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The sensitivity of German and British tourists to news shocks

Cevat Ertuna and Zeliha Ilhan Ertuna

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Abstract

Purpose – This study aims to investigate the impact of news shocks on the growth rate of German and British tourist arrivals in Turkey.

Design/methodology/approach – This research utilizes GARCH as a detection device to distinguish the sensitivity of German and British tourists to news shocks, and employs monthly log-differenced tourist arrivals covering the period from January 1996 to December 2006.

Findings – The uncertainty about future British arrival rates does not follow any specific pattern. The impact of news shocks seems to have an asymmetric, long-lasting, but decaying, effect on German tourists. The national culture seems to modify the impact of news shocks on visiting decisions; German tourists seem to be more sensitive to news shocks than British tourists.

Research limitations/implications – The research covers only British and German tourists' decisions to visit Turkey. The question of whether the composition of the mean equation substantially alters the variance structure merits further study.

Practical implications – The findings suggest that, in the case of an unexpected negative news shock, tourism and travel-related organizations (private and government) should concentrate their mitigating policy responses on news-sensitive nationalities. Destinations that are more susceptible to negative occurrences such as natural disasters or political instability could reconsider their approaches to their target markets by taking into consideration characteristics of national cultures in their strategy.

Originality/value – The paper compares, for the first time, non-event-specific sensitivity of national cultures to news shocks and offers practical recommendations for response strategies.

Keywords Tourism, Information media, Consumer behaviour, Germany, United Kingdom, Turkey

Paper type Research paper

1. Introduction and literature review

With an increasing network of mass media and technological developments, news is being dissipated quickly and widely, and so are the embedded actual and potential positive and negative messages to tourists. It is reasonable to assume that some news shocks will directly or indirectly influence tourists' travel and destination decisions. Carlsen and Hughes (2007) showed that after the 2004 tsunami in the Maldives, the Italians, Japanese and French evidenced the highest reaction, with substantial decreases in tourist arrivals, while Indians, Russians and the British showed the lowest decreases. Recovery periods for tourists coming from different countries were also different: The countries that turned around the quickest were the UK, Russia and China. The numbers of tourists coming from Germany, Italy and France were slower to recover. Although very insightful, those results were event specific and based on case studies and percentage changes in inbound tourism by nationality. Weber and Hsee (1998) provide evidence that cultural differences may play a role in risk perception, which may, in turn, impact destination decisions.

The link between risk perception and cultural differences goes back to the seminal work of Hofstede (1980). Hofstede considers uncertainty avoidance an important dimension of

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national culture and assigns Germans a relatively higher score than the British on an uncertainty avoidance index (65 versus 35). Money and Crotts (2003) demonstrate that members of national cultures with a high uncertainty avoidance index, such as the Japanese (compared with ones with a medium uncertainty avoidance index, such as Germans), exhibit statistically significant differences in terms of travel planning, travel party and trip characteristics. Types of risks associated with tourism and risk perception are extensively (if not exhaustively) covered by Reisinger and Mavondo (2006). They found significant differences, in varying degrees, in risk perception, anxiety, safety perception and travel intention among tourists from different countries.

A comprehensive review by Li *et al.* (2005) indicated that 420 studies on modeling tourism demand and forecasting were published during the period 1960-2002. Another review article by Li and Song (2008) covers publications on the same topic for the period 2000-2006. The impact of news stories on tourism demand for individual countries has also been the topic of considerable research. For example, Kuo *et al.* (2008) investigated the impacts of infectious diseases including Avian Flu and Severe Acute Respiratory Syndrome (SARS) on international tourist arrivals to Asia; Huang and Min (2002) examined the impact of the September 21, 1999 earthquake on Taiwan's inbound demand; Soemodinoto *et al.* (2001) reported a drastic drop in tourist arrivals on the Gili Islands of Indonesia during the period from October 1999 to April 2000 when large-scale riots broke out; Pizam (1999) reviewed 300 cases of acts of crimes and violence to classify associated attributes and analyze the differential effects that such attributes have on tourism demand; Law (2001) studied the impact of the Asian financial crisis on the Japanese demand for travel to Hong Kong.

