Urban Studies

The Impact of Terrorism on Italian Employment and Business Activity

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The Impact of Terrorism on Italian Employment and Business Activity

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Summary. Despite the growth in research examining direct economic impacts of terrorism, the indirect impact of terrorism on the stability of local economies has generally been overlooked. Using panel data regression models and the most comprehensive open source database on terrorism currently available to researchers, the paper examines the impact of terrorism on employment and business outcomes in Italy from 1985 to 1997. It is found that terrorist attacks reduce the number of firms and employment in the year following an attack. By disaggregating net outcomes into their component gross flows, it is also found that these impacts are primarily attributable to reduced business formations and expansions.

A repeated theme in al Qaeda communications since September 11 has been the importance of inflicting enormous economic costs on the US and other Western nations (Benjamin and Simon, 2005, p. 15). The economic consequences of the September 11 attacks on the US have been estimated to be in excess of $100 billion in direct cost and as much as $2 trillion in total cost (Chernick, 2005; Frey and Luechinger, 2002; Navarro and Spencer, 2001; Rathbone and Rowley, 2002). Empirical research has also shown that terrorist attacks can have a direct and significant effect on tourism (Drakos and Kutan, 2003; Enders and Sandler, 1991; Enders *et al.*, 1992; Greenbaum and Hultquist, 2006); foreign direct investment (Enders and

Sandler, 1996); gross domestic income and stock prices (Abadie and Gardeazabal, 2003); trade (Nitsch and Schumacher, 2004; Walkenhorst and Dihel, 2002) and international business (Suder, 2004). Yet despite the growing interest in these direct economic impacts of terrorism, a relatively overlooked cost of terrorism is its indirect impact on the stability of local economies. In this paper, we consider whether localised terrorist events, and the fear generated from these events, has a significant impact on employment and business activity in the affected areas.

In developing our analysis, we have been especially influenced by prior research in criminology, which has demonstrated that violent crime can contribute greatly to the

economic decline of communities (Bursik and Grasmick, 1993; Fisher, 1991), and that this impact may vary across local communities (Greenbaum and Tita, 2004). Because violent crime is spatially concentrated (Shaw, 1929; Sherman, 1995; Sherman *et al.*, 1989), its effects are also likely to be concentrated. Hence, crime-ridden neighbourhoods are likely to have the least stable economies, suggesting that local economies are sensitive to their communities' risk of violence. Indeed, the destabilising effects of urban terrorism on neighbourhoods have been compared with those of severe crime (Savitch, 2005).

In this paper, we are concerned with determining whether prior research on the economic effects of criminal violence on local economies also applies to terrorist violence. Although some terrorists target specific localities due to their symbolic importance, others engage in more indiscriminate violence aimed at civilian non-combatants who have no particular connection with a specific organisation or belief and are selected more or less at random (Hoffman, 1998; Kullman and Rodgers, 2004).[1] As Aron (1966, p. 170) notes, it is the indiscriminate nature of terrorism that helps to spread fear; if no one in particular is a target, no one can be safe. It may also be the case that the indiscriminate nature of terrorist activities makes it easier to reduce one's risk of criminal victimisation than one's risk of terrorist victimisation. Shoppers can avoid most violent crimes by carefully selecting safer places to shop, but they cannot reduce their risk of being attacked by terrorists unless they avoid public places altogether. Nevertheless, prior research suggests that fear of terrorism can affect consumer choices. For example, Roe *et al.* (2005) found evidence that homeowners in Ohio preferred lower-density housing subsequent to the September 11 attacks. There is also evidence that, in the wake of high-profile terrorist strikes, business owners are more reluctant to locate their offices in central cities and are instead more likely to choose suburban locations (Marcuse, 2002). Further, as we note later, tourists are likely to alter their

destinations subsequent to a terrorist strike. In this research, we aim to capture the impact of local terrorist strikes by using a politically small unit of analysis that is still general enough to capture the potentially diffuse effects of terrorist strikes, the Italian province.

Many recent articles and books have focused on the economic impact of the September 11 attacks on New York and Washington, DC, and they generally show large initial effects that fade rapidly over time (for example, Chernick, 2005; Eisinger, 2004; Lenain *et al.*, 2002). However, much less attention has been paid to the effects of more mundane terrorist incidents on the economic decisions and activity levels of firms. These more typical incidents are likely to be more similar to the incidents studied in the violent crime literature than the extremely high-profile 9/11 attack on the US, the 3/11 attack on Madrid and the 7/7 attack on London. A small minority of terrorist attacks typically lead to the majority of the causalities (Tucker, 2001).

It is reasonable to assume that, following a terrorist attack in a given area, potential investors and existing firms alike may be more averse to local investment due to the increased risk of future terrorism, whether real or perceived, and the subsequent loss of capital or business activity. In fact, Pinkerton Global Intelligence Services, the company that originally collected the data analysed in this study, used these data to inform businesses about their risk of victimisation by terrorism prior to investing in a location. Thus, we argue that an accurate measure of the costs of terrorism to society requires not only an assessment of direct costs but also the more indirect cost of deleterious effects on firms' investments and foregone business activity.

Using the most comprehensive open source database on terrorism currently available to researchers, we examine the impact of terrorist events starting in 1981 on employment and business outcomes in Italy over the period 1985–97. Italy is a strategic case study in that there have been a number of different domestic terrorist groups with a wide variety

of political and economic goals operating in Italy for the years spanned by our data and Italy has also been a frequent target of international terrorist organisations. This is also the period when one of the most notorious terrorist organisations in Europe, the Red Brigades, scaled back its attacks. In general, the terrorism incidents examined for this study represent acts that were less widely publicised but more common than the recent al Qaeda attacks on the US, Madrid and London. Moreover, total attacks at the province level in Italy are far fewer than occurred in earlier terror campaigns in Italy or in cities such as Jerusalem more recently. This has the conceptual advantage of being much more typical of the experiences of most countries of the world—where terrorism is relatively uncommon most of the time—and also the methodological advantage of making it easier to separate any impact of individual terrorist events.

In the next section, we examine some of the major economic costs of terrorism and provide our hypotheses. Using panel data methods, we find that terrorist incidents in Italian provinces from 1981 to 1997 have a significant impact on reducing the number of firms and employment in provinces that have experienced terrorist attacks in the year following an incident, but that this impact is greatly diminished in subsequent years. By decomposing net employment and firm changes into changes attributable to 'gross flows' of firm births, deaths, expanding firms and shrinking firms, we are further able to gain a more complete picture of these impacts. We find that the reductions in employment and numbers of firms are primarily attributable to reduced business formations and reduced firm expansions subsequent to terrorist incidents.

