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# The Impact of Terrorism on Business


Michael D. Larobina

*Sacred Heart University*, larobinam@sacredheart.edu

Richard L. Pate

*Sacred Heart University*, pater@sacredheart.edu

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## ***The Impact of Terrorism on Business***

**Michael D. Larobina**, Sacred Heart University

**Richard L. Pate**, Sacred Heart University

### **ABSTRACT**

*Terrorism has in one form or another been a part of society throughout history. Since the September 11, 2001 attacks in New York, the world community has been more focused on terrorism than ever before in most recent modern history. Terrorism has impacted multiple levels of society across the world community. One of those levels is the business environment. A specific aim of terrorism is to disrupt and destroy ongoing businesses. Therefore, the ability of governments to disrupt and destroy terrorism is essential to the continued growth and expansion of the world economy. Terrorism will directly impact a country's ability to attract and maintain business development and investment. This paper examines the impact of terrorism on five business sectors: the equities market, aviation, tourism, insurance and corporate security. An examination of the available literature and data concludes there is an initial detrimental impact on all these business sectors. However, available data trends in the direction of no long-term disruption. The economic costs, however, are present and most business sectors endure additional economic costs as a result of terrorism.*

### **Introduction**

In his book, *Business Confronts Terrorism, Risks and Responses*, by Dean C. Alexander he states that "terrorism's implications on business – merits closer scrutiny given its relation to economic security. Terror metamorphoses business, causing firms to deal with current threats and craft plans to reduce future challenges. Terrorists weaken industry and society through their manipulation of economic systems components – companies, nonprofits, labor, capital and technology – against their targets" (Alexander 2004, 4). Alexander's argument that terrorism affects business activities deserves closer analysis.

### **Equities Markets**

The first level of analysis is the impact a terrorist attack has directly on the equities markets. Alexander points out that the Dow Jones Industrial Average and the Nasdaq Composite Index declined by 7.13% and 6.83%, respectively; when the markets reopened after the September 11, 2001 New York attacks (Alexander, 146). He states that during the five day period after the markets reopened, the Dow Jones Industrial Average declined by 14.3%; the largest decline in one week since 1933. Following the March 2004 attack in Madrid, the initial reaction of the

European equities markets responded in a similar manner. The European Dow Jones Stoxx 600 Index declined by 2.67%, Spain's stock market index fell by 2.18% and the U.S. Dow Jones Industrial Average declined by 1.64% (Alexander, 147).

Clearly there is some initial effect on the equity markets following a terrorist attack. Studies by Chen and Siems also indicate some initial effect on the equities markets after a terrorist attack. "When information becomes available about a cataclysmic event like a terrorist or military attack investors often flee the market in search of safer financial instruments and panic selling ensues" (Chen and Siems, 2004, 349). However, the impact is not long term and the markets seem to bounce back in a relatively short period of time. According to Chen and Siems it only took the S&P 500 index nineteen days to return to its pre-September 11<sup>th</sup> trading levels (Chen and Siems, 360). There is also strong evidence to support a rapid return of the markets outside of the United States after a terrorist attack.

The last column in Table 2 [See Appendix 1 for copy of Table 2] also shows that, for the most part, global capital markets rebounded fairly quickly after the September 11<sup>th</sup> attacks. Of the 33



markets, 9 had significant negative CARs over the 11-day event window, but none of these markets is generally considered a major global capital market. Moreover, within 20 trading days, 6 of the 33 markets (18%) had returned to their pre-attack levels. Within 40 trading days, 21 markets (64%) had returned to their pre-attack levels, and after 60 trading days, 27 markets (82%) had fully rebounded (Chen and Siems, 359).

Chen and Siems give the following reasons for the resilience of the markets. First, they point out that improved technology has made communications more effective. Second, this has led to the markets being more efficient and allows for increased participation. Lastly, better monetary and fiscal policies have allowed the markets to have more confidence, promote stability and provide proper levels of liquidity (Chen and Siems, 356). They conclude by stating:

We find evidence that suggest that modern U.S. capital markets are more resilient than they were in the past and that they recover sooner from terrorist/military attacks than other global capital markets. We also find evidence that suggest the possibility that this increased market resilience can be at least partially explained by a banking/financial sector that provides adequate liquidity to promote market stability and quell panic (Chen and Siems, 363).

