Fear and the Response to Terrorism: An Economic Analysis*

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PRELIMINARY AND INCOMPLETE

First draft: October 2003

February 14, 2006

Abstract

In this project we aim at explaining why small probability events such as being harmed by terror affect peoples' behavior so much. Our argument is based on two corner stones. Terror affects not only the likelihood to be harmed but mainly, by generating fear, persons' utility and well-being. Yet, fear can be handled and managed by accumulating required mental skills. Like other investments in human capital, it is not a "free-lunch" and it does not pay back the same to anyone. Individuals who had previously consumed large quantities of what turned to be a risky good, invest, overcome fear, and keep their consumption plans unchanged, especially when risk is negligible, while others substitute the risky activity by other consumption plans, falsely appearing as if they overstate the objective probability to be harmed. Data from the US and from Israel support out theory. For instance, using micro data on public bus routes and taxis we find that suicide bomber attacks carried out on buses have a substantial negative average effect on bus rides and positive effect on the use of taxis. By disaggregating the population into low and high frequency users we find no effect of suicide bomber attacks

*We profited from discussions with Kfir Eliaz, Itzhak Gilboa, Omer Moav, Kevin Murphy, Rani Spiegler and Daniel Tsiddon. We thank Reuben Gronau, Dan Peled, Manuel Trajtenberg and Yoram Weiss for valuable comments. Dror Brenner deserves special thanks for superb research assistance. We are in debt to Shlomo Yitzhaki, the Israeli Government Statistician, Yoel Finkel Associate Government Statistician and Yafit Alfandari, the Head of Consumption and Finance Division at the Central Bureau of Statistics for helpful suggestions and valuable data assistance.

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on the number of bus rides taken by the later. Micro data on consumption in coffee shops clearly demonstrate that while moderate consumers substantially decrease their consumption when terror strikes, consumers who had previously spent more of their income in coffee shops did not change their habits. Fear is not limited to terror. Evidence from the "Mad Cow" crisis show that those who consumed high level of beef did not change their consumption at all while those who consumed less reduced their beef consumption substantially.

1 Introduction

In the aftermath of the tragic events of September 11 2001, terror is no longer a phenomenon limited to specific areas of conflict. Terrorism, in the form of "premeditated, politically motivated violence perpetrated against noncombatant targets by sub-national groups or clandestine agents, usually intended to influence an" (the US State Department definition; 1983) is not a new phenomenon. However, the current events carried out by suicide terrorists who are motivated by religious and cultural ideas are not similar to what we have known so far. It is thus not surprising that understanding the causes and consequences of terrorism, especially in its current form, is a challenge economists find hard to resist. So far public opinion, as well as the academic community, focused mainly on: (i) understanding why young and educated people commit suicide while killing others in the name of 'God' (see: Krueger and Malečkova 2003), (ii) estimating the causal effect of terror on aggregate outcomes (Abadie, 2003; Eckstein and Tsiddon, 2004).

Outside academic journals it is common knowledge that even in terror-stricken countries the likelihood to be harmed (by terror) is very low. Nonetheless, terrorism does generate, borrowing Webster's Encyclopedic Unabridged Dictionary definition for terror "an intense fear which is somewhat prolonged and refer to imagined or future dangers".

Extreme fear caused by low probability events is not limited to what is known as terror actions. Illustrative examples are the outburst of the "Mad Cow" disease (Creutzfeld-Jakob disease when contaminating humans) in early 1996, and recently the SARS epidemic where, although the likelihood to be infected was practically zero, visits to the "infected" regions came to a halt. Neither the standard expected utility model or its state-dependent version explain why a negligible change in the probabilities of the underlying states of nature has such a substantial effect on peoples' behavior. In these models, expected utility is linear in the probabilities and therefore it is hard

to fit the observed reaction to SARS, terror attacks and the like by using the standard state-dependent expected utility model.