Costs of Terrorism

In addition to rescue, clean-up and rebuilding expenses, governments and private companies invest a great deal of additional resources to prevent terrorist attacks (Lenain *et al.*, 2002). Zycher (2003) estimates that US federal government terrorism-related spending

increased by approximately \$95 billion annually after the September 11 attacks. Outside the US, Gupta *et al.* (2004) find that internal conflict and terrorism directly affect the amount that governments in low- and middle-income countries spend on defence. For governments, it is important to be able to quantify the economic impact of terrorist threats in order to inform decision-making about the appropriate levels of counter-terrorism spending.

In principle, the threat of terrorism could induce a number of economy-wide macroeconomic costs. According to Lenain *et al.* (2002), resources devoted to improving security in both the public and private sectors may crowd out more productive spending, raise the cost of capital and labour, and divert research towards military and security-oriented projects. The authors conclude that public increases in military-security spending of 1 per cent of gross domestic product (GDP) coupled with increases in private security spending of a 0.5 cent of GDP would be likely to lead to a reduction in GDP 5 years later of the order of 0.7 per cent. Similarly, Abadie and Gardeazabal (2003) found that the GDP per capita in the Basque area of Spain declined by about 10 per cent relative to a comparable region after the outbreak of an extensive terrorist campaign in the late 1960s.

Another macroeconomic impact of higher security is an increase in shipping and transport costs as the movement of people and goods is slowed.[2] Further, broader financial markets appear to be sensitive to terrorism. When the daily rates of terrorist attacks in Israel began to intensify after 27 September 2000, structural modelling revealed a drop in the Tel Aviv 100 stocks market daily index (Eldor and Melnick, 2004). However, Chen and Siems (2004) found that, while US and global markets do suffer after terrorism attacks and military invasions, the US capital market has become increasingly resilient over time. Indeed, there is some evidence that neither New York real estate (Haughwout, 2005) nor equity (Korenman, 2005) markets were negatively impacted by the September 11

attacks. However, others have found that terrorism impacts the economy by reducing investment from foreign countries (Enders and Sandler, 1996) and decreasing the volume of international trade (Nitsch and Schumacher, 2004).

Large, cataclysmic terrorist events are likely to impose substantial direct costs and have important macroeconomic effects. However, even much smaller and more typical events are likely to have measurable economic impacts on local economies. We know from the criminology literature on routine activities that violence affects decisions on where people are willing to live, work, shop and congregate (Felson, 1998; Greenbaum and Tita, 2004). Thus, even people with a very small probability of being victimised by a crime may nevertheless alter their behaviour in measurable ways that impose economic costs. Although the literature measuring the costs of crime on businesses is not extensive (Fisher, 1991), it generally supports the conclusion that crime has a significant impact on the cost of doing business in a given community.

More generally, a large body of empirical research suggests that fear of violence causes changes in the routine activities of employers, employees and customers (Liska *et al.*, 1988; Skogan and Maxfield, 1981; Warr, 1990, 2000; Wilcox *et al.*, 2003). Presumably, many of these changes in behaviour translate into greater costs for businesses. For example, Hamermesh (1999) found that fear of crime reduces the willingness of employees to work on evenings and weekends. Businesses may be forced to offer higher wages, and crime raises other costs such as insurance premiums, security or surveillance expenditures, repairs and replacing stolen property (Burrows *et al.*, 2001; Fisher, 1991; Mirrlees-Black and Ross, 1995). Similarly, Greenbaum and Tita (2004) found that violence 'surges' significantly reduced retail and personal service business in lower-crime neighbourhoods, and Bingham and Zhang (2001) found a significant impact of crime on the location of service industries in urban neighbourhoods.

Terrorism is likely to affect businesses in similar ways, as the insecurity related to terrorism increases the costs of doing business (Gupta *et al.*, 2004; Nitsch and Schumacher, 2004). Businesses in areas that have experienced terrorist attacks are likely to face higher interest rates (Zycher, 2003) in addition to higher insurance costs (Lenain *et al.*, 2002; Barker, 2003). Thus, terrorism is likely to affect profitability in areas that are perceived to be riskier. For example, there is evidence that some entrepreneurs have abandoned the Basque region of Spain to avoid extortion or kidnapping by ETA, the most active terrorist group in the region (Abadie and Gardeazabal, 2003). Similarly, Eldor and Melnick (2004) found that Palestinian attacks after 27 September 2000, reduced firms' expected profits. Despite a general concern about how terrorism affects business, we expect that some industries will suffer more than others. For example, after the 11 September 2001, attacks on the US, tourism-related businesses in and outside the US were hurt severely, while other industries, such as security and information technology, saw increased demand (Zycher, 2003). Drakos and Kutan (2003) demonstrate that terrorist incidents reduce the tourist demand in some Mediterranean countries, while increasing demand for destinations that are perceived to be safer (see also, Enders and Sandler, 1991; Enders *et al.*, 1992).

Finally, when attempting to measure the impact of terrorist incidents on businesses, it is important to recognise that policy could mitigate some of the short-run economic impacts. For example, in the days following the September 11 attacks, the Federal Reserve acted quickly to inject liquidity and reopen financial markets, the US Congress passed $40 billion in emergency spending, $5 billion in direct grants and $10 billion in loan guarantees to US airlines; some European Union countries granted aid to affected airlines; and security was tightened around the world (Lenain *et al.*, 2002).

Research clearly shows that individuals and businesses change their behaviour in response to terrorist incidents. For example, Parrott and

Cooke (2005) found negative impacts on employment and wages in New York City following the September 11 attacks, particularly in late 2001 and early 2002 and especially among low-wage occupations. Yet, to date, no study has estimated these indirect impacts of terrorism by explicitly measuring how businesses respond to attacks through their decisions to open, close, expand or contract their employment in areas that have been victimised. If indeed businesses do close and jobs are lost, then these costs of terrorism are high enough to be included in any cost-benefit analysis of programmes or interventions designed to stop terrorist attacks.

Data

In this research, we examine annual data from 95 Italian provinces. Italian provinces had an average population in 1991 of 411 000 residents, ranging from 92 000 to 3.9 million (Istituto Tagliacarne, 2001). It is of course possible that some of the economic impact of terrorism is national or even international, particularly if instigated by international groups or if foreigners are the targets. However, we argue that much of the impact of terrorism on businesses is likely to be spatially concentrated, as it is local businesses that bear the most direct costs of infrastructure disruptions, increases in insurance premiums and frightened customers. Moreover, while some of the economic impact may be very localised, especially if there are probable targets such as government buildings or power plants, it is likely that much of the impact will be felt in the immediate region, especially on industries that are specifically linked to particular regions.

Terrorism Data

To address these questions, we use an open source global terrorism database recently compiled by a team lead by LaFree and Dugan (2002). For the purposes of this study, we defined terrorism as

the threatened or actual use of illegal force or violence to attain a political, economic,

religious or social goal through fear, coercion or intimidation (LaFree and Dugan, 2002, p. 16).