The impact of news shocks on the uncertainty of future demand is a recent interest of researchers. The uncertainty of international tourism demand within the framework of conditional heteroskedastic models is investigated by a few researchers, such as Shareef and McAleer (2005) for Barbados, Cyprus, Dominica, Fiji, the Maldives and the Seychelles; Chan *et al.* (2005) for Australia; Kim and Wong (2006) for Korea. Chan *et al.* (2005) applied three multivariate GARCH models to the log monthly arrival rate of four leading tourism source countries: Japan, New Zealand, the UK and the USA, covering the period from July 1975 to 2000. The goal was to detect interdependencies between major tourism source countries. The differences among those countries in terms of sensitivity to news shocks were not of any interest to the authors. Kim and Wong (2006) applied different univariate GARCH models to the log monthly arrival rate of total inbound tourists covering the period from January 1985 to November 2003. They were interested in the persistence of news shocks and the asymmetric effect on total inbound tourists. They were also not interested in differences among source countries in terms of sensitivity to news shocks. This research, on the other hand, compares the sensitivity of two different national cultures to news shocks.

One of the observed characteristics of news shocks is that they may have an asymmetric impact (i.e. the higher uncertainty induced by negative shocks is not proportional to the lower uncertainty induced by positive shocks). Prospective theory may explain this phenomenon: People tend to be more sensitive to negative messages or news than to positive ones. Tourists usually feel greater potential loss when negative news is broadcast than the potential gain they perceive when positive news is announced (Diamond and Campbell, 1989; Thaler, 1985).

This paper follows this new line of interest and investigates the effects of news shocks on the growth of tourism demand and its volatility. Furthermore, our research adds a new dimension, namely, national culture to the investigation. The purpose of this paper is to discover whether the impacts of information shocks vary from one nation to another. An analysis of conditional variance in tourism demand holds clues for cultural sensitivities and differences in that regard. This paper should be considered in the category of cross-national tourism research rather than tourism forecast, although it taps into that area too.

This paper is organized as follows: The data and methodology are explained in Section 2. Section 3 discusses the results and, finally, the conclusion and implications are found in Section 4.

2. Data and methodology

To determine the impact of news shocks on the inbound tourism demand for Turkey, monthly tourist arrival rates of two major source countries (Germany and the UK) for a period from January 1996 to December 2006 have been investigated. This study defines tourist arrival rates or the growth rate of tourist arrivals as the first difference of the natural logarithm of monthly tourist arrivals. This 11-year period, with 132 observation points, is short enough to reflect recent tendencies and long enough to allow us to perform a meaningful statistical analysis.

Although there are no theories as to why we should observe a relationship between tourism growth rate and the volatility of that rate, we can borrow some explanations from other disciplines. The cause of volatility/variance of a series could be a risk premium in finance, a political event in political science, etc. These concepts can be generalized as "information influence variability." GARCH is a time-series technique that is used to model the time-varying volatility. Since the GARCH specification deals with the structure of variance, it can cover all changes that affect the state of the observed time series (tourist arrival rates). This reason justifies the use of GARCH as a detection device to distinguish sensitivity of German and British tourists to news shocks.

The descriptive statistics of tourist arrivals from Germany and Britain are presented in Table I.