Hence, it is thus surprising that most previous studies ignore the issue of why terrorism generates large influence on peoples' behavior. The large-scale effects of low probability events on peoples' behavior were often attributed to their "ignorance" of the objective ("true") probabilities and their tendency to overstate low probability events using Tversky and Kahneman (1979) prospect theory.[1]

At first glance, the large-scale effects may cast doubt whether a rational choice model can be employed to explain such phenomena. For instance, consider tourism to Israel before and during the "Al-Aqsa" "intifada". Figure ISR.1 shows the number of tourist arrivals to Israel by year and month (in thousands), starting July 2000. As this figure shows the number of tourist arrivals to Israel dropped by more than 1/2 right after Sharon's visit to Al-Aqsa and by 50 percent after suicide bomber attacks in major Israeli cities took place. Is it possible to fit these data using a standard value of statistical model? Table ISR.1 shows a simple back of the envelope calculation of the "effect" of terror on the cost of a one week visit to Israel using the value of a statistical life approach. As this table makes clear, the effective cost of a one week visit to Israel increased by approximately 1 percentage point, suggesting that other factors not included in the standard expected utility model have an important role in explaining this large response.

Nonetheless, we argue that it is possible to explain large reactions by very small changes in the states of nature objective probabilities using the framework of a rational choice model. In the standard state-dependent utility model the uncertainty agents face is with respect to the states of nature. However, when consumption eventually takes place, the state of nature is already known. We argue that this view misrepresents "agents' problem" in situations where consumption takes place when the state of nature is not fully revealed.

Our argument is based on two corner stones. Like other low probability events, terror affects not only the likelihood to be harmed, but mainly persons' utility and well-being by generating fear. People can handle their fears. They do so by accumulating the necessary mental skills. Like other investments in human capital, it is not a "free-lunch"

[1]Eckstein and Tsiddon (2004) study the effect of terror on the change in trends and business-cycles in Israeli economy. In their model terror endangers peoples' life such that the value of the future relative to the present is reduced. As a result of that investment declines and long-run income declines. They find that a very low increase in the probability to die due to terror nonetheless economic slow-down is large. Eckstein and Tsiddon reconcile this puzzle pointing out the differences between objective and individuals subjective probabilities.

and it does not pay back the same to anyone. Those who are more likely to benefit from risk-infected activities will invest and overcome their fears, while others will substitute the risky activity by other consumption (activity) plans, falsely appearing like they overstate the objective probability to be harmed.

The earliest work that we know of, in which persons' belief is an argument in their utility function, is Akerlof and Dickens (1982). In their study, people affect their well being by influencing their beliefs. Recently Caplin and Leahy (2001) incorporated into the expected utility theory situations in which agents experience feelings of anticipation prior to the resolution of uncertainty. By introducing fear as an argument into the utility function we allow uncertainty to affect persons' utility and well-being. Unlike Caplin and Leahy we allow people to invest and handle their fears. Those who find investment "profitable" pay its cost accumulate mental capital and overcome their fears. Unlike Akerlof and Dickens, in our model agents overcome fear by accumulating mental skills and not by understating the objective probabilities.

Hence, an exogenous shock to the underlying probabilities affect agents' choices via two different channels: (i) the risk channel: increasing the probability of the bad state keeping (marginal) utility in each state constant; (ii) the fear channel: deprecating the utility from the risky activity in each state of nature.

A simple, and hopefully illustrative, example is the experience of unsafe sex in the era of AIDS. It is common knowledge that people involved in sexual relationship with occasional partners learn whether they were infected by that only days or perhaps weeks later. Yet, it is hard to believe that the presence of AIDS does not affect the "real time" pleasure from having unsafe sex. Obviously, their health condition that will be revealed to then only in the future, has no effect on their utility. Unsafe sex is less pleasurable under these conditions even if eventually one is not infected. The analogy to the "Mad Cow" disease and the sharp decline in the consumption of beef during the mid-1990s is trivial.

Employed with our model we aim at identifying the role of fear by comparing the effect of terror on the economic behavior of people who face the same objective (and subjective) probability to be harmed however different incentives for overcoming fear. Our analysis rests mainly on two identifying assumptions. First, terror incidents are exogenous to measured outcomes. Second, people can be classified according to their objective probabilities to be harmed and their likelihood to invest and overcome fear.

We aim at estimating both treatment effects as well as structural risk and fear aversion parameters. We intend to estimate the treatment effect of fear using differences-

in-differences estimator. That is by comparing the effect of terror incidents on the consumption of persons facing similar objective probability to be harmed, but different incentive for overcoming fear. Using the well-known Constant Relative Risk Aversion (CRRA) utility function we aim at estimating structural risk and fear aversion parameters and evaluate the effect of contaminating diseases or terror on the utility and well being via the risk and the fear channels.