Most of the information from this database was originally collected by the Pinkerton Global Intelligence Service (PGIS) using detailed reports of international and domestic terrorist events from 1970 to 1997 (LaFree et al., 2005). During this period, PGIS trained researchers to record all terrorism incidents they could identify from wire services (including Reuters and the Foreign Broadcast Information Service), US State Department reports, other US and foreign government reporting and US and foreign newspapers (including the *New York Times*, *The Financial Times*, the *Christian Science Monitor*, the *Washington Post*, the *Washington Times* and the *Wall Street Journal*). Information was provided by PGIS offices throughout the world, with occasional input from such special interests as organised political opposition groups and information furnished by PGIS clients and other individuals in both official and private capacities. More recently, PGIS staff also relied on the Internet. Most importantly, the same coding scheme was used during the entire 28 years of data collection. Our research team finished computerising and validating the PGIS data in early 2005 and has continued to validate and update the database since that time. We refer to the updated database constructed on the original PGIS platform as the Global Terrorism Database (GTD).[3]

While several individuals and organisations now maintain open source databases on terrorist incidents,[4] the GTD includes more incidents over a longer period of time. Most of the publicly available terrorism databases are compiled from only international attacks despite the fact that domestic terrorism greatly outnumbers instances of international terrorism.[5] Schmid and Jongman (1988) argue that because most open source databases fail to include information on domestic terrorism, research on terrorism incidents has been severely handicapped. Falkenrath (2001) claims that the main reason that

domestic terrorism is excluded from available databases is that many governments have traditionally divided bureaucratic responsibility and legal authority according to a domestic–international distinction (for example, US Justice Department versus US State Department). Falkenrath concludes that this practice is 'an artifact of a simpler, less globally interconnected era' (p. 164). Some terrorist groups (such as al Qaeda, Mujahedin-E-Khalq) now have global operations that cut across domestic and international lines. Others (such as the Kurdistan Workers' Party and the Popular Front for the Liberation of Palestine) may have begun as strictly domestic terrorist organisations, but now operate in multiple countries and therefore simultaneously engage in both domestic and international terrorism. In short, maintaining an artificial separation between domestic and international terrorist events impedes a more complete understanding of terrorism and the persistence of terrorist activity. Ultimately, such compartmentalised thinking is likely to weaken counter-terrorism efforts. The GTD includes both international and domestic incidents—which is the main reason that it is approximately seven times larger than any other existing open source database.

A second advantage of the GTD is that, because it was originally collected by a private company, it faced fewer political pressures than databases maintained by political entities.[6] Thus, the US State Department generally omitted terrorism attacks by the right-wing Contras in Nicaragua during the 1980s. By contrast, after the 1972 Munich Olympics massacre in which 11 Israeli athletes were killed, representatives from a group of Arab, African and Asian nations successfully derailed United Nations action by arguing that

> people who struggle to liberate themselves from foreign oppression and exploitation have the right to use all methods at their disposal, including force (Hoffman 1998, p. 31).

These political issues explain in part why the United Nations has still not developed a universally accepted definition of terrorism.

However, the GTD also has important limitations, many of which are common to other open source terrorism databases and, more generally, to data collection based on secondary media reporting. Foremost is the fact that there is no universally accepted definition of terrorism. The definition adopted by PGIS and inherited *de facto* by our research team is closest to the one used by the US military.[7] The military definition of terrorism is one of the broadest of the definitions used in the creation of open source databases, including threats as well as actual violence and social, religious and economic motives as well as political ones.

Other problems with the GTD are also found in other secondary, media-generated databases. These include the threat of media inaccuracies and false reporting, conflicting claims, multiple or no claims of responsibility for incidents, government censorship or disinformation and 'false flag' incidents (where one group incorrectly claims or fails to claim responsibility for an incident). However, note that many of these general problems (such as conflicting claims, multiple claims, no claims and false flags) are unlikely to bias the current analysis because we examine only the frequency of incidents in each province regardless of who claimed responsibility. More generally, despite its limitations, the GTD uses one of the most inclusive terrorism definitions among the currently available open source databases. Finally, the likelihood that decision rules were consistently applied in the GTD is heightened by the fact that only two individuals supervised data collection during the entire 30 years spanned by the data.

Table 1 summarises the province-level terrorism data for Italy by year.[8] There were a total of 329 incidents from 1981 through 1997. According to Table 1, the largest single number of annual terrorist incidents in Italy for the years included in our analysis happened in 1981, the first year of the series. Total annual incidents declined dramatically in subsequent years, falling to only seven incidents in 1986. The number of incidents increased to another peak in 1988, dropped to low point in 1990, reached another peak in 1992 and then declined to the end of the series. A total of 129 people

Table 1. Terrorist incidents in Italy, 1981 – 97

Year	Incidents	Killed	Wounded	Percentage change in firms	Percentage change in employment
1981	73	25	43	N/A	N/A
1982	24	14	59	N/A	N/A
1983	9	2	3	N/A	N/A
1984	19	25	108	N/A	N/A
1985	11	16	213	2.16	1.32
1986	7	1	1	2.02	0.14
1987	12	3	0	3.27	3.56
1988	29	6	19	2.46	3.28
1989	14	0	1	2.68	3.18
1990	6	0	0	0.66	1.77
1991	30	0	7	1.03	1.52
1992	37	17	23	21.01	21.86
1993	19	16	130	23.22	24.43
1994	19	3	8	1.22	1.52
1995	3	1	1	20.04	1.05
1996	9	0	1	20.79	20.96
1997	8	0	0	20.59	1.88
Total	329	129	617	0.76	0.92

Source: The Global Terrorism Database (GTD).

were killed and 617 people were injured due to the incidents included in our analysis.

The final two columns of Table 1 report the annual percentage change in number of firms and employment. In general, there was a positive creation of new firms for eight of the years spanned by the data; total firms declined in only five years: 1992, 1993, 1995, 1996 and 1997. The largest expansion in total firms occurred in 1987 and the largest contraction in new firms occurred in 1993—one year after a sharp increase in total terrorist incidents. The employment trends generally resemble trends for the creation of new firms; years of expansion outnumber years of contraction. Thus, employment increases in 10 years and declines in only 3: 1992, 1993 and 1996. Again, note that the largest single drop in employment happened one year after the second-largest recorded number of annual terrorist attacks. According to the last two columns of Table 1, growth rates were much more rapid during the second half of the 1980s than during the 1990s.

