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**Severity vs. Frequency of Acts of Terrorism:  
Which Has a Larger Impact on Tourism Demand?**

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**SEVERITY VS. FREQUENCY OF ACTS OF TERRORISM: WHICH HAS A  
LARGER IMPACT ON TOURISM DEMAND?**

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## **SEVERITY VS. FREQUENCY OF ACTS OF TERRORISM: WHICH HAS A LARGER IMPACT ON TOURISM DEMAND?**

### **ABSTRACT**

The results of a study conducted on the impact of acts of terrorism on tourism demand in Israel during the period of May 1991-May 2001, confirmed the hypothesis that the frequency of acts of terrorism had caused a larger decline in international tourist arrivals than the severity of these acts. The implications of this study are that in cases similar to Israel, tourist destinations can recover from even severe acts of terrorism, *as long as the terrorist acts are not repeated*. However, when acts of terrorism – whether of high or low severity - occur at high frequency and regular intervals, tourism demand will constantly decrease and eventually the destination's tourism industry will come to a standstill.

### **INTRODUCTION**

The September 11, 2001 terrorism act in the USA has had an enormous negative effect on tourism demand worldwide, and a devastating impact on the tourism industry of the USA. Airlines, tour operators, theme parks and attractions, car rental and hotel companies to name just a few, have all reported drastic cancellations of existing reservations and extensive declines in their future bookings. In its turn, the negative impact on the tourism industry has caused a domino effect in other sectors of the economy and may possibly lead to a worldwide recession. On September 24, 2001 the World Travel & Tourism Council (WTTC) estimated that “annualized over the next twelve months, the decrease of travel and tourism demand is currently expected to total 10-20% in the United States and less in the rest of the world, including Europe and Asia” (WTTC, 2001). Based on a conservative scenario of 10% decrease in tourism demand, WTTC estimates “a decrease of 1.7% of total Gross Domestic Product (GDP) for the world economy and the loss of 8.8 million jobs and a decrease of 1.8% of total GDP for the US economy and the loss of 1.1 million jobs” (WTTC 2001). Thus, as one can see from the above estimates a single terrorist act has caused havoc in the entire world economy. The question that is currently on everyone's mind is whether the industry can ever completely recover from such a massive blow and if so, how long would it take.

### **PREVIOUS RESEARCH**

Acts of terrorism and their negative effects on tourism demand are not a new phenomenon. Terrorism increased from 206 major events in 1972 to 3010 in 1985 (D'Amore and Anunza, 1986, p. 21). These events have resulted in significant declines in tourism receipts and demand, such as the loss of over a million arrivals from the U.S. to Europe in 1986 -- down 23 percent from 1985 -- as an aftermath of the December, 1985, Palestinian terrorists attacks in airports in Rome and Vienna and the 1986 hijacking of TWA flight 847 in Athens and seizure of the cruise ship *Achille Lauro* (Brady and

Widdows, 1986, p. 8; Hurley, 1988; Conant, Clark, Burnett, and Zank, 1988). By the mid 90's the frequency of acts of terrorism had subsided but increased again in Israel the Middle East and Africa in the late 90's and the beginning of the 21<sup>st</sup> century.

The impacts of terrorism on tourism destinations from an economic perspective has been studied and documented in numerous studies (Enders, Sandler, and Parise, 1992; Enders and Sandler, 1991; Gu and Martin, 1992; Tremblay, 1989). Many of these studies found that the impact of terrorism on tourism can occur up to three months after the event took place and last for a relatively long time – 6 to 9 months after the event. (Sonmez, 1994, p. 43-44; Enders Sandler and Paris 1992).