Standard micro and macro data sets were not designed to provide information about the questions discussed in this project. Therefore, rather than analyzing one data set in isolation, we intend to study various data sets, some of them will be constructed especially for the sake of this study. We intend to use both aggregated and micro data, from the US and Israel. We also plan to take advantage of French micro panel data on the consumption of beef before and during the "Mad Cow" crisis (1996). Using data from US and Israel we show that terror events, on both sides of the Atlantic, generate substantial effects, which cannot be solely attributed to either the change in likelihood to be harmed by terror or to other factors correlated with terror events. Moreover, our preliminary results indicate that the effect of terror varies across individuals in accordance with our theory.

For instance, using micro data on the use of public bus routes and taxis in Israel we find that a suicide bomber attacks carried out on buses decreases the number of bus passengers by approximately 20 percentage points during the month after. At the same time it increases the use of taxis. Disaggregating the population into low and high frequency users reveals that this does not hold for the latter. Controlling for income, age, and education we find no effect what so ever of suicide bomber attacks on the number of bus rides taken by high frequency users. Micro data on the consumption in coffee shops make it very clear that while moderate consumers substantially decrease their consumption when terror strikes, consumers who had previously spend more of their income in coffee shops did not change their habits.

Evidence from the "Mad Cow" crisis in France (1996) support our theory as well. According to Adda's (2001) findings, consumers who had previously eaten large quantitative of beef did not change their consumption while those with intermediate levels of past consumption decreased significantly their consumption.

We use the benchmark utility function employed in the macro and finance literature - the Constant Relative Risk Aversion (hereafter CRRA) - to estimate (calibrate) risk and fear aversion parameters.[2] The fear aversion parameter in our model stands for the

[2] A special form of the CRRA power function that has significant operational advantages is when

rate at which fear depreciates the utility from consumption. The nature of this part in our proposed research is to search for parameters for which peoples' projected outcome match their observed outcomes.[3] We address two main issues. First, the extent that previous studies might have overstated people's risk aversion by ignoring their fears. Second employed with risk and fear aversion parameters we aim at evaluating the effect of terror or rare contaminating diseases on persons' utility and well-bring via these two channels. Terror takes advantage of people being human and rational. By generating fear, terror, even in the form of a low probability event, may generate substantial effects.

The remainder of this paper is organized as follows. Section II builds a simple model which incorporates into the expected utility framework situations in which the extreme consequences associated with consumption of risky goods affect persons' mental state, generate fear, in an economy where people can handle their fears by investing in there mental human capital. We work out a systematic statement of this theory, and derive various implications, some we discuss here. Section III we provide a brief review of the econometric approach and the data we intend to use. Section IV displays stylized facts. In Section V we present the identifying strategy. In Section VI we estimate the treatment effect of terror via fear and provide additional evidence to the role of fear from France data on consumption of beef before and during the Mad Cow crisis in France. We conclude in Section VII.

a equals to one. In this case, so-called "everyone's utility function" postulated by Daniel Bernoulli (1738) the utility function is defined to be logarithmic function which is the limit of the above function as a approaches one.

[3]This class of questions is very popular in the Macro/Finance/Risk and Uncertainty literature (examples: Mehra and Prescott 1985, Rabin, 2000).

2 The Model

It is common knowledge outside academic journals that the economic costs of terrorism can be divided into (i) the direct losses from the terror attacks and (ii) the costs of distorting individual and public decisions. Despite the negligible direct effect of terrorism it appears to have large effects on economic outcomes, pointing out, presumably for the role of the latter. In this model we aim at shedding light on the latter, the "indirect channel".

Model set-up

Consider an economy where individuals live for one period, capital markets are perfect and a full actuarially fair annuity system and a fair insurance market are operating. The economy consists of two consumption goods: a risky good (x) and a risk-less good (c). Individuals face the risk of not lasting till the end of the period. The probability of surviving is determined by their consumption plans. As long as they consume only from the risk-less good, their probability to survive equals 1. The more they consume from the risky good, the less likely they are to survive. *Consumption takes place prior to the resolution of uncertainty.* To simplify we assume that agents gain utility from consumption only if they survive.

Utility is a function of agents' consumption plans and their mental state. Individuals experience different mental states such as fear or excitement which affect their well-being. In our model we use the word "fear" to account for agents' mental state in situations at which consumption, from the risky good, takes place prior to the resolution of uncertainty. People can handle their fears. They do so either by avoiding consumption of risky good or by investing, in mental human capital and overcoming their fears. Agents maximize their expected utility subject to their budget constraint.