Figure 1 displays the 329 terrorist attacks from 1981 to 1997 across the 95 Italian provinces. Of the 95 provinces, 49 (51.6 per cent) had at least 1 incident during the period. Most of the provinces that had at least one attack experienced only 1 (19 provinces) or 2 (12 provinces) attacks over the 17 years spanned by the data. By contrast, over 60 per cent of the total incidents occurred in just 3 provinces—Roma (129), Milano (40) and Bolzano (34). These provinces include the major cities of Rome and Milan. Most of the attacks in the province of Bolzano occurred in the city of Bolzano. There were also some interesting regional patterns. Every single province on Sardinia had at least one terrorist strike during the period spanned by the data. Likewise, there is considerable concentration of terrorist events in the northern Italian provinces.

The GTD data allow us to classify incidents by their intended targets and by incident type. Table 2 shows the 329 terrorist incidents in the GTD from 1981 to 1997 divided into 10 targeted categories, with 'other' including such relatively uncommon targets as a Gypsy encampment, a Jewish cemetery and a trash can.[9] Interestingly, of the total cases in which the intended target of the attack was known, businesses were the most common single target, accounting for 34 per
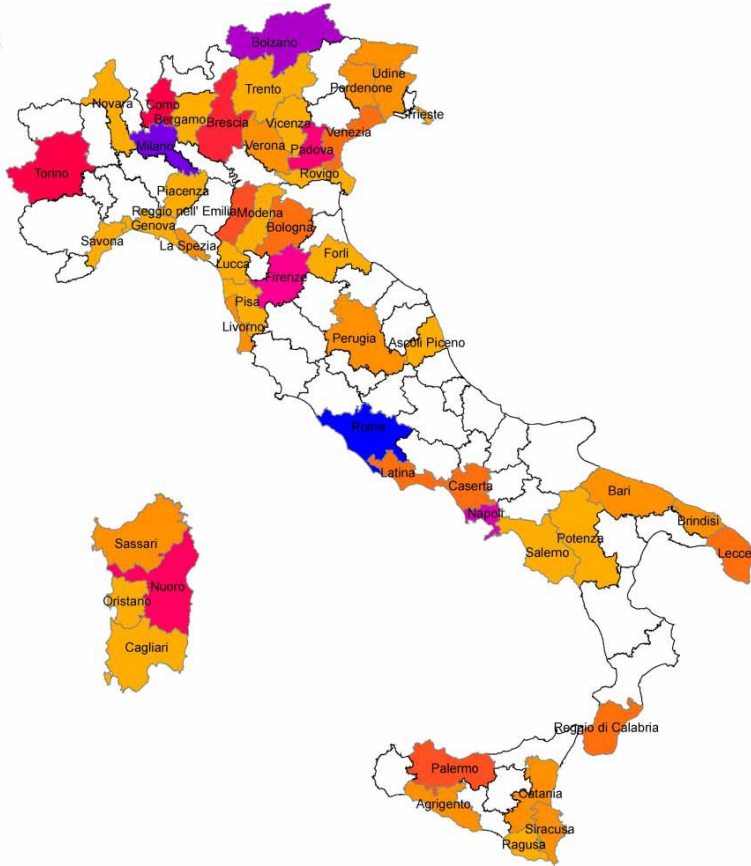
Figure 1. Number of terrorist incidents in Italy, 1981– 97. *Source*: The Global Terrorism Database (GTD).

cent of the total. Following businesses, the next most common targets (in order) were government, political or military targets, the 'other' category and diplomatic targets.

By far the most common type of terrorist incident in Italy during this period was bombings, which accounted for almost 60 per cent of the total incidents. Assassinations were

Table 2. Terrorist targets by type of terrorist incident in Italy, 1981 – 97

Target	Assassination	Bombing	Facility attack	Hijacking	Kidnapping	Maiming	Assault	Total
Business	3	79	16	0	13	1	0	112
Diplomatic	5	10	5	0	0	0	0	20
Government	13	28	5	0	1	2	0	49
Media	0	5	1	0	0	0	1	7
Political party	12	5	3	0	1	0	0	21
Political/military	22	16	7	0	0	0	0	45
Transport	0	10	0	1	0	0	0	11
Utility	0	13	1	0	0	0	0	14
Other	8	13	4	0	4	1	1	31
Unknown	3	15	0	0	0	1	0	19
Total	66	194	42	1	19	5	2	329

Sources: The Global Terrorism Database (GTD); Enterprise Observatory (EO), Italy's National Institute of Social Security (INPS).

the next most common type, accounting for 20 per cent of the total incidents. Facility attacks in the data are situations in which

> the objective of the act is to rob, damage, or occupy a specific installation .. . This operation is carried out openly—in contrast to the covert placement of bombs when the building is unoccupied (LaFree *et al.*, 2005, pp. 91–92).

Facility attacks accounted for 13 per cent of the total incidents. Kidnappings, maiming, assaults and aerial hijackings were relatively uncommon during this period.

Business Data

Data on the number of businesses and employment in Italy come from the Enterprise Observatory (EO) of Italy's National Institute of Social Security (INPS). The annual data cover the years 1984 to 1998 and contain counts of firms and employment for the 95 provinces, 45 industrial sectors and for 9 different firm size classes. The data are reported in terms of gross flows. That is, the employment counts are broken down into employment gained in new and expanding firms and employment lost to contracting and closed firms. Because the data are aggregated to the firm level, we attributed employment in multiple establishments of the same firm to the location of the firm's headquarters. Across all industries and firm sizes, the average annual province-level growth rate in the number of firms was 0.76 per cent and the average annual growth rate of employment was 0.92 per cent over the period 1984 – 97.

Analysis

The impact of terrorist incidents on business establishment and employment outcomes is modelled at the province level. A province is coded as having had a terrorist incident if there was at least one incident in the province in that year. Two-thirds of the time, there was only a single incident in the province during the course of a year. In the remaining cases with multiple incidents in the province in a

year, the province is similarly coded in a binary fashion as having had an incident.[10]

While it would be preferable to examine business outcomes subsequent to each event in a province, the business data are reported only annually, thus necessitating the binary annual coding of each province in each year. Using a panel of provinces that did and did not experience attacks, we model the percentage change in the number of firms or employment as a function of whether the province experienced any incidents in a particular year and time- and place-fixed effects. Time-fixed effects account for factors in the economy that affect all provinces during different parts of the business cycle. Province-fixed effects account for observable and unobservable time-invariant factors, such as market size, demographics and industrial specialisation, that are likely to affect business growth. By using time- and place-fixed effects, we are essentially estimating the impact of *changes* in terrorism on *changes* in economic outcomes, allowing each province to serve as a control for itself, reducing the chances of omitted variable bias.