Several researchers have also suggested that acts of terrorism have differential effects on tourism demand depending on such factors as the *severity* of the event and the *frequency of occurrence*. For example Pizam (1999) claims that:

“The *severity* of the criminal/violent act would affect the magnitude of the impact. Acts that cause mass *destruction of life and property* - such as war and terrorism - would have a more devastating effect on tourism demand, than acts that cause some *loss of life* (i.e. murder), which in turn will have a more negative impact than those that cause only *bodily harm* (i.e. assault and rape)...” (Pizam 1999: 7-9)

He also suggests that

“The more *frequent* the criminal/violent acts occur, the greater is their impact on tourism demand. Since tourists' memory is relatively short, crimes and violence at tourist destinations that occur at *infrequent intervals* will have a negative impact for only a short duration. In contrast, acts that occur in *rapid succession* or *constantly* will have a serious negative effect for as long as they continue.” (Pizam 1999: 9)

This leads him to conclude

“Acts resulting in mass destruction of life and property followed by loss of life and bodily harm have the strongest effect on tourism demand.... Acts resulting in loss of property only have the lowest effect on tourism demand....All else being equal, acts occurring more frequently will have a more intense, widespread and lengthy effect on tourism demand than those occurring less frequently.” (Pizam 1999: 11)

Krakover (2000) studied the impact of acts of terrorism on the Israeli tourism industry and found that the more severe was the terrorist event the larger was the decline in tourism demand following the event. This was done by regressing the monthly number of arrivals against a severity index of the terror events. Fleischer and Buccola (forthcoming)

have used a similar index in order to develop a supply and demand model of the Israeli hotel industry, distinguishing between its domestic and foreign sectors. Similar to Krakover (2000) they found that higher is the severity of the terror event the larger is the decline in foreign demand for hotel rooms.

Though as mentioned above, Pizam (1999) suggested that both the severity of the events as well as their frequency affect tourism demand, at present there is no known evidence as to which of the two has a greater negative impact.

## **OBJECTIVE**

The objective of this study was to estimate the relative impact of severity of acts of terrorism as compared to their frequency, and determine which of the two has a greater negative impact on tourism demand. Since Israel is one of a very small number of active tourist destinations that has a long history of terrorism events of varying degrees of severity, we chose to conduct this study in the context of the Israeli tourism industry.

## **HYPOTHESIS**

Based on Pizam's (1999) study we hypothesized that the frequency of acts of terrorism will cause a larger decline in international tourist arrivals in Israel than the severity of these acts.

## **METHODOLOGY**

### ***1. Time frame***

The time frame for this study was the 121 months period between May 1991 and May 2001. Although earlier data were available we started from May 1991 in order to exclude the effects of the Gulf War in January 1991 from our analysis. This event was a regional war rather than a terrorist event, and had a vast impact on tourism flows worldwide and more so in the Middle East.

### ***2. Variables***

To test the above hypothesis we used the number of tourists entering Israel on a monthly basis (Central Bureau of Statistics 1992-2001) as the dependent variable. The explanatory or independent variables were (1) the severity and (2) the frequency of acts of terrorism. The data for the two independent variables were obtained from the web site of the International Policy Institute for Counter-Terrorism which documents terrorist acts throughout the world, their date, and the number of people killed and/or injured (<http://www.ict.org.il>). To measure the severity of the acts we used an index adapted from Krakover (2000). In this index, zero represents a month with no terrorist events and seven represents two or more very serious events. Intermediate values correlate with the number of deaths and injuries from the attacks. To better reflect the euphoria surrounding

especially positive events, we extended this index to include the signing of the two peace treaties.

The frequency of the events was taken from the same data source as the terror index but instead of the intensity of the events, which reflected by number of killed and injured, the data used here were the number of terrorist events per month. The values vary from 0 in months with no events to 17 in May of 2001 where the highest number of terror events was registered.

Both variables, the severity of the terrorism events and their frequency has a long-term effect on incoming tourists. According to a survey of the Israel Tourism Ministry (2000) most of the incoming tourists make their reservation within the four months preceding their visit. Thus we assumed that a terror event within this time frame could affect the tourists' entries to Israel. To account for this lagging effect we created a moving average for each variable over the period of four months preceding tourists' entry.

Two other factors had to be considered in the construct of our model. Israel enjoyed, like the rest of the world, an increase in incoming tourists over the 10-year duration of the model; thus a trend variable was created and included in the model. This variable received the values of 0 in June of 1991 and increased by an interval of one each month. The second factor to be considered was the seasonality in the tourist influx. In Israel, the winter months are considered the low season while early spring months, mid-summer months and late fall months are considered high season. Dummy variables for each month, excluding December, accounted for the seasonality of the data. Variables description and descriptive statistics are presented in Table 1.