Technology

The likelihood to survive is determined by agents' consumption plans. The probability to survive as function of x decreases at a constant rate as a function of terror incidents and takes the following functional form:

$$\pi(x) = \exp(-\tau x) \tag{1}$$

where τ is a random variable that captures the rate at which terror strikes. To simplify

we assume that:

$$\tau = \gamma + \nu \tag{2}$$

where γ is the expected hazard rate and ν is a zero mean *iid* shock. Thus the expected probability to survive $\pi^e(x)$ is equal to:

$$\pi^e(x) = \exp(-\gamma x). \tag{3}$$

The reason that I decomposed τ into γ and ν is to allow variations in terror incidents, which do not reflect a change in the expected level of terror, and therefore do not affect the expected risk. Hence, ν will be used to study the effect of terror incidents or other shocks with negligible (zero) risk effect.

Fear and mental human capital

Fear (F) is determined endogenously by consumption and investment plans. To simplify we assume that fear is a linear function of consumption of the risky good. Fear is also determined by the rate at which terror attacks take place and the extent at which extreme consequences associated with consumption of risky goods turn into a salient phenomenon. To illustrate the latter, consider fear in the context of terror. Terror incidents generate fear not only by making consumption risky but also by the focus of the mass media in its "physical consequences" surpassing various events with similar consequences. People can handle their fears. They do so by accumulating mental capital. As long as they do not invest, fear (F) is equal to:

$$F = f(\tau) \cdot x, \tag{4}$$

where $f_\tau > 0$, $f_{\tau\tau} < 0$ and $\lim_{\tau \to 0} f_\tau \to \infty$ and $\lim_{\tau \to \infty} f_\tau \to 0$.

Preferences:

The utility function of individuals $W(\cdot)$ has an additive representation that exhibits the following form:

$$W(x, c, F) = \alpha_i U(x, F) + (1 - \alpha_i) V(c). \tag{5}$$

To simplify, we assume that $U(x, F) = u(x) - F$ and that $V(c) = c$. Thus the utility function $W(\cdot)$ exhibits the following quasi-linear form:

$$W(\alpha, x, c, F) = \alpha_i (u(x) - fx) + (1 - \alpha_i) c, \tag{6}$$

where $u_x > 0$ and $u_{xx} < 0$, $\lim_{x\to 0} u_x \to \infty$ and $\lim_{x\to\infty} u_x \to 0$.

Mental human capital

People can handle their fears. They do so by accumulating mental capital. Investment in mental skills, like other investments in human capital, is not a *free-lunch*. To simplify, yet without losing generality, let us assume that fear can be eliminated completely by accumulating at least $\bar{M}$ units of mental skills, where $\bar{M}$ is given by:

$$\bar{M} = \lambda \cdot f(\tau), \tag{7}$$

where $\lambda > 0$. As long as decision makers do not invest fear (F) is equal to $f(\tau) \cdot x$. Once they accumulate the necessary skills consumers feel no fear:

$$F(x, \tau, \lambda, M) = \left\{ \begin{array}{ll} f(\tau) \cdot x & \text{if } M < \lambda \cdot f \\ 0 & \text{if } M \geq \lambda \cdot f \end{array} \right\}. \tag{8}$$

Naturally DMs invest either $M = \lambda \cdot f$ or $M = 0$ units.

Budget constraint:

The budget constraint can be written as:

$$px + c + M \leq I, \tag{9}$$

where p is the relative prices of x and I is agents' income. We further assume that it is feasible to overcome fear, namely that the persons' endowment, in terms of x, is at least as high as the required investment $I > \lambda f$. We further assume that expected hazard rate evaluated in life time earnings, that is γI, does not exceed the monetary cost of a unit of x, that is $\gamma I < p$.

Expected utility with and without investment

Utility (and expected utility) varies with investment. Let $D_i = 1$ if $M \geq \lambda f$ and 0 otherwise. By substituting (4) and (9) into (6) we receive that expected utility is:

$$W = \left\{ \begin{array}{lll} W^0 = & \alpha_i u(x^0) + (1-\alpha_i)(I - px^0) - \alpha_i f x^0 & \text{if } D_i = 0 \\ W^1 = & \alpha_i u(x^1) + (1-\alpha_i)(I - px^1 - \lambda f) & \text{if } D_i = 1 \end{array} \right\}, \tag{10}$$

where $\{W^1, x^1\}$ and $\{W^0, x^0\}$ denote persons' utility and consumption from the risk infected good with and without investment respectively. Similarly $c^0 = (I - px^0)$ and $c^1 = (I - px^1 - \lambda f)$.