The basic model to examine the impact of terrorist events takes the following form

$$LnY_{it} - LnY_{it-1} = a_i + b_t + d_1 I\_YR0_{it}$$

$$+ \ldots + d_5 I\_YR4_{it} + u_{it}$$

where, LnY_{it} measures the natural log of the annual level of firms or employment in province i in year t. Subtracting LnY_{it-1} from LnY_{it} provides a measure of the percentage change in the number of firms or employment from the previous year. We prefer to use percentage change as the dependent variable to avoid disproportionate influence from the more populous provinces. I_YR0_{it} equals 1 if province i had a terrorist incident in the current year t and 0 otherwise. I_YR1_{it} equals 1 if province i had a terrorist incident in year *t-1* and 0 otherwise, and so on. Also included in the regression are province (a_i) and year (b_t) fixed effects to account for differences across provinces and across time; u_{it} is a classic error term.

Thus, we are estimating how changes in terrorism activity affect the percentage changes in business activity for the current year and the four following years. We estimate the model on different partitions of the business data to assess the impact of terrorism on changes in activity for total firms, new firms, expanding firms, contracting firms and firms that close. To test the sensitivity of the model, we also do separate estimates based on firm size and for various industry groupings.

The relevant results of estimating the model using OLS on the percentage change in the number of firms and employment are shown in Table 3. The coefficients on the time- and province-fixed effects are omitted due to space constraints. In the arguments developed earlier, we predicted that terrorist incidents in a province would significantly reduce the number of firms and employment in the years following the incident. In support of these predictions, Table 3 shows that having one or more incidents in the previous year lead to a 0.52 per cent decrease in the number of firms ($p < 0.01$). The average number of firms in each province between 1985 and 1997 was 12 037; thus, the 0.52 per cent decrease in the number of firms translates into an annual loss of approximately 63 firms per province. The coefficient measuring the impact of a terrorist incident in the current year on the percentage change in the number of firms (-0.0017) is negative, as expected, but not statistically significant at traditional levels ($p = 0.306$). This is not surprising because firms rarely go out of business immediately after suffering financial losses. We also find a significantly negative impact of terrorist incidents in the previous year on employment in the province. Last year's terrorist attacks lead to a 0.89 per cent decrease in employment in the current year ($p < 0.05$). This translates into a loss of an average of 854 jobs per province based upon the average province employment of 95 910 between 1985 and 1997.

The results presented in Table 3 apply to businesses of all sizes in all industries and for both new and existing firms. Yet, a firm's

Table 3. OLS regression of change in the number of firms and employment for all firms: province-specific and year fixed effects, 1985 – 97
($N = 1235$)

	Firms	Employment
Incident_Y0	20.0017	20.0044
	(0.0016)	(0.0042)
Incident_Y1	20.0052[***]	20.0089[**]
	(0.0017)	(0.0042)
Incident_Y2	0.0007	0.0005
	(0.0017)	(0.0043)
Incident_Y3	20.0004	0.0015
	(0.0017)	(0.0043)
Incident_Y4	20.0002	20.0016
	(0.0017)	(0.0043)
Adjusted R^2	0.674	0.320

Notes: [*]p-value 0.1, [**]p-value 0.05, [***]P-value 0.01. Standard errors are in parentheses.

vulnerability to crime may depend on how well it is established. Greenbaum and Tita (2004) found that homicide surges in five large American cities had the largest negative impact on establishment births, and they attributed this to the fact that, unlike established firms, these firms had not yet made location-specific capital investments. Thus, it would be less costly for a prospective firm to avoid locating in a 'dangerous' place than it would be for an existing firm to change location.

Separate regressions were estimated to determine whether outcomes differ between new and existing firms. Therefore, the model shown in Table 3 was re-estimated with the number of firms and employment outcomes for new firms (births), expanding firms (expansions), contracting firms (contractions) and firms that went out of business (deaths). Table 4 presents the results for firm changes and Table 5 presents the results for changes in employment. Not surprisingly, there is a 2.2 per cent decrease in the number of new firms ($p < 0.1$) and a 9.8 per cent decrease in the percentage change of new employment ($p < 0.1$) during the year of a terrorism attack. Based on an average number of 1314 new firm births per province per year and associated employment of 3690, this represents an average of 29 fewer firm births and 362

fewer jobs in those firms annually in each province. The results also show that firms (and employment) are less likely to expand during the year of the incident or during the following year. The second column of Table 4 shows that the number of expanding firms falls 1.6 per cent (p ⏦ 0.1) during the year of an attack and falls 1.5 per cent the year after incidents (p ⏦ 0.1). Based on an average of 2694 expanding firms in each province, this translates into 43 fewer expansions during the year of the attack and 40 fewer in the year after. The second column of Table 5 shows that employment falls 3 per cent (p ⏦ 0.1) during the year of an attack and falls 3.5 per cent (p ⏦ 0.05) the year after incidents. This represents approximately 202 and 235 fewer jobs based on an average province employment of 6729 in expanding firms. However, contracting firms appear to be unaffected either during the year of an attack (p⏦0.669) or the year after (p⏦0.959) and losses of employment due to firm closures (last column of Table 5) are impacted in the year following the incident.

In order to test the robustness of the results, the basic model was re-estimated on a number of subsets of the data based upon firm size and industry. In addition, alternative specifications examined the appropriateness of using incident and place indicator variables. Because of space limitations, none of these results is reported but all are available from the authors.

A large majority of firms in Italy are small, and firms with fewer than 100 employees comprise almost 70 per cent of all employment (Guiso, 2003). It might be expected that smaller firms, with fewer resources to draw upon, might be more sensitive than larger firms to the economic disruptions of terrorist events. To examine this possibility, the regression model was re-estimated for firms with fewer than 200 employees.[11] These results (available on request) are very similar to those reported in Tables 3, 4 and 5. In contrast, we expected larger firms, with greater resources, to be the least sensitive to terrorist strikes. Indeed, there were almost no significant coefficients when the model was estimated on firms with 200 or more employees (again, results available on request).[12]

In order to test whether industries that might be more sensitive to frightened customers were differentially affected, we also re-estimated the model for only firms in the wholesale and retail trade and hotel services industrial sectors.[13] The only coefficient significant at the 5 per cent level was a negative impact on the birth of new firms during the year of an incident. The same regression was estimated for these industries, but just for firms with fewer than 200 employees. These results are more similar to those of the entire sample, indicating that the smaller trade-sector firms are more vulnerable to

Table 4. OLS regression of change in the number of firms: province-specific and year fixed effects, 1985 – 97 ($N \frac{1}{4}$ 1235)

	Births	Expansions	Contractions	Deaths
Incident_Y0	20.0218[*]	20.0157[*]	0.0082	20.0110
	(0.0112)	(0.0092)	(0.0102)	(0.0121)
Incident_Y1	20.0130	20.0153[*]	0.0025	0.0197
	(0.0113)	(0.0092)	(0.0102)	(0.0122)
Incident_Y2	0.0132	20.0115	0.0065	20.0057
	(0.0117)	(0.0095)	(0.0105)	(0.0125)
Incident_Y3	0.0034	20.0047	0.0024	20.0054
	(0.0115)	(0.0093)	(0.0103)	(0.0123)
Incident_Y4	0.0072	0.0193[**]	0.0156	0.0099
	(0.0117)	(0.0095)	(0.0106)	(0.0126)
Adjusted R^2	0.483	0.462	0.341	0.809

Notes: [*]p-value 0.1, [**]p-value 0.05. Standard errors are in parentheses.