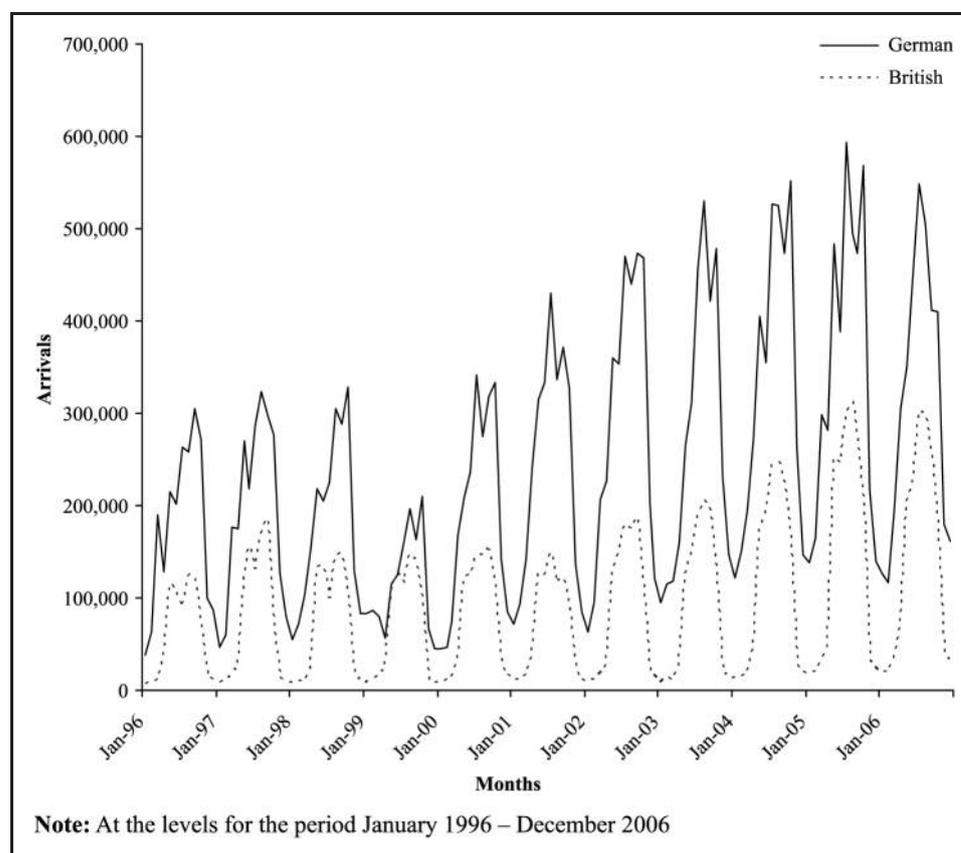
A comparison of the growth rates indicates that that the growth of British tourist arrivals fluctuates more (both in absolute and in relative terms) than that of the Germans (the coefficients of the variations are 37.7 and 60.6, respectively). The growth rates of tourists from both countries exhibit similar skewness – slightly less than two standard errors. The growth rates of tourist arrivals from both countries are tightly scattered around their mean values. Extreme (too high or too low) growth rates are much more common for German tourists than one would expect, and they are much more than the British extreme occurrences.

Tourist arrivals into Turkey, as Figure 1 suggests, exhibit strong seasonality and heavy fluctuation. Data exhibit the typical pattern of "sun, sea and sand" tourism. The amplitude of German tourist arrivals is higher than that of the British. The variability of both series also seems to increase over time.

To determine the impact of news shocks on inbound tourism demand to Turkey, this study investigated the tourist arrival rates (the growth rate of arrivals or, in other words, log differences of arrivals) of major source countries (Germany and the UK). The variances of these series are also of interest to this study.

Table I Summary statistics of tourist arrivals to Turkey (of two major source countries and for the period of January 1996-December 2006)

<i>Statistics</i>	<i>Levels</i>		<i>Growth (log difference)</i>	
	<i>German</i>	<i>British</i>	<i>German</i>	<i>British</i>
Mean	242,306	90,948	0.011	0.012
Maximum	593,751	314,066	1.115	1.691
Minimum	38,528	6,062	-1.151	-2.086
Standard deviation	144,783	83,313	0.415	0.727
Skewness	0.588	0.788	-0.419	-0.416
Std error of skewness	0.211	0.211	0.212	0.212
Excess kurtosis	-0.651	-0.345	3.466	1.380
Std error of kurtosis	0.419	0.419	0.420	0.420
<i>n</i>	132	132	131	131

Figure 1 German and British tourist arrivals to Turkey

Let y_t denote the natural logarithm of monthly tourist arrivals, and let Δy_t (the first difference of log tourist arrivals) denote the growth rate of log monthly tourist arrivals. To model the series, the stationarity of the series is checked first. Table II summarizes the results of the Phillips-Perron unit root test.

Table II indicates that the first difference of the natural logarithm of monthly tourist arrivals or the growth rate of arrivals (Δy_t) for both German and British series did not exhibit the unit root, suggesting that the series are stationary. An augmented Dickey-Fuller test yields similar results for both, with intercept and with intercept and trend.