Other studies support the idea that although there is an initial negative reaction in the equities markets after a terrorist attack, they are quick to return to pre-attack levels (Cohen and Remolona 2001) and (U.S. General Accounting Office Report 2003).

### **Aviation**

Nothing demonstrates the impact terrorist acts have on the airline industry more than the economic numbers. Prior to the September 11, 2001 attacks, the industry on whole showed a profit. Since that time it has shown losses in excess of forty billion US dollars (IATA 2008, 1). [See Appendix 2 for Industry Statistics]. In

terms of passenger traffic it has decline on domestic flights within the United States; however it has increased in international travel. The drop domestically is twelve (12%) percent. The increase internationally has been thirty-seven (37%) percent. Although this is a significant increase, it is still five (5%) percent below the expected trend prior to September 11, 2001 (IATA, 2).

One cannot look at the airline industry and the impact terrorism has had on it without considering the cost of oil. Crude oil has gone from \$25.00 dollars a barrel in 2001 to over \$100.00 a barrel in 2008 (Wikipedia.org accessed 2008). "The industry's fuel bill has more than doubled from US\$46 billion or 14% of operating expenses in 2000 to an estimated US\$ 115 billion or 26% of operating expenses in 2006" (IATA, 3). [See Appendix 3 for fuel impact on operating cost]

As Appendix 3 clearly demonstrates, the cost to the airline industry for fuel has steadily increased since 2001. The connection between instability in the Middle East and the cost of oil is hard to escape.

The war on terrorism may some day bring lasting stability to the oil producing states of the Persian Gulf. But for now, we have to consider the possibility of outcomes that could arise from instability in the region ... Currently 28 percent of the world's crude oil comes from the Organization of Arab Petroleum Exporting Countries (OAPEC) consisting of Arab Muslim nations, some of which are not part of the OPEC cartel. The governing regimes in all these countries are at some risk (Perry 2001, 3).

Any major disruption in oil supplies as a result of terrorist acts committed in the Middle East or in other parts of the world on oil infrastructures will drive oil prices higher. Historical evidence exists to support this proposition (Perry, 2).

The United States has responded to security issues in the airline industry by passing The Aviation and Transportation Security Act of 2001 (U.S. Public Law 107-71). In very broad terms the Act places most of the economic costs



related to its implementation on the government. “The act is a comprehensive approach to increasing aviation security. The objective of the act is to create, develop, and streamline security procedures and protocols that radically reduce the chances of any security breach or violation” (Coughlin, Cohen and Khan 2002, 19). It is estimated that the total cost of implementation will be 9.4 billion dollars (Coughlin, Cohen and Khan, 20). At the same time, there is an indirect cost that will be placed upon the airline industry. The Act imposes requirements not only on airlines but also aircraft manufacturers and training facilities. “The bill requires commercial manufacturers to increase the security involving the doors separating the pilots from the passengers on new large aircraft as well as on new commuter aircraft ... the legislation mandates that person who provide aircraft training report certain information on those they train” (Coughlin, Cohen and Khan, 22). These indirect costs will only add to the overall rising cost airlines have incurred since 2001.

### **Tourism**

Closely connected to the airline industry is tourism. Worldwide tourism in 2006 accounted for US\$ 733 billion in revenue (World Tourism Organization, 2006). For some countries, especially smaller and developing countries revenue from tourism accounts for a significant portion of their overall economy. “Tourism is a straightforward concept and may be defined as a service based industry comprised of several elements including transportation, accommodation, food and beverages, tours and merchandising” (Essner 2003, 3).

International tourism is one of the world’s largest industries, and many small, open economies rely heavily on tourism revenues as a major source of foreign exchange earnings. In addition to such direct benefits, tourism is also a source of foreign direct investment (FDI) in many developing countries. Terrorism may hurt tourism by reducing tourist arrivals. Over time continued terrorist attacks may also significantly reduce FDI. Besides such direct cost, indirect costs of terrorism include additional advertising expenses necessary to

attract new or more tourist, reconstruction costs for damaged tourist facilities, and security enforcement expenses to lessen terrorist threats (Drakos and Kutun 2003, 621).

Drakos and Kutun (2003) point out that the literature on the impact of terrorism on tourism is in their words “scant”. They point to two studies on the connection between terrorism and tourism. One is by Enders and Sandler (1991) and the other by Enders, Sandler and Parise (1992). They cite these studies as demonstrating “empirical evidence on the link between terrorism and the tourism sector for a sample of European countries” (Drakos and Kutun, 623). Drakos and Kutun state that “they (Enders, Sandler and Parise) “observe that terrorist incidents have an adverse effect on tourism revenues in Europe and that tourists substitute away from some countries to others to minimize the risk of experiencing terrorist incidents. Our evidence is consistent with their finding[s]” (Drakos and Kutun, 623).