Agents problem:

Decision makers (DMs) maximize expected utility subject to investment and consumption constraints, where the expectations are taken over survival probabilities, which is the only source of uncertainty in our analysis. In general we can express agents' maximization problem in the following switching expected utility representation:

$$\begin{aligned} \max_{x,c,M} EW &= D_i \pi^e\left(x^1\right) W^1 + \left(1 - D_i\right) \pi^e\left(x^0\right) W^0, \\ s.t. &: px + c \leq I - \lambda f D_i. \end{aligned} \tag{11}$$

The FOCs for optimal consumption with and without investment are :

$$\begin{aligned} &\text{if } D_i = 0: \quad \alpha_i u_x^0 - \left(1 - \alpha_i\right) p - \alpha_i f - \gamma W^{0,*} = 0 \\ &\text{if } D_i = 1: \quad \alpha_i u_x^1 - \left(1 - \alpha_i\right) p - 0 \quad - \gamma W^{1,*} = 0 \end{aligned},$$

where $u_x^0 \equiv \partial u\left(x^0\right)/\partial x$, $u_x^1 \equiv \partial u\left(x^1\right)/\partial x$, $x^{0,*}$ and $W^{1,*}$ and $W^{0,*}$ stand for the utility from optimal bundle of goods with and without investment respectively.

DMs consume less from the risk infected good the more expensive it is. This holds for monetary and non-monetary cost, whether DMs invest ($x^{1,*}$) or not ($x^{0,*}$), where $x^{1,*}$ and $x^{0,*}$ denote the optimal consumption from the risk infected good with and without investment respectively. As long as DMs do not invest terror (or other) risky incidents reduce consumption from the infected good even when these incidents are not perceived as reflecting a change in the distribution of risk by turning the extreme consequences associated with consumption of risky goods into a salient phenomenon. Thus, the demand for risky good with and without investment increases with α and declines with monetary (p) and non monetary (γW^*) costs:

$$\begin{aligned} x^{0,*} &= x^0\left(\overset{+}{a}, \overset{-}{p}, \overset{-}{\gamma}, \overset{-}{\nu}\right) \\ x^{1,*} &= x^1\left(\overset{+}{a}, \overset{-}{p}, \overset{-}{\gamma}\right) \end{aligned}. \tag{12}$$

Proofs are available in the appendix.

It is worth noticing that in a model without investment terror incidents (or other realizations) may affect individuals who had previously consumed large quantitative of the risk infected good even more than others, when risk is practically negligible. Terror incidents that do not reflect a change in the underlying distribution shed light

on the effect of such shock. Without investment the effect of terror shocks which have no effect on the expected risk is equal to:

$$\frac{dx^{0*}}{d\nu} = \frac{f_\nu}{u_{xx}\left(x^{0,*}\left(\alpha\right)\right)} < 0. \tag{13}$$

Note that without investment individuals who previously consumed large quantitative reduce their consumption from the risk infected good more than others when terror shocks occur if $u_{xx} < 0$.

This is important and I'll use it later.

The optimal plan

Consumers chose to invest if and only if the expected utility from the optimal plan, if they invest, exceeds their expected utility from the optimal plan without investment: $\pi\left(x^{*,1}\right)W^{1,*} \geq \pi\left(x^{*,0}\right)W^{0,*}$. The break-even point ($\hat{x}$), that is the level of x for which $\pi\left(x\right)W^0 = \pi\left(x\right)W^1$, is solely determined by the price of investment (λ) and the extent that DMs prefer x relative to c, that is α:

$$\hat{x} = \lambda \cdot \frac{(1-\alpha_i)}{\alpha_i}. \tag{14}$$

It pays back to invest only if the optimal level of consumption from the risky good (x^*) exceeds the break-even point, that is for $x^* \geq \hat{x}$ (necessary but not sufficient condition). As long as the optimal level of x^* with investment ($x^{*,1}$) and without investment ($x^{*,0}$) are both above or below the break-even point DMs invest if $x^* > \hat{x}$ and choose not to invest otherwise as illustrated in Figure T.1 and Figure T.2 respectively.