Before modeling the growth of inbound tourism with the GARCH specification, it is checked whether the growth series has an ARCH effect. The autoregressive conditional heteroskedasticity-Lagrangian multiplier (ARCH-LM) test is performed on the growth rates of inbound tourism for each source country. To determine the optimal number of lags, Akaike's information criterion (AIC) is used. Several studies suggest that differentiating between various order selection criteria such as the AIC (Akaike, 1973), Schwarz information criterion (SIC) (Schwarz, 1978), Hannan-Quinn criterion (HQC) (Hannan and Quinn, 1979), final prediction error (FPE) (Akaike, 1969) and Bayesian information criterion (BIC) (Akaike, 1979) may pay off only when one has a large enough sample size (200 and above).

Table II Phillips-Perron unit root test (on the growth rate of log monthly tourist arrivals)

	<i>Adj. t-stat</i>	<i>Critical values (1%)</i>
German	- 8.5961	- 3.4812
British	- 7.1428	- 3.4812

To capture the dynamics of German and British tourist arrival rates to Turkey, several models are tested. Some researchers apply one model to all arrivals. Since different cultural backgrounds may result in different motivation, risk perception and, hence, decision results, German and British arrival rate series are investigated separately.

Let us consider an autoregressive model, AR (1):

$$\Delta y_t = \omega + \rho \Delta y_{t-1} + \varepsilon_t, \quad (1)$$

where

ρ is persistence and $|\rho| < 1$,

ε_t is a "news," "shock," or error (part of Δy_t unexplained by mean equation).

The conditional variance of ε_t varies over time:

$$E[\varepsilon_t^2 | \Omega_{t-1}] = h_t, \quad (2)$$

where Ω_{t-1} represents the information set available at time $t - 1$.

In:

$$\varepsilon_t = z_t \sqrt{h_t}, \quad (3)$$

h_t represents the conditional variance of ε_t and z_t is the independently, identically and normally distributed process with mean zero and unit variance. Of course, z_t could be formulated as Student t and GED distributions to capture fatter tails.

Equation 3 means that the distribution of ε_t is conditional upon the previous information set Ω_{t-1} and normal with zero mean and h_t variance.

ARCH and GARCH models can be used to specify how the conditional variance of ε_t evolves over time. If conditional variance is modeled after an AR (q) process so that today's conditional variance is a weighted average of past squared news or shocks:

$$h_t = \omega + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 \varepsilon_{t-2}^2 + \dots + \alpha_q \varepsilon_{t-q}^2 \text{ or} \quad (4.a)$$

$$h_t = \omega + \sum_{i=1}^q \alpha_i \varepsilon_{t-i}^2,$$

then the model is called an ARCH (q) model where q is the length of ARCH lags.

GARCH (Bollerslev, 1986) is the generalized version of the ARCH model. It incorporates both autoregressive and moving average components to model heteroskedastic variance. If conditional variance is modeled after an ARMA (q, p) process so that today's conditional variance is a function of past squared news (or shocks) and its own past values:

$$h_t = \omega + \sum_{i=1}^q \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^p \beta_i h_{t-i}, \quad (5)$$

then the model is called a GARCH (p, q) model.

To incorporate an asymmetric effect, Threshold GARCH (TGARCH) model can be used and one way to specify its specification would be as:

$$h_t^{1/2} = \omega + \sum_{i=1}^q (\alpha_i \varepsilon_{t-i} + \gamma_i \varepsilon_{t-i} I_{t-1}) + \sum_{i=1}^p \beta_i h_{t-i}^{1/2}, \quad (6)$$

where, I_{t-1} is a dummy variable that is equal to 1 if $\varepsilon_{t-i} < 0$ and zero otherwise. The parameter γ captures the asymmetric effect and is expected to be positive. In this model, bad news ($\varepsilon_t < 0$) and good news ($\varepsilon_t > 0$) may have differential effects on the conditional variance. If $\gamma \neq 0$ the news impact is asymmetric. Bad news has an impact of $\alpha + \gamma$ while good news has an impact of α . If $\gamma > 0$ then the leverage effect exists and bad news increases volatility.

The differenced logarithm of monthly tourist arrival rates to Turkey exhibit, as seen in Figure 2, strong seasonality. This indicates that seasonality should be incorporated into the main model.

Figure 2 also indicates that the variation of both series does not increase over time. This ensures that the forecast is not sensitive to forecast origin.