After the New York attacks in 2001, there is a slight decrease in both international tourist arrivals and in international tourism receipts. In 2000 worldwide tourism receipts was \$481.6 billion. In 2001 that number fell to \$469.9 billion. In 2000 tourism receipts in the Americas was \$130.8 billion. That number fell to \$119.8 billion in 2001 and to \$113.5 billion in 2002. However, both worldwide numbers and the numbers for the Americas began to increase in 2003 and the 2006 numbers have exceeded the 2000 numbers (World Tourism Organization 2007, Facts and Figures Section, Tourism Highlights 2007 Edition).

The same trends exist for tourist arrivals. There was a slight decrease in worldwide tourist arrivals from 687.0 million in 2000 to 686.7 million in 2001. In the Americas there was a decrease from 128.1 million to 122.1 million from 2000 to 2001. From 2001 to 2002 the numbers decreased again to 116.7 million. This represents a 4.7 percent decrease from 2000 to 2001 and another decrease of an additional 4.4 percent from 2001 to 2002. Once again however, both worldwide numbers and numbers for the Americas began to increase in 2004 and have exceeded



the 2000 numbers (World Tourism Organization, *Tourism Highlights 2007 Edition*).

Both the literature and the economic data tends to show that, not unlike other economic sectors, the tourism industry is initially impacted by terrorism, but recovers in a relatively short period of time. Nonetheless, there is a definite monetary loss to the tourism industry both regionally and worldwide when terrorist activity increases.

### **Insurance**

Generally, insurance exists to alleviate the insured's potential losses and create profit for the insurer. This twofold objective is achieved in great part by calculating measurement costs, that is, the probability that a risk will materialize and the magnitude of the loss in case of the materialization (Posner 1992). Insurance coverage and profitability rest on the accuracy of this calculation. Terrorism, on the other hand, exists to create a perpetual threat and chronic fear of unpredictable, future risks of losses (Schmid 1983). In essence, the concepts of insurance and terrorism are diametrically opposed. Ultimately, terrorism renders risk probability and loss magnitude nearly incalculable, consequently decreasing the insurance market's profitability and hence its coverage.

Notwithstanding this dichotomy, prior to the terrorist acts of September 11, 2001, in the U.S. most commercial property and casualty insurance provided coverage for losses resulting from terrorist acts (Allyn and McNeff, 2003, 821, 822). Prior to then, terrorism was perceived as a distant nuisance. The massive property losses caused by the 2001 attacks, estimated to be between \$36 billion (in 2006 dollars) (Allyn and McNeff, 826), changed such practice and perception. In the aftermath of such losses, insurers either (1) added express terrorism exclusions to new policies (and old policies up for renewal) or (2) greatly increased premiums (Gersen, 2007, 289). This practice resulted in a major decrease of insurance coverage for losses resulting from terrorist acts.

The absence of adequate coverage had immediate and serious reverberations in the commercial real estate market. Given lenders' insur-

ance coverage requirements, the absence of adequate coverage made the sale, purchase and refinancing of commercial property prohibitive. In fact, a survey by the Bond Market Association revealed that "large lenders placed on hold or cancelled more than \$7 billion or 10% of the 2001 large loan volume in commercial mortgage loans" (Bond Market Association 2002). Naturally, the real estate predicament created correlative repercussions to the construction, transportation, energy and utility sectors of the overall economy. But the insurance malaise also extended to a less foreseeable victim, the average investor.

Beginning in the 1990s, retirement savings plans, pension plans and other funds began to significantly invest in commercial mortgage-backed securities. According to the Mortgage Bankers Association, in 2001, commercial mortgage-backed securities ("CMBS") were the second largest source of commercial and multi-family real estate financing, representing approximately 17 percent of the \$ 2 trillion total debt outstanding (Mortgage Bankers Association 2005). In the aftermath of the 2001 attacks, the amount of CMBS issued in the U.S. dropped 11 percent (Mortgage Bankers Association 2005). Additionally, Fitch Ratings downgraded billions of dollars in CMBS in reaction to the lack of terrorism insurance coverage in the market place (Philipp & Pamela 2002; Fitch Ratings 2002). Ultimately, the average investor was poised to absorb a great part of the burden caused by the aforementioned lack of coverage.

