are quite different. Although the highest return belongs to Firm 2, the highest risk value belongs to Firm 8. Contrarily, it is seen that the lowest return and risk values belong to Firm 7. Another conclusion attained from the table is that an HML portfolio provides higher return compared to the market whereas the SMB portfolio provides lower return than the market. Nonetheless, risk levels of both portfolios are lower than the market. However, return and risk of the BASKET portfolio came to fruition at a lower level than market, SMB, and HML portfolios. Findings regarding regression estimations are summarized in Table 2.

TABLE 1. Returns of Tourism Shares and Market Portfolio Exceeding Risk-Free Interest Rate and Returns of SMB, HML, and BASKET Portfolios

	Average Return (%)	Standard Error (%)
RM	0.44	10.34
SMB	0.35	4.31
HML	0.48	4.36
BASKET	0.23	3.68
FIRM 1	2.43	19.64
FIRM 2	2.89	18.72
FIRM 3	0.64	22.96
FIRM 4	0.85	18.75
FIRM 5	2.23	22.00
FIRM 6	1.16	19.22
FIRM 7	0.60	17.36
FIRM 8	2.13	24.21

Findings of AFFM are presented in Table 2. AFFM results demonstrate that the market is a crucial factor for all eight tourism firms. However, changes in exchange rate became an important factor for only three tourism firms (Firm 2, Firm 4, and Firm 5). Results obtained for SMB and HML factors showed similarity among tourism firms. Although the two factors in question affected only Firm 6, they did not have a significant impact on stocks of other tourism firms. To the contrary, R^2 values concerning models showed considerable variation. Moreover, a considerable portion of the variance of dependent variables is not explained by the model. This is not surprising, because an almost unlimited number of potential explanatory variables exist in asset-pricing models. Nevertheless, a direct comparison of R^2 values of different asset-pricing models is not appropriate, because each model has unique characteristics. Another important finding was that beta coefficients, statistically important with regard to exchange risk took negative values. Accordingly, tourism firms, for which exchange rate risk is essential, are negatively affected by exchange rate risk. This finding largely coincides with applied study results (Kolari et al., 2008; Muller & Verschoor, 2007; Lee & Jang, 2010, 2011).

[1]BIST official site, http://www.borsaistanbul.com/en/indices/index-data.

[2]Republic of Turkey Prime Ministry Undersecretariat of Treasury Web Site, http://www.treasury.gov.tr/irj/portal/anonymous?NavigationTarget=navurl://7039f4e84307de43c6ebefc95a44a79c

[3]http://www.borsaistanbul.com/en/companies/listing

[4]Central Bank of the Republic of Turkey Web Site, http://evds.tcmb.gov.tr/yeni/cbt-uk.html

TABLE 2. AFFM Regression Analysis Results

AFFM : $R_i - R_f = \alpha_i + bi(R_m - R_f) + si(SMB) + h_i(HML)) + r_i(BASKET) + \varepsilon_i$

FIRM	A	b	s	H	r	F-Stats	Adjusted R^2
FIRM 1[a]	0.018 (0.880)	0.542* (3.302)	0.605 (1.151)	0.586 (1.278)	−0.608 (−1.027)	3.942 [0.005]	0.410
FIRM 2	0.005 (0.225)	0.795* (4.785)	0.769 (1.583)	−0.072 (−0.284)	−0.924* (−2.072)	7.896 [0.001]	0.437
FIRM 3	0.018 (0.893)	0.837* (3.867)	0.747 (1.393)	−0.687 (−1.308)	−0.137 (−0.269)	5.529 [0.000]	0.359
FIRM 4[b]	0.087 (0.557)	1.267* (6.186)	0.594 (1.516)	−0.470 (−1.485)	−0.812* (−2.183)	22.148 [0.000]	0.488
FIRM 5	0.007 (0.375)	0.826* (3.717)	0.415 (0.756)	−1.289* (−2.316)	−0.427* (−2.292)	5.876 [0.000]	0.371
FIRM 6	−0.006 (−0.410)	0.842* (5.456)	0.782* (2.033)	0.898* (2.320)	0.667 (1.526)	9.836 [0.000]	0.376
FIRM 7	0.029 (1.583)	0.334* (2.088)	0.806 (1.716)	−0.839 (−1.832)	−0.298 (−0.525)	3.663 [0.012]	0.297
FIRM 8[a]	0.016 (0.526)	0.778* (4.318)	0.908 (1.167)	−0.196 (−0.369)	−0.038 (0.481)	3.557 [0.011]	0.303

Note. * denotes statistical significance at 5% level.
The number of observations is 96.
Figures inside round brackets are *t*-statistic values of respective coefficients.
Figures inside square brackets are probability values regarding *F*-statistics.
[a] *T*-statistics of coefficients reflect correction according to Newey–West Heteroskedasticity and Autocorrelation-Consistent Standard Errors.
[b] *T*-statistic of coefficient reflects correction according to White Heteroskedasticity-Consistent Standard Errors.