3. Results

The mean equations for German and British arrival rates were separately specified by testing several models (including the "airline model") with different AR and MA terms and with and without monthly dummy variables. The mean equation model is specified based on stationarity, invertibility, parsimony and goodness of fit. Seasonal ARMA modeling yields near unit-root results. Thus, dummy variables were used for January (JAN) through November (NOV), and December was kept as the reference month. At the 0.01 significance level all months were significant except for January and October for British tourists, indicating that there exists a monthly seasonality effect for both nationalities.

The best conditional mean equation of tourist log arrival rates to Turkey is ARMA (0,1), both for British and German tourists, with monthly dummies to capture the seasonality effect. The ARCH-LM test is performed on residuals to detect the presence of conditional variance. Table III summarizes the results for the first lag. Higher lags were not significant.

Table III indicates that the log growth of British arrivals does not exhibit the ARCH-GARCH effect. On the other hand, German tourist arrival rates do. This means that British arrivals exhibit no or short-lived sensitivity to news impacts and that the uncertainty about future British arrival rates do not follow any specific pattern. On the other hand, when German tourist arrival rates are volatile, they tend to be volatile for a while, and when arrival rates are steady or calm, they tend to be so for a while.

Figure 2 Tourist arrival rates for Turkey

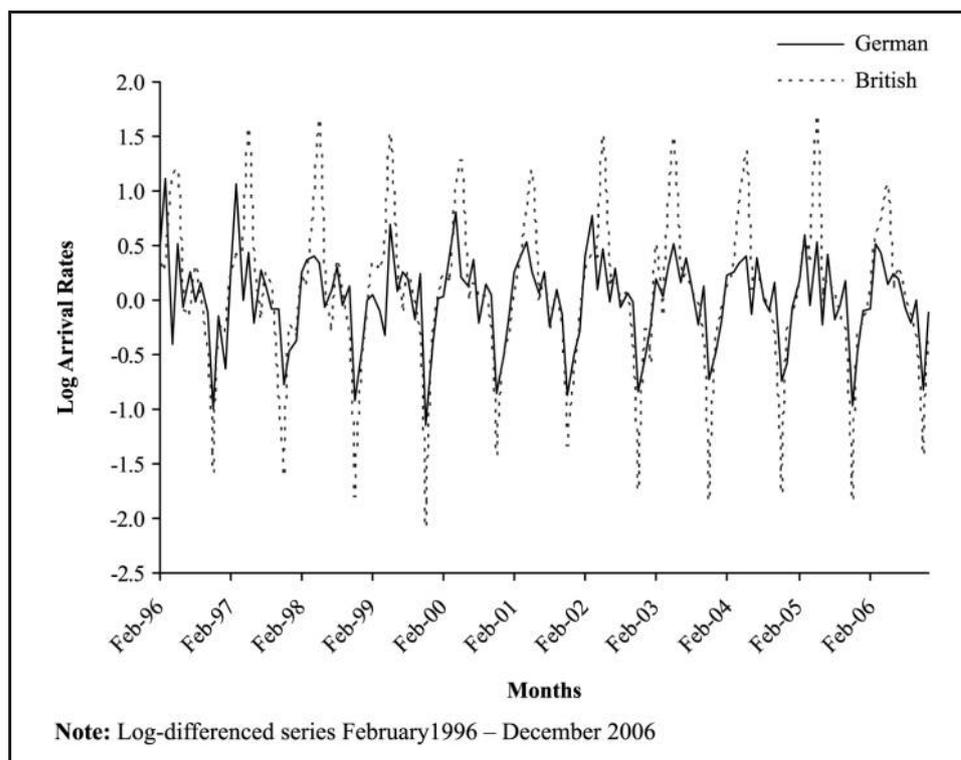


Table III ARCH-LM Test (for the first lag)				
	<i>F</i> -statistic	<i>Prob.</i>	<i>Obs</i> * <i>R</i> -squared	<i>Prob.</i>
British	0.4403	0.5082	0.4457	0.5044
German	4.8211	0.0299	4.7187	0.0298
Note: Prob. <i>F</i> (1,128) and Prob. Chi-Square (1)				

Table IV indicates that the MA roots for British and German arrival rates satisfy the invertible condition. Although British tourist arrival rates to Turkey exhibit no ARCH-GARCH effect, German arrival rates exhibit a statistically significant asymmetric leverage effect (γ) in conditional variance, which could be best modeled by TGARCH (1, 1). Since British arrival rates exhibit no ARCH-GARCH effect, related variables are omitted in Table IV.