In response to the actual and likely harms facing the overall economy, the U.S. government began to regulate an industry traditionally regulated by state law when it enacted the Terrorism Risk Insurance Act of 2002 (Pub. L. No. 107-297, 116 Stat. 2322 (2002) ("TRIA"). The goal of TRIA, as amendment, is to subsidize terrorist coverage of commercial property and casualty insurance for a transitional period. This "transitory period" (originally three years) is intended to render coverage available while the market learns to calculate the measurement costs associated with terrorist acts. (TRIA has been amended by the (1) Terrorism Risk Insurance Extension Act of 2005, Pub. L. No. 109-144, 119 Stat. 2660 (2005), ("TRIEA"), which extended the transitory period by two more



years; and by (2) the Terrorism Risk Insurance Program Reauthorization Act of 2007, Pub. L. No. 110-160 121 Stat. 1839 (2007) (“TRIPRA”), which further extended this period for an additional seven years, that is, until December 31, 2014.)

TRIA, as amended, requires every insurer to make available in all its commercial property and casualty insurance policies coverage for insured losses resulting from terrorist acts. TRIA originally defined “commercial property and casualty insurance” to include commercial lines of property and casualty insurance, excess insurance, workers’ compensation insurance and surety insurance, and specifically exclude, among other things, health or life insurance, including group life coverage (TRIA § 103(12)). In turn, “property and casualty insurance” originally included multiple peril (including business interruption), fire allied lines, liability, commercial auto, aircraft, ocean marine and inland marine, and product liability (Treasury Report 2005, 18). Eventually, TRIEA excluded commercial auto, burglary and theft, surety, professional liability (other than directors and officers liability), and farm owners multiple peril from TRIA (Treasury Report). TRIA, as amended, continues to exclude losses resulting from nuclear, biological, chemical and radiological attacks (TRIA § 102(5)).

TRIA, as amended, nullifies any preexisting terrorism exclusions (§105) and creates a program administered by the Secretary of the Treasury, pursuant to which private insurers and the federal government share in the losses. The federal government’s share is triggered only after (1) specified insurance industry’s aggregate insured losses are exceeded and (2) specified “deductions” are paid (§103). Under TRIA as amended by TRIPRA, upon satisfaction of these requirements, the federal government pays 85% of each insurer’s losses above the applicable deductible (§103(e)(1)). TRIPRA limits the government’s responsibility to a total cap of \$100 billion per year (§103(e)(2)). The cost to the government may or may not, depending on aggregate industrial annual losses, be later recouped by charging a surcharge of a maximum of 3% as a policyholder premium (§103(e)(8)).

A 2005 assessment of the program (Treasury Report) reached the following conclusions. After TRIA, the availability of terrorist coverage increased from 73% in 2002 to 91% in 2003, and in 2004, 54% of policyholders reported having insurance coverage as compared to the 2002 figure of 27% (Treasury Report, 7). Immediately after TRIA, 75% of insurers did not charge for terrorist coverage; in the 2003 to 2004 period this rate decreased to 40%, but, among policyholders who reported paying for terrorism coverage, the cost declined steadily from 4% of premium in 2002 to 2.7% of premium in 2004 (Treasury Report, 4).

As with previously analyzed sectors of the economy, the severe, initial impact of terrorism on the insurance market was eventually absorbed. However, in the case of insurance, the rectification was not at the hands of market forces. The need for multiple extensions of TRIA’s “transitory period” demonstrates that the stabilization currently enjoyed is not due to the market’s handling of the precarious measurement costs, but the result of the subsidy provided by TRIA. Back in 2005, the Treasury Report concluded that the effectiveness of TRIA’s purposes “should not imply a continuation of TRIA since the extension of TRIA would discourage private insurance industry from making its own proper adjustments” (Treasury Report, 5). However, notwithstanding the Report’s admonition and while playing homage to TRIA’s temporary nature façade, the government has extended the transitory period twice. In fact, the mere length of the third extension (seven years) suggests the government’s recognition of the private industry’s inability to cope with the incalculability of terrorism’s measurement costs. In the end, it seems apparent that terrorism’s negative effects on the calculability of measurement costs will endure, ostensibly, mandating the protection of permanent legislation, a need recognized in other nations (see, for example, the Pool Reinsurance Company in England and the Consorcio de Compensacion de Seguros in Spain).