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Table 5. OLS Regression of change in employment: province-specific and year fixed effects, 1985–97 ($N = 1235$)

	Births	Expansions	Contractions	Deaths
Incident_Y0	−0.0975***	−0.0300*	0.0072	−0.0429
	(0.0368)	(0.0158)	(0.0169)	(0.0400)
Incident_Y1	0.0563	−0.0345**	−0.0009	0.0988**
	(0.0370)	(0.0158)	(0.0170)	(0.0402)
Incident_Y2	0.0124	−0.0239	0.0069	0.0018
	(0.0382)	(0.0163)	(0.0176)	(0.0414)
Incident_Y3	−0.0251	0.0228	0.0127	−0.0014
	(0.0375)	(0.0160)	(0.0173)	(0.0407)
Incident_Y4	−0.0095	0.0176	−0.0080	−0.0410
	(0.0383)	(0.0164)	(0.0176)	(0.0416)
Adjusted R^2	0.095	0.443	0.289	0.433

Notes: *p-value 0.1, **p-value 0.05, ***P-value 0.01. Standard errors are in parentheses.

incidents. Coefficients significant at the 5 per cent level include negative impacts on employment in the year after an attack, negative impact on the creation of new firms and employment in those firms during the year of an attack, and additional jobs lost due to firm closings in the year after an attack.

To test for model sensitivity in these estimates, the province-fixed effects were replaced with province-level measures such as the number of manufacturing employees, population density and population level. The finding of a negative impact on the number of firms and employment in the year after an incident was robust to the re-specification of the model.

Finally, analysis that weighted the events based on various measures of the severity of the incident, such as the number of people wounded or killed, yielded no more explanatory power than a simple indicator of whether an incident occurred. Results were similarly not affected if terrorist incidents were separated based on whether they were perpetrated by domestic versus foreign agents.

Discussion and Conclusions

In order to get a better accounting of the costs of terrorism, it is important for analysis to include indirect economic costs. From a policy perspective, it is also important to understand whether smaller, but much more

typical, attacks impose some of the same indirect costs that have been documented after large attacks. In this paper, we empirically examine several important indirect costs to local businesses near these smaller terrorist incidents. Using panel data methods to estimate the impact of terrorist incidents on business outcomes in Italy between 1985 and 1997, we find that terrorism incidents significantly reduce the growth of employment in affected provinces. However, this impact only lasts through the year following the incident. We must be careful not to minimise this impact just because it initially appears to be short-lived. Our findings, robust across a number of alternative specifications, also show that affected provinces do not make up for lost business after the terrorism threat has subsided. There is little evidence that the number of firms or their employment bounces back years after the terrorism incident.

This point is clear in the findings from the analysis of new firms. We find that business births significantly declined following terrorist incidents. Affected provinces are less likely to attract new businesses to their area, suggesting that entrepreneurs are instead locating in safer unaffected provinces. This negative impact on new business births is consistent with findings from the crime literature regarding the localised impact of homicide surges (Greenbaum and Tita, 2004).[14] By

contrast, existing businesses appear to be more resilient to terrorism activity. The greater sensitivity of new businesses to terrorism may also be partially attributable to differences in the reactions of existing local business owners and potential business owners to terrorist threats. These differences in reactions can have both economic and psychological underpinnings.

Becker and Rubinstein (2004) argue that the differences in the way people react to terrorism may partially be explainable by economics, and they find that people with greater fixed costs of overcoming the fear of terror are less likely to change their behaviour. As an example, they note that, while suicide bomb attacks in Israel reduced drivers' willingness to become bus drivers, they did not increase the likelihood that existing bus drivers (who already possess job-specific skills) would quit. In a similar manner, the existing businesses in our sample have already invested in location-specific fixed costs, while prospective businesses have not. Thus, the costs of reacting to similar threats are different for the two types of firm.

Another possible explanation is psychological; there may be differences in the way different people perceive the same threats. Yechiam *et al.* (2005) argue that responses to terrorist attacks are conditioned by personal experience. That is, people who have more experience with terrorism are less likely to react to it. They point to the fact that the Intifada had a much larger impact on overnight stays in Israeli hotels among international rather than among domestic tourists. Laboratory experiments support their contention that repeated exposure to low-probability risks reduced individual sensitivity to these events. Thus, it is possible that the locals running businesses in Italian provinces that have been attacked by terrorists may perceive the threat of terrorism differently from outsiders who are considering whether to open a business in that province.

While our analysis does not allow us to isolate the causes of the different reactions to terrorist incidents, we do find that businesses are indeed affected. These findings

suggest that policy-makers should be concerned with the economic consequences of lost business activity due to terrorism attacks—even relatively small and infrequent attacks like the ones experienced in Italy during the 1980s and 1990s. Despite the low probabilities of victimisation (see Mueller, 2004, 2005), these attacks raise the costs to businesses in affected provinces relative to provinces that are perceived to be safer. Policy-makers should also be cognisant that such attacks repeated frequently within the same urban area may be even more deleterious to local economies, particularly in tourism-sensitive sectors such as retail trade (Savitch, 2005).

Business owners typically have many options regarding where to locate their businesses within an urban area, and residents likewise have a similar menu of options. Foreign tourists have even more options, as they can easily choose to avoid a particular city or country. Thus, governments may wish to pay particular attention to policies that help to allay the fears of potential investors, visitors and customers. Likewise, our results suggest that any business incentives offered to compensate for the increased costs relating to the fear of terrorism be targeted at new and expanding firms.

Notes

1. Similarly, compared with natural disasters that have negative impacts on business risks, the threat of terrorism is less predictable and can occur anywhere (Barker, 2003).
2. Some evidence, however, shows that shipping costs actually declined half a year after the September 11 attacks (Lenain *et al.*, 2002).
3. The GTD is continuously updated with new information about previously recorded incidents as well as the addition of incidents not initially captured by the original data collectors. The analysis of the current dataset is based on the summer 2005 version of the GTD.
4. These include the US State Department; the Jaffee Centre for Strategic Studies in Tel Aviv (Falkenrath, 2001); the RAND Corporation (Jongman, 1993); the ITERATE database (Mickolus, 1982; Mickolus *et al.*,

1993); and data collected by the Monterey Institute of International Studies (Tucker, 1999).