For both series, *Q*-statistics indicate that residual autocorrelations are not significant (24 lags); hence, both models capture available information well. High-adjusted *R*-squared values (0.951 for British and 0.758 for German) indicate that the model has high explanatory power. Although the results are not presented here, we did test several other conditional variance specifications, such as PARCH, EGARCH, and TARCH. The TGARCH model was superior to the others.

4. Conclusion and recommendations

Data on the growth rates of tourist arrivals, measured by log-differenced inbound monthly tourist arrivals to Turkey, indicate that the country of origin plays a role in shaping this process. In the case of Turkey, the growth rate of British arrivals exhibits no or short-lived sensitivity to news impacts and the uncertainty about future British arrival rates does not follow any specific pattern. On the other hand, when German tourist arrival rates are volatile, they tend to be volatile for a while; and when arrival rates are steady or calm, they tend to be so for a while. Furthermore, the impact of negative news on German tourists' decisions about visiting Turkey is stronger than the impact of positive news.

Table IV Full model for tourist arrival rates to Turkey (in terms of log differenced monthly arrivals and for the period January 1996-December 2006)						
<i>Variable</i>	<i>Coefficient</i>	<i>British</i> <i>t</i> - <i>statistic</i>	<i>Prob.</i>	<i>Coefficient</i>	<i>German</i> <i>z</i> - <i>statistic</i>	<i>Prob.</i>
<i>C</i>	-0.372	-6.123	0.000	-0.477	-13.923	0.000
JAN	0.114	1.084	0.281	0.312	5.472	0.000
FEB	0.575	6.637	0.000	0.643	12.923	0.000
MAR	0.672	7.831	0.000	0.904	17.581	0.000
APR	1.070	12.473	0.000	0.758	16.829	0.000
MAY	1.791	20.870	0.000	0.879	20.557	0.000
JUN	0.447	5.206	0.000	0.462	9.851	0.000
JUL	0.443	5.163	0.000	0.770	16.264	0.000
AUG	0.468	5.456	0.000	0.426	8.834	0.000
SEP	0.346	4.037	0.000	0.454	9.411	0.000
OCT	-0.069	-0.802	0.424	0.564	11.516	0.000
NOV	-1.307	-12.514	0.000	-0.402	-7.040	0.000
MA(1)	-0.753	-12.526	0.000	-0.451	-10.099	0.000
<i>Variance equation</i>						
ω	N/A	N/A	N/A	0.006	1.958	0.050
α	N/A	N/A	N/A	-0.084	-2.456	0.014
β	N/A	N/A	N/A	0.766	6.330	0.000
γ	N/A	N/A	N/A	0.188	2.148	0.032
Adjusted <i>R</i> -squared	0.951			0.758		
Log likelihood	60.424			58.751		

These findings are directly in line with the findings of Carlsen and Hughes (2007), in terms of the differences between German and British tourists' behavior regarding the 2004 tsunami news shock for the Maldives. They also give support (in a broader sense) to Hofstede's (1980) conclusion that there are cultural differences in terms of risk avoidance and to his statement that cultures shift together, such that the differences remain intact (Hofstede, 1991).

The most important implication of this finding is that, in the case of an unexpected negative news shock, to become relatively more effective, tourism and travel-related organizations, as well as the Turkish government, should concentrate their offsetting policy responses on German rather than British travelers. Such targeting, however, should be for the right reasons; it should not be done simply because German tourists constitute the highest percentage of inbound tourism to Turkey. Destinations that are more susceptible to negative news such as natural disasters or political instability could reconsider their approaches to the target markets by considering characteristics of national cultures in their strategy. Other implications are that planners and forecasters should incorporate national culture and TGARCH representations into their modeling and forecasting tasks.

Although comparison of two important source countries in terms of sensitivity to news shocks is important, this research should also be extended to other national cultures. If the mean equation is restructured using exogenous variables, then GARCH representations for both British and German tourist arrival rates may exhibit different structures. The question of whether the composition of the mean equation substantially alters the variance structure merits further study. Media coverage could be one of the exogenous variables. Even though news is transmitted almost immediately to all parts of the world, media coverage in terms of emphasis, frequency and size may differ from one country to the other. Hence, media coverage may alter perceived riskiness of news.

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