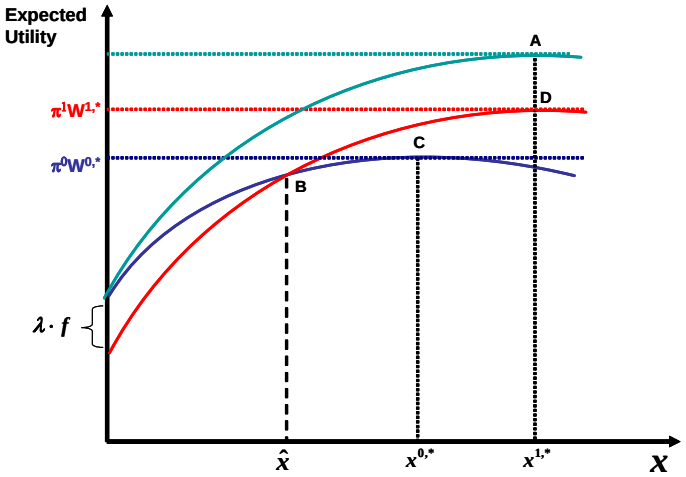

Figure T.1: Optimal Consumption Plans with and without Investment for $x^* > \hat{x}$.

The green line shows the expected utility as a function of x in an economy without terror. The red and the blue curves show the expected utility with and without investment respectively, where λf stands for the cost of investment (in terms of utility). Point B is the break-even point, whereas points C and D indicate the maximum expected utility with (D) and without investment (C) and the corresponding levels of x. As Figure 1 clearly shows the expected utility with investment exceeds the expected utility without investment. Similarly Figure 2 shows the case when DMs chose not to invest.

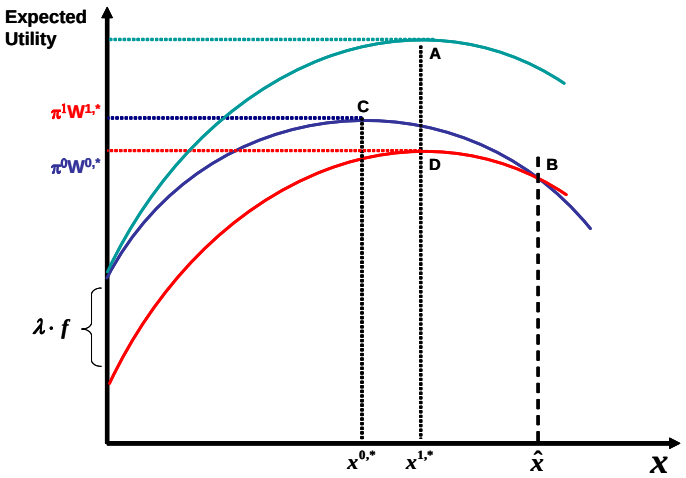

Figure T.2: Optimal Consumption Plans with and without Investment for $x^* < \hat{x}$.

In this example the optimal level of x with and without investment are to the left of the break-even point and the expected utility without investment exceeds the expected utility with investment. It is also possible that the optimal consumption with investment is above the beak-even point and the optimal plan without investment is below. When $x^{0,*} < \hat{x} < x^{1,*}$, as in Figure T.3, the optimal plan is determined by the monetary (p) and non monetary (γW^*) costs as well as by the level of fear which is not related to the expected risk (ν), which depreciates the expected utility from the x intensive bundle ($W^{1,*}$) more than the other bundle ($W^{0,*}$).

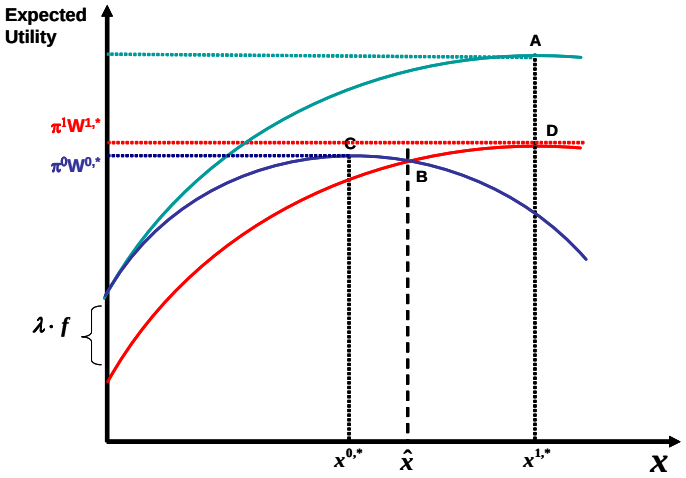

Figure T.3: Optimal Consumption Plans with and without Investment for $x^{0,*} < \hat{x} < x^{1,*}$.