5. We use the term 'domestic terrorism' throughout to signify terrorism where the perpetrator and target were nationals from the same country and the attack was perpetrated within the boundaries of their country.

6. The original PGIS data were missing most incidents from 1993. Our research team recreated those incidents for Italy using other open source databases.

7. This is a logical outcome given that many of the individuals responsible for maintaining the PGIS data were ex-Air Force officers.

8. While regressions are estimated for the years 1985 – 97, terrorist incidents dating to 1981 are included as lags and are displayed in Table 1.

9. An additional four incidents could not be attributed unambiguously to a specific Italian province. One incident was ambiguously coded as having occurred in 'Central Area', one in the 'Alto Adige Region' and two were coded as 'Sardinia' without indicating precisely where on the island of Sardinia the incidents occurred.

10. Alternative specifications that replaced the binary treatment variable with the number of incidents did not improve the fit of the model.

11. Small and medium-sized enterprises are defined by the European Union to be firms with fewer than 250 employees. INPS firm size classes do not allow for the selection of a 250 employee cutoff (the third-largest size category is 200 – 499 employees); therefore, the limit of 199 employees was used.

12. The null findings could also be influenced by measurement issues because bigger firms are more likely to have employees in multiple provinces.

13. ISTAT Ateco81 sector codes 61, 62, 63, 64, 65 and 66.

14. Note that these estimates would not include new businesses that relocated within the same province, thus underestimating the total effect.

References

ABADIE, A. and GARDEAZABAL, J. (2003) The economic costs of conflict: a case study of the Basque Country, *The American Economic Review*, 93(1), pp. 113 – 132.

ARON, R. (1966) *Peace and War*. London: Weidenfeld and Nicolson.

BARKER, D. (2003) Terrorism insurance subsidies and social welfare, *Journal of Urban Economics*, 54, pp. 328 – 338.

BECKER, G. S. and RUBINSTEIN, Y. (2004) *Fear and the response to terrorism: an economic analysis*. Working Paper, The University of Chicago, August.

BENJAMIN, D. and SIMON, S. (2005) *The Next Attack: The Failure of the War on Terror and a Strategy for Getting it Right*. New York: Times Books.

BINGHAM, R. D. and ZHANG, Z. (2001) *The Economics of Central-city Neighborhoods*. Boulder, CO: Westview Press.

BURROWS, J., ANDERSON, S., BAMFIELD, J. *ET AL.* (2001) *Crime against business in Scotland*. The Scottish Executive Central Research Unit, Edinburgh.

BURSIK, R. J. and GRASMICK, H. (1993) *Neighborhoods and Crime: The Dimensions of Effective Community Control*. New York: Lexington.

CHEN, A. H. and SIEMS, T. F. (2004) The effects of terrorism on global capital markets, *European Journal of Political Economy*, 20, pp. 349 – 366.

CHERNICK, H. (Ed.) (2005) *Resilient City: The Economic Impact of 9/11*. New York: Russell Sage Foundation.

CUTTER, S. L., RICHARDSON, D. B. and WILBANKS, T. J. (Eds) (2003) *The Geographical Dimensions of Terrorism*. New York: Routledge.

DRAKOS K. and KUTAN, A. M. (2003) Regional effects of terrorism on tourism in three Mediterranean countries, *Journal of Conflict Resolution*, 47(5), pp. 621 – 641.

EISINGER, P. (2004) The American city in the age of terror, *Urban Affairs Review*, 40(1), pp. 115 – 130.

ELDOR, R. and MELNICK, R. (2004) Financial markets and terrorism, *European Journal of Political Economy*, 20, pp. 367 – 386.

ENDERS, W. and SANDLER, T. (1991) Causality between transnational terrorism and tourism: the case of Spain, *Terrorism*, 14, pp. 49 – 58.

ENDERS, W. and SANDLER, T. (1996) Terrorism and foreign direct investment in Spain and Greece, *Kyklos*, 49, pp. 331 – 352.

ENDERS, W., SANDLER, T. and PARISE, G. F. (1992) An econometric analysis of the impact of terrorism on tourism, *Kyklos*, 45, pp. 531 – 554.

FAIRCHILD, E. and DAMMER, H. R. (2001) *Comparative Criminal Justice Systems*. Belmont, CA: Wadsworth/Thomson Learning.

FALKENRATH, R. (2001) Analytic models and policy prescription: understanding recent innovation in US counterterrorism, *Journal of Conflict and Terrorism*, 24, pp. 159 – 181.

FELSON, M. (1998) *Crime in Everyday Life*, 2nd edn. Thousand Oaks, CA: Pine Forge Press.

FISHER, B. (1991) A neighborhood business area is hurting: crime, fear of crime, and disorders take their toll, *Crime and Delinquency*, 37, pp. 363 – 373.

FREY, B. S. and LUECHINGER, S. (2002) *Terrorism: deterrence may backfire.* Unpublished manuscript, Institute of Empirical Economic Research, Zurich, Switzerland.

GREENBAUM, R. T. and HULTQUIST, A. (2006) The economic impact of terrorist incidents on the Italian hospitality industry, *Urban Affairs Review*, 42, pp. 113 – 130.

GREENBAUM, R. T. and TITA, G. E. (2004) The impact of violence surges on neighbourhood business activity, *Urban Studies*, 41, pp. 2495–2514.

GUISO, L. (2003) Small business finance in Italy, *EIB Papers*, 7(2), pp. 120 – 149.

GUPTA, S., CLEMENTS, B., BHATTACHARYA, R. and CHAKRAVARTI, S. (2004) Fiscal consequences of armed conflict and terrorism in low- and middle-income countries, *European Journal of Political Economy*, 20, pp. 403 – 421.

HAMERMESH, D. (1999) Crime and the timing of work, *Journal of Urban Economics*, 45, pp. 311 – 330.

HAUGHWOUT, A. F. (2005) Evidence from real estate markets of the long-term impact of 9/11 on the New York City economy, in: H. CHERNICK (Ed.) *Resilient City: The Economic Impact of 9/11*, pp. 97 – 121. New York: Russell Sage Foundation.

HECKMAN, J. J. and HOTZ, J. (1989) Choosing among alternative nonexperimental methods for estimating the impact of social programs: the case of manpower training, *Journal of the American Statistical Association*, 84, pp. 862–875.

HOFFMAN, B. (1998) *Recent Trends and Future Prospects of Terrorism in the United States.* Santa Monica, CA: Rand.

ISTITUTO TAGLIACARNE (2001) *Sistema Starter.* CD-ROM. Istituto Tagliacarne, Rome.

JONGMAN, A. J. (1993) Trends in international and domestic terrorism in western Europe, 1968–88, in: A. P. SCHMID and R. D. CRELINSTEN (Eds) *Western Responses to Terrorism*, pp. 26 – 76. London: Frank Cass.