## Corporate Security

The effect of the September 11 terrorist acts on corporate security costs is difficult to measure; the information necessary for such analysis is dispersed and private in nature. However, the review of certain statistics leads to the following conclusions. While concern for terrorism has become part of the corporate culture, expenditure for corresponding security measures has not been notable.

Ostensibly, corporate security encompasses security personnel (from security guard to chief security officer), operation systems designed to protect corporate employees, infrastructure (physical and electronic), customers and chain of supply. According to a study of this issue, total annual spending on security (private and public) is estimated to have risen from \$56 billion in 2001 to \$99.5 billion in 2005 (Hobjin and Sager, 2007, 2). Although this \$43.5 billion growth seems significant, in U.S. gross domestic product ("GDP") terms it reflects a growth from 0.5% to 0.8% of GDP (Hobjin and Sager). Most of the increase in spending originated with the federal government; \$34.2 billion of the \$43.5 billion spent in 2005 was spent by the government (Hobjin and Sager). The Congressional Budget Office has projected a gradual decline in security spending by 2015, when it is anticipated to equal to 0.25% of the GDP (Hobjin and Sager). The balance of the increase, \$9.4 billion, reflects the very modest increase of expenditure by the private sector (from \$36 billion in 2001 to \$45 billion in 2005) (Hobjin and Sager). Given the lack of detailed information regarding private sector spending, this increase has been measured by changes in labor and capital inputs in the security sector of the economy (Hobjin and Sager, 3). Employment and wages in the general security labor market have not increased (Hobjin and Sager). From 2001 to 2005, the number of protective services employees in the total U.S. economy rose from 3.0 million to 3.1 million (Hobjin and Sager). This increase merely kept up with the rise of overall employment, keeping the share of total employees devoted to protective services constant at 2.3% of total U. S. employment (Hobjin and Sager). The study also found that wages of protective services employees have not

increased during the aforementioned period (Hobjin and Sager). Lastly, the study concluded that capital input in the security labor market has also not increased during the four years following 2001 (Hobjin and Sager, 4).

Notwithstanding the unremarkable changes in expenditures, the prominence of corporate security was notably elevated by the events of September 11, 2001. The acceptance of terrorism security into the corporate culture has manifested itself in several ways, including the following. First, corporate organization at the highest levels now includes positions responsible for corporate security management. The title of Chief Security Officer ("CSO") has made its way into a formalized job description, and the candidates for such positions are chosen more with an eye on their law enforcement background than their business experience (Harowitz, 2003, 52). (For example, after 2001 AOL Time Warner, Oracle, Fidelity Investments, hired CSOs with greater orientation towards law enforcement background and less with business. PepsiCo., Inc., a global business with revenues in the excess of \$527 billion and more than 143,000 employees hired a CSO only after 2001 events (Harowitz, 55-57). Second, several coalitions of private companies have been formed to help prevent and respond to terrorism. For example, The Business Roundtable, an association of CEOs from leading corporations, formed a terrorism security task force, which was joined by 41 CEOs in three days. After its formation they developed the CEO COM LINK (SM) (a communication system that will allow CEO's of major corporations to communicate directly in the event of an emergency) (Harowitz, 51). Third, many shippers, carriers and intermediaries have joined government sponsored efforts such as the voluntary supply-chain security program known as the Customs-Trade Partnership Against Terrorism (Edmonson, 2005, 40).

In the end, however, notwithstanding increased visibility, the modest increase of expenditure devoted to terrorism security demonstrates that protection from terrorism is clearly not businesses' greatest concern. It is unclear whether this position is due to the fear of spending an excessive amount of resources for an event that may never materialize or because



in a cost-benefit analysis, the benefit of security devoted to terrorism is invisible even when successful (especially for shareholders with limited liability). Regardless of the reason, corporate security has not materialized in a significant cost to the private sector. This supports the theory that notwithstanding an initial cost from a terrorist attack, in the long term the cost is absorbed.

### Conclusion

Although the data clearly shows terrorism has an impact on business, it also demonstrates that business is capable of recovering. This is most evident in the equities markets. With respect to individual market sectors, some sectors have experienced longer recovery periods and have required government intervention; as for example the aviation and insurance industries. However, none of the ones examined have been driven from the marketplace.