Significant differences were observed among BIST tourism firms in terms of how they were affected by exchange rate risk. Although a structure exposed to exchange rate risk was observed for Firm 2, Firm 4, and Firm 5, it was detected that tourism firms other than these three tourism firms were not exposed to exchange rate risk. The difference in exposure levels of BIST tourism firms from exchange rate risk can be associated with the magnitude of net foreign currency positions. Because only three firms are exposed to exchange rate risk, an increase in the number of the firms that are exposed to exchange rate risk might initiate an increase in the R^2 values of the relevant models. Because there are considerable scale differences among tourism firms in the sample, scaling became obligatory when assessing the relative importance of net foreign currency positions of tourism firms. In this framework, scaling was carried out by proportioning net foreign currency positions of tourism firms to their asset size. The 2002–2010 data with regard to ratios of net foreign currency positions of tourism firms to their total assets appear in Table 3.

Examining the data in Table 3, it is observed that tourism Firms 2, 4, and 5 are considerably different than other tourism firms in terms of the ratio of net foreign currency position to total assets. Net foreign currency positions of tourism Firms 1, 3, 7, and 8 have a share under 2% within assets absolutely. The said ratio for Firm 6 is about 17%. Whereas the share of net foreign currency positions for tourism Firms 2, 4, and 5 within assets is above 30%. It is considered that these differences determined were also observed in outcomes of regression analysis in

TABLE 3. Ratios of Net Foreign Currency Positions of Tourism Firms to Their Total Assets

FC/Assets	FIRM 1	FIRM 2	FIRM 3	FIRM 4	FIRM 5	FIRM 6	FIRM 7	FIRM 8
2010	0.000	−0.781	−0.066	−0.184	−0.815	0.010	0.120	0.004
2009	0.000	−0.746	−0.064	−0.367	−0.786	−0.012	0.045	−0.018
2008	−0.062	−0.696	−0.054	−0.412	−1.410	0.022	−0.005	0.044
2007	−0.048	−0.393	0.043		−0.305	−0.039	0.005	0.002
2006	−0.049	−0.461	0.003		−0.238	−0.357	0.013	0.004
2005	0.001	−0.475	0.067		−0.293	−0.359	0.000	−0.009
2004	−0.001	−0.414	0.039		−0.217	−0.398	0.000	0.019
2003	−0.003	−0.603	0.054		−0.320	−0.287	0.000	0.009
2002	−0.002	−0.581	0.085		0.127	−0.114	0.000	0.072
Average	**− 0.018**	**− 0.572**	**0.012**	**− 0.321**	**− 0.473**	**− 0.171**	**0.020**	**0.014**

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terms of net foreign currency positions. The reason of larger exchange rate exposure of tourism Firms 2, 4, and 5 is that their net foreign currency positions are relatively large.

CONCLUSION

Exchange rate risk is a risk factor that affects all firms due to its systematic character. However, firms whose revenues and/or expenses are foreign currency-based are much more affected by exchange rate risk. Firms conducting import and export and tourism firms stand out within the group of firms, which are more subjected to exchange rate risk.

Analysis results suggest that exchange rate risk is a significant risk factor for three of the BIST tourism firms. Also, exchange rate risk seems to negatively impact stock returns of tourism firms. However, exchange rate risk appears to impact BIST tourism firms at various degrees. Although three tourism firms seem to be exposed to exchange rate risk, the rest of the BIST tourism firms do not seem to be impacted by exchange rate risk. The difference between the levels of exchange rate exposure of tourism firms might be tied to the magnitude of net foreign currency positions. The ratio of net foreign currency positions to assets of the three tourism firms negatively affected by exchange rate risk is evidently higher compared to other tourism firms. In this manner, it can be considered that the relative magnitude of net foreign currency position significantly affects tourism firms' exchange rate exposures.

Findings of this study demonstrate that tourism firms with open foreign currency position are exposed to exchange rate risk. However, any evidence of exchange rate exposure could not be found in tourism firms, whose open foreign currency positions were relatively small. At this point, an issue arises that needs to be clarified: It is not known whether tourism firms with small net foreign currency position have deliberately ensured a small level of open positions. If this result is obtained by matching assets and liabilities in foreign currency, it can be considered as a successful outcome. However, if the matching of assets and liabilities in foreign currency occurs randomly, these firms need to be cautious. It is possible for them to encounter an open foreign exchange position and, consequently, exchange rate risk in subsequent periods. Firms that still remain subjected to exchange rate risk or in a position that cannot manage exchange rate risk via operational hedging methods in subsequent periods might need to assess a financial hedging option. It is recommended to use financial and operational hedging methods together. Even, some studies suggest operational and financial risk hedging as complementary methods (Wong, 2007; Kim et al., 2006). It is stated that firms tend to manage short-term exchange rate exposure by financial hedging methods and long-term exchange rate exposure by operational hedging methods (Chowdhry & Howe, 1999).

This study is expected to make significant contributions to financial literature and practitioners in the tourism sector. First, it is considered that this study will be a pioneering study to eliminate the gap in the literature with regard to the exchange rate exposures of Turkish tourism firms and the reasons of this exposure. Again, it is expected that findings of this study will also provide useful information for managing exchange rate risk to practitioners in the tourism sector. It could be suggested that future studies could examine exchange rate exposures of many nonpublic tourism firms (such as accommodation firms, travel and transportation firms). Furthermore, examining the exposures of Turkish public or nonpublic tourism firms to other financial risk factors is also considered to be a potential area of research in order to supply useful information on financial risk management in the Turkish tourism sector.

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