Clearly consumption from risky good and investment in mental capital are determined jointly. DMs (i) consume more from the risky good if they overcome fear since $x^{1,*} > x^{0,*}$, even when the optimal level with investment ($x^{*,1}$) and without investment ($x^{*,0}$) are both above or below the break-even point[4] and (ii) investment pays back only if $x^* > \hat{x}$ pointing out that investment takes place only for high enough levels of x.

Proposition 1 *Investment in mental capital and consumption of the risky good are complementary goods*

Proof. Investment in mental capital and consumption of the risky good are complementary goods, that is $dM^*/dp < 0$ if and only if DMs who are indifferent between

[4] As long as ...

investment plans choose not to invest as the price of the risk infected good increases, that is if and only if:

$$\frac{d\pi\left(x^{1,*}\right)W^{1,*}}{dp} < \frac{d\pi\left(x^{0,*}\right)W^{0,*}}{dp} < 0.$$

We already show that:

$$x^{1,*} > x^{0,*}.$$

Using the envelope theorem and the FOCs we receive that:

$$\begin{aligned}\frac{d\pi\left(x^{0,*}\right)W^{0,*}}{dp} &= -\left(1-a_i\right)x^{0,*}\pi\left(x^{0,*}\right)W^{0,*} < 0\\ \frac{d\pi\left(x^{1,*}\right)W^{1,*}}{dp} &= -\left(1-a_i\right)x^{1,*}\pi\left(x^{1,*}\right)W^{1,*} < 0.\end{aligned}$$

Therefore for any two bundles such that $\pi\left(x^{0,*}\right)W^{0,*} = \pi\left(x^{1,*}\right)W^{1,*}$:

$$-\left(1-a_i\right)x^{0,*} > -\left(1-a_i\right)x^{1,*},$$

and therefore:

$$\frac{d\pi\left(x^{0,*}\right)W^{0,*}}{dp} > \frac{d\pi\left(x^{1,*}\right)W^{1,*}}{dp}.$$

■

Hence, the demand for the risk infected good and investment in mental capital increase with α and drop with p, γ, ν, and λ:

$$\begin{aligned}x^* &= x\left(\overset{+}{a},\overset{-}{p},\overset{-}{\gamma},\overset{-}{\nu},\overset{-}{\lambda}\right)\\ M^* &= M\left(\overset{+}{a},\overset{-}{p},\overset{-}{\gamma},\overset{-}{\nu},\overset{-}{\lambda}\right)\end{aligned}. \tag{15}$$

In the next sub-section we discuss implications of this model

Implications

Exogenous risk shocks affect agents' choices via the *risk* channel and the *fear* channel. If overcoming fear is "technically" feasible, we expect individuals who had previously consumed large quantitative of what turned to be a risky good, to invest, overcome fear, and practically keep their consumption from the risk infected good unchanged, when risk is negligible. We expect that others will substitute the risky activity by other

consumption plans, falsely appearing as if they overstate the objective probability to be harmed.

We are not the first to incorporate "fear" and beliefs as an argument in the utility function. Akerlof and Dickens (1982) is the first study we know, in which agent's beliefs enters as an argument into their utility function. Caplin and Leahy (2001) incorporated into the expected utility theory situations in which agents experience feelings of anticipation prior to the resolution of uncertainty.

By introducing fear as an argument in the utility function we allow uncertainty to affect persons' mental state, and by that their utility and well-being. Unlike Caplin and Leahy, we allow people to handle their fears. This generate nontrivial implications. As we show, fear is limited by the extent of economic incentives to overcome it. Those who find investment "profitable" pay its cost, accumulate mental capital, and overcome their fears. Moreover, since individuals have the option to invest, those had previously consumed large quantitative of the infected good invest and keep their consumption from the risk infected good unchanged while the others substitute the risky activity by other consumption plans.