Terrorist acts are meant to disrupt governments, markets and cultures. Terrorism will continue to present challenges on many different levels in society. The disruption to business, although not insignificant, is temporary and manageable. Costs are present, but these costs have not resulted in the complete destruction of a particular business sector and government has shown it is capable of providing the necessary regulatory environment when needed. Clearly some sectors have experienced greater harm as a result of terrorist acts than others, but even these sectors have proven resilient. Overall, business has been able to survive the destructive and devastating results of a terrorist act.

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## APPENDIX 1

### Average abnormal returns on global capital markets, following the September 11<sup>th</sup> terrorist attacks

Global stock Market	Event-day AR	6-day CAR	11-day CAR	Days to rebound <sup>a</sup>
S&P 500	-4.84%***(-5.48)	-7.72%* (-3.40)	-3.83% (-1.25)	19
Dow Industrials	-7.14%***(-7.72)	-10.57%***(-4.45)	-7.90% (-2.45)	40
NYSE	-4.55%***(-7.14)	-8.09%***(-4.93)	-3.98% (-1.79)	37
Nasdaq	-6.56%***(-3.70)	-10.14% (-2.22)	-9.99% (-1.62)	12
Toronto	-4.05%***(-5.67)	-9.21%***(-5.01)	-9.87% (-3.96)	44
Mexico	-5.45%***(-4.24)	-13.17%***(-3.98)	-6.54% (-1.46)	52
London	-5.29%***(-6.46)	-4.17%* (-2.27)	-9.04% (-3.17)	22
Frankfurt	-7.61%***(-6.73)	-7.98% (-2.75)	-10.64% (-2.70)	23
Europe-Bloomberg	-6.23%***(-6.71)	-6.82% (-2.86)	-8.30% (-2.57)	23
France	-7.07%***(-7.26)	-9.80%***(-3.91)	-10.82% (-3.19)	31
Spain	-4.79%***(-4.43)	-7.64%* (-2.75)	-8.83% (-2.34)	23
Switzerland	-7.03%***(-6.59)	-5.97% (-2.17)	-7.29% (-1.96)	30
Austria	-0.96%* (-1.54)	-4.36% (-2.70)	-7.76% (-3.55)	97
Italy	-7.71%***(-9.45)	-13.51%***(-6.44)	-14.19%***(-5.00)	31
Belgium	-5.41%***(-10.54)	-8.51%***(-6.44)	-9.22%***(-5.15)	76
Amsterdam	-6.94%***(-7.83)	-8.52%* (-3.74)	-10.83% (-3.51)	42
Portugal	-3.82%***(-5.75)	-6.70%* (-3.91)	0.67% (0.29)	14
Helsinki	-3.30%* (-1.58)	7.49% (1.40)	15.26% (2.10)	2
Norway	-4.53%***(-8.33)	-9.89%***(-7.08)	-12.39%*** (-6.55)	78
Sweden	-7.65%***(-6.56)	-4.96% (-1.65)	-4.96% (-1.16)	23
Tokyo	-6.20%***(-4.77)	-0.56% (-0.17)	-3.05% (-0.67)	14
Hong Kong	-8.45%***(-5.84)	-5.57% (-1.50)	-5.23% (-1.04)	20
South Korea	-12.42%***(-8.33)	-11.82%* (-3.08)	-16.65% (-3.21)	28
India	-5.45%***(-4.24)	-13.17%* (-3.98)	-6.54% (-1.46)	45
Jakarta	-3.42%***(-3.16)	-4.58% (-1.65)	-9.31% (-2.47)	89
Singapore	-4.69%***(-7.80)	-12.07%***(-7.80)	-16.00%***(-7.64)	59
Kuala Lumpur	-4.46%***(-4.89)	-12.45%***(-5.31)	-15.41%***(-4.85)	75
Australia	-4.19%***(-6.50)	-6.81%***(-4.11)	-8.60%* (-3.83)	31
New Zealand	-4.50%***(-9.28)	-6.66%***(-5.35)	-6.22% (-3.68)	33
Pakistan	-3.94%***(-4.28)	-11.73%***(-4.96)	-15.62%***(-4.88)	23
Saudi Arabia	-4.10%***(-12.05)	-8.19%***(-9.36)	-13.82%***(-11.66)	100
Israel	-1.82%***(-2.62)	-11.27%***(-6.30)	-7.77% (-3.21)	45
Johannesburg	-2.66%***(-2.69)	-11.40%***(-4.49)	-12.18%* (-3.55)	25

Standard errors are in parentheses.