KORENMAN, S. (2005) The effects of 9/11 on New York's publicly traded companies: a brief look at financial market data, in: H. CHERNICK (Ed.) *Resilient City: The Economic Impact of 9/11*, pp. 122 – 153. New York: Russell Sage Foundation.

KULLMAN, T. and RODGERS, J. (2004) Networks of hate, in: A. A. NYATEPE-COO and D. ZEISLER-VRALSTED (Eds) *Understanding Terrorism* pp. 51 – 63. Upper Saddle River, NJ: Pearson Prentice Hall.

LAFREE, G. and DUGAN, L. (2002) *The impact of economic, political and social variables on the incidence of world terrorism, 1970 to 1997.* Grant No. 2002-DT-CX-0001, National Institute of Justice.

LAFREE, G., DUGAN, L., FOGG, H. and SCOTT, J. (2005) *Building a global terrorism database.* Final Report, Grant No. 2002-DT-CX-0001, National Institute of Justice.

LAFREE, G., MORRIS, N., DUGAN, L. and FAHEY, S. (2006) Identifying global terrorist hot spots, in: J. VICTOROFF (Ed.) *Tangled Roots: Social and Psychological Factors in the Genesis of Terrorism*. Amsterdam: IOS Press.

LENAIN, P., BONTURI, M. and KOEN, V. (2002) *The economic consequences of terrorism.* Working Paper No. 334, Economics Department, OECD, Paris.

LISKA, A. E., SANCHIRICO, A. and REED, M. D. (1988) Fear of crime as a social fact, *Social Forces*, 60, pp. 760 – 770.

MARCUSE, P. (2002) Urban form and globalization after September 11th: the view from New York, *International Journal of Urban and Regional Research*, 26(3), pp. 596 – 606.

MICKOLUS, E. F. (1982) *International terrorism: attributes of terrorist events, 1968 – 1977*, Iterate 2. Inter-university Consortium for Political and Social Research, Ann Arbor, MI.

MICKOLUS, E. F., SANDLER, T., MURDOCK, J. M. and FLEMING, P. (1993) *International terrorism: attributes of terrorist events 1988 – 91*, Iterate 4. Vineyard Software, Dunn Loring, VA.

MIRRLEES-BLACK, C. and ROSS, A. (1995) *Crime against retail and manufacturing premises: findings from the 1994 Commercial Victimisation Survey.* Research Study No. 146, Home Office, London.

MUELLER, J. (2004) A false sense of insecurity?, *Regulation*, Fall, pp. 42 – 46.

MUELLER, J. (2005) Simplicity and spook: terrorism and the dynamics of threat exaggeration, *International Studies Perspectives*, 6, pp. 208–234.

NAVARRO, P. and SPENCER, A. (2001) September 2001: assessing the costs of terrorism, *Milken Institute Review*, 2, pp. 16 – 31.

NITSCH, V. and SCHUMACHER, D. (2004) Terrorism and international trade: an empirical investigation, *European Journal of Political Economy*, 20(2), pp. 423 –433.

PARROTT, J. A. and COOKE, O. D. (2005) The economic impact of 9/11 on New York City's low-wage workers and households, in: H. CHERNICK (Ed.) *Resilient City: The Economic Impact of 9/11*, pp. 122 – 153. New York: Russell Sage Foundation.

RATHBONE, A. and ROWLEY, C. K. (2002) Terrorism, *Public Choice*, 111, pp. 9 – 18.

ROE, B., IRWIN, E. G. and MORROW-JONES, H. A. (2005) Changes in homeowner preferences for housing density following 11 September 2001, *Applied Economics Letters*, 12, pp. 73 – 78.

SAVITCH, H. V. (2005) An anatomy of urban terror: lessons from Jerusalem and elsewhere, *Urban Studies*, 42, pp. 361 – 395.

SCHMID, A. P. and JONGMAN, A. J. (1988) *Political Terrorism: A New Guide to Actors, Authors, Concepts, Databases, Theories and Literature.* Amsterdam: North-Holland Publishing Company.

SHAW, C. R. (1929) *Delinquency Areas: A Study of the Geographic Distribution of School Truants, Juvenile Delinquents, and Adult Offenders in Chicago.* Chicago, IL: University of Chicago Press.

SHERMAN, L. W. (1995) Hot spots of crime and criminal careers of places, in: J. E. ECK and D. WEISBURD (Eds) *Crime and Place: Crime Prevention Studies*, Vol.4, pp. 35 – 52. Monsey, NY: Criminal Justice Press.

SHERMAN, L. W., GARTIN, P. R. and BUERGER, M. E. (1989) Hot spots of predatory crime: routine activities and the criminology of place. *Criminology*, 27, pp. 27 –55.

SKOGAN, W. G. and MAXFIELD, M. G. (1981) *Coping with Crime: Individual and Neighborhood Reactions*. Beverly Hills, CA: Sage.

SMITH, B. L. and ORVIS, G. P. (1993) America's response to terrorism: an empirical analysis of federal intervention strategies during the 1980s, *Justice Quarterly*, 10, pp. 661 –681.

SUDER, G. (Ed.) (2004) *Terrorism and the International Business Environment*. Cheltenham: Edward Elgar.

TUCKER, D. (2001) What is new about the new terrorism and how dangerous is it?, *Terrorism and Political Violence*, 13, pp. 1 – 14.

TUCKER, J. B. (1999) Historical trends related to bioterrorism: an empirical analysis, *Emerging Infectious Disease*, 5, pp. 498 – 504.

WALKENHORST, P. and DIHEL, N. (2002) *Trade impacts of the terrorist attacks of 11 September 2001: a quantitative assessment*. Paper prepared for the workshop on *The Economic Consequences of Global Terrorism*, German Institute for Economic Research, Berlin, June.

WARR, M. (1990) Dangerous situations: social context and fear of victimization, *Social Forces*, 68, pp. 891 –907.

WARR, M. (2000) Fear of crime in the United States: avenue of research and policy, in: D. DUFFEE (Ed.) *Crime 2000: Measurement and Analysis of Crime and Justice, Vol. 4*, pp. 451 – 489. Washington, DC: National Institute of Justice.

WILCOX, P., LAND, K. C. and HUNT, S. A. (2003) *Criminal Circumstance: A Dynamic Multicontextual Criminal Opportunity Theory*. New York: Aldine de Gruyter.

YECHIAM, E., BARRON, G. and EREV, I. (2005) The role of personal experience in contributing to different patterns of response to rare terrorist attacks, *Journal of Conflict Resolution*, 49(3), pp. 430 – 439.

ZYCHER, B. (2003) *A Preliminary Benefit/Cost Framework for Counterterrorism Public Expenditures*. Santa Monica, CA: Rand.