Unlike Akerlof and Dickens, in our model agents overcome fear by accumulating mental skills and not by understating the objective probabilities. Another notable difference between the Akerlof-Dickens' model and our model is with respect to peoples response to risky situations. In their model it worth to invest in changing one's beliefs especially when risk is not negligible. This is not true in our model. In fact investment is limited by the extent of the "true" risk.

Our model generates testable implications that distinguish our model from alternative explanations. If overcoming fear is "technically" feasible, we expect individuals who had previously consumed large quantitative of what turned to be a risky good, to invest, overcome fear, and practically keep their consumption plans unchanged, especially when risk is negligible. We expect that others will substitute the risky activity by other consumption plans, falsely appearing as if they overstate the objective probability to be harmed.

3 Brief preview of the econometric approach and the data employed

The econom teric approach

Employed with our model, we identify the role of fear by comparing the effect of terror on the economic behavior of people who, according to our model, *will not* invest in eliminating fear with those who *will*. Using individual micro data and the natural variation of terror incidents we estimate the effect of terror on frequent users and rare consumers on their consumption from what turned to be a terror infected goods. Allowing for heterogeneity yet assuming that terror incidents, in the US as well as in Israel, are exogenous to measured outcomes, we estimate the effect of terror via the fear channel using differences in differences estimator.

Rather than analyzing one data set in isolation we take advantage of various data sets, some of them established especially for this study, in order to explore different aspects of terror and fear on persons' economic activities. We preview our rigours anlysis with a brief descripition of our data sets and few basic facts on the aggregate effect of terror on economic activities.

The data

In this paper we use both aggregate and micro (individual and family level) data, from the US and Israel. US aggregate data on the number of air passengers before and after September 2001 are taken from the Department of Transportation, Bureau of Transportation Statistics and Air Carrier Traffic Statistics. Micro data are taken from the Bureau of Labor Statistics Current Population Surveys.

The ongoing violence in Israel (and the Palestinian authority) is characterized by weekly and sometimes daily incidents. In the absence of micro data on the consumption in the Palestinian authority, we focus on the economic behavior of Israelis during this period. Using Israeli newspapers (HAARETZ) we documented all terror incidents since October 2000, by type, date and location. Data on casualties were collected from Israeli newspapers and from the Israeli Ministry of Foreign Affairs. Israeli aggregate and micro data are taken from the Israeli Central Bureau of Statistics (CBS). Further description of the data is available in each section.

In this paper we focus on the use of bus public transportation and consumption in restaurants and coffee shops, in the household level, to identify the effect of terror

via fear. These data are taken from the Israeli CBS' expenditure surveys. Household consumption is given at the monthly (and weekly) resolution, which enable us to merge the terror incidents data to the micro consumption data. The CBS survey provide TO ADD

The next draft will include a table that describes the different data sets being used and a detailed table of terror incidents in Israel by method, location and casualties.

4 First glance at the data

We preview our rigorous estimation of the effect of fear with a set of evidence on the overall effect of terror on the consumption of terror infected goods and the labor market outcomes of those who provide them.

The effect of terror on the use of terror-struck transportation means

In the US as well as in Israel, terrorists took advantage of transportation facilities (air flights in the US and public line buses in Israel) to commit deadly suicide attacks. It would be almost natural to start our empirical study by estimating the effect of deadly terror events on the use of these facilities in both side of the Atlantic. Four main facts emerge: (i) Terror affects the use of air flights in the US and public transportation in Israel; (ii) The decline in the number of air passengers in the US after September 11th 2001 was approximately 10 percentage points above and beyond the effect of aggregate economic activity on the use of air transportation facilities; (iii) We find similar results for Israel: the usage of public transportation (buses) is about 20 percentage points lower in months when suicide bomber attacks took place; (iv) The number of passengers in public buses is affected ONLY by suicide bomber attacks which took place on buses, and not by other types of terror, not carried out on buses.

The use of air transportation in the US and the labor market outcomes of pilots

The use of air transportation in the US We take a first glance at possible overall effect of terror on the use of air flights by comparing the number of air passengers before and after September 2001. We use monthly data on domestic air passenger miles and freight ton-miles, for the years 1979 to 2003 (April) drawn from the U.S. Department of Transportation, Bureau of Transportation Statistics and Air Carrier Traffic Statistics. The use of air flights was growing constantly since it became available

to public use. Data from 1979 show that passengers' air miles were growing at an annual rate of 2.5 percent, with little fluctuations around the trend (see Figure A1.USA in the appendix). This also holds for the air freight ton miles