<b>TABLE 1 HERE</b>
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## RESULTS

Two models were estimated in linear form using least squares regression and employing monthly data from May 1991 through May 2001 (Eviews, 1994). Parameter estimates of the two models are given in Table 2. In Model #1 all the aforementioned independent variables were used excluding the frequency of terror attacks. The coefficient of severity level is negative and significant which means that holding everything else constant, the more severe is the level of the terrorist act the higher is the decline in the number of tourists entering Israel. The *trend* variable is positive and significant. This articulates the increase influx of tourists to Israel over the relevant period. Since the dummy variable for December - usually a low season - was excluded, all the months' dummy coefficients should be interpreted in relation to the excluded coefficient. Accordingly, as expected, March, April, July, August and October enjoyed significantly higher number of tourists than December.

<b>TABLE 2 HERE</b>
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In Model #2 the terrorism *frequency* variable was added. Subsequently the coefficient of *severity* level variable was no longer significant. However, the coefficient of terrorism *frequency* was negative and highly significant. The signs and significance of the rest of the independent variables stayed the same as in Model #1. Notably, Model #2 had a significant increase in  $R^2$  over Model #1.

## CONCLUSION AND IMPLICATIONS

The results of this study confirmed our hypothesis by showing that during the period of May 1991 through May 2001 -- a period characterized by many terrorist acts and political turbulence -- the most important factor that affected tourists' entries to Israel was the frequency of the terrorist acts and not their level of severity.

If the Israeli data can be generalized to other destinations, the implications of this study are that tourist destinations can recover from even severe acts of terrorism, *as long as the terrorist acts are not repeated*. However, when acts of terrorism – whether of high or low severity - occur at high frequency and regular intervals, tourism demand will constantly decrease and eventually the destination's tourism industry will come to a standstill. Applying this to the current crisis in the tourism industry of the USA, it is possible to surmise that if no other acts of terrorism will occur in the near future, tourism demand will slowly increase and the industry will return to normalcy within a period of 6 to 12 months.

**Table 1: Variable Descriptions and Summary Statistics (May 1991 - May 2001)**

Variable	Description	Mean	Standard Deviation
Tourists	Monthly number of tourists entering Israel (thousands)	160.11	41.00
Terrorism severity	Moving average, over 4 months, of the severity level	1.26	2.35
Terrorism frequency	Moving average, over 4 months, of the number of terrorism acts in a given month	0.93	2.71
Trend	= 0 in June of 1991 and increases by intervals of 1 each month		
January	= 1 if January, zero otherwise		
February	= 1 if February, zero otherwise		
March	= 1 if March, zero otherwise		
April	= 1 if April, zero otherwise		
May	= 1 if May, zero otherwise		
June	= 1 if June, zero otherwise		
July	= 1 if July, zero otherwise		
August	= 1 if August, zero otherwise		
September	=1 if September, zero otherwise		
October	= 1 if October, zero otherwise		
November	= 1 if November, zero otherwise		

**Table 2: Models' Estimates for Number of Incoming Tourists**

Variable	Model 1		Model 2	
	Coefficient	t-Statistic	Coefficient	t-Statistic
Terrorism severity	-10.52*	-6.00	3.11	1.19
Terrorism frequency	-	-	-14.86*	-6.42
Trend	0.76*	9.85	0.84*	12.4
January	-19.35	-1.60	-17.54	-1.71
February	4.61	0.38	4.74	0.46
March	40.00*	3.32	40.09*	3.90
April	51.54*	4.28	46.94*	4.56
May	21.76	1.84	12.61	1.24
June	5.00	0.41	-1.67	-0.16
July	35.26*	2.92	29.19*	2.83
August	29.63*	2.45	23.45*	2.27
September	1.52	0.12	-2.36	-0.22
October	36.18*	3.00	32.34*	3.14
November	10.68	0.88	5.52	0.53
Constant	104.83*	10.85	98.63*	11.90
Number of Observations	121		121	
R <sup>2</sup>	0.61		0.72	

\* Significant at 5%

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