<sup>a</sup> Number of trading days for the market index to return to pre-attack level.

- Statistically significant at the 0.10 level.
- \*\* Statistically significant at the 0.05 level.
- \*\*\* Statistically significant at the 0.01 level.

Source: (Chen and Siems, 2004)

## APPENDIX 2



GLOBAL COMMERCIAL AVIATION  
INDUSTRY

	2004	2005	2006	2007	Consensus Oil 2008F	Future Market Oil 2008F
<b>Revenues, \$billion</b>	<b>379</b>	<b>413</b>	<b>452</b>	<b>485</b>	<b>514</b>	<b>523</b>
Passenger revenue	294	323	355	384	407	415
Cargo revenue	47	48	52	54	57	59
Traffic volumes						
Passenger growth, tkp, %	14.9	7.0	5.9	5.9	3.9	3.1
Cargo growth, tkp, %	7.9	0.4	3.9	4.1	3.9	3.1
World economic growth, %	4.1	3.5	4.0	3.6	2.6	2.4
Yield growth, %	4.5	4.0	4.0	1.7	2.0	5.0
Yield growth, inflation/ex rate adj.%	-2.0	0.1	0.5	-3.2	-3.1	-0.5
<b>EXPENSES, \$ billion</b>	<b>376</b>	<b>409</b>	<b>440</b>	<b>468</b>	<b>509</b>	<b>523</b>
Fuel	61	90	111	136	176	189
% of expenses	16	22	26	29	34	36
Crude oil price, Brent,\$/b	38.3	54.5	65.1	73.0	106.5	122.0
Non-Fuel	314	319	328	332	334	334
Cents per atk (non-fuel unit cost)	39.9	38.8	38.3	36.9	35.6	35.8
% change	2.6	-2.9	-1.3	-3.5	-3.5	-3.0
% change, adjusted for ex rate	-1.2	-3.5	-1.7	-5.5	-5.6	-5.2
Break-even weight load factor, %	63.4	63.3	62.9	62.8	63.7	64.1
Weight load factor achieved, %	62.4	62.6	63.3	63.6	63.4	63.3
<b>OPERATING PROFIT, \$ billion</b>	<b>3.3</b>	<b>4.3</b>	<b>12.9</b>	<b>16.3</b>	<b>4.4</b>	<b>0.8</b>
% margin	0.9	1.0	2.9	3.4	0.9	0.1
<b>Net profit, \$ billion</b>	<b>-5.6</b>	<b>-4.1</b>	<b>-0.5</b>	<b>5.6</b>	<b>-2.3</b>	<b>-6.1</b>
% margin	-1.5	-1.0	-0.1	1.1	-0.4	-1.2

Source: (International Air Transport Association, 2008)

Appendix 3

FUEL IMPACT ON OPERATING COST

Year	Annual Fuel Bill	Average Price of	Break Even Price	Fuel as % of	Refinery
Margin	US\$ BN	BARREL Brent US\$	of oil US\$	Operating cost	
US\$					
<b>2003</b>	<b>44</b>	<b>28.8</b>	<b>22</b>	<b>14%</b>	<b>6.0</b>
<b>2004</b>	<b>66</b>	<b>38.3</b>	<b>34</b>	<b>16%</b>	<b>11.4</b>
<b>2005</b>	<b>91</b>	<b>54.5</b>	<b>50</b>	<b>22%</b>	<b>16.5</b>
<b>2006</b>	<b>115</b>	<b>68</b>	<b>67</b>	<b>26%</b>	<b>16.0</b>

Source: (International Air Transport Association, 2008)



**Michael D. Larobina** is an associate professor of business law at the John F. Welch College of Business. He teaches undergraduate and graduate courses in business law, international trade law and international commercial transactions. His research interests have focused on the settlement of international commercial disputes and domestic commercial transactions. Professor Larobina holds a Masters of Laws in international business and trade law from Fordham University School of Law. In addition to his teaching responsibilities, he advises businesses on commercial legal matters and has represented both private and public sector entities. Professor Larobina has held elective public office in the City of Stamford Connecticut; where he resides.

**Richard L. Pate** is an assistant professor of business law at the John F. Welch College of Business. Professor Pate teaches undergraduate courses in business law. In addition to his teaching responsibilities Professor Pate also practices law in the area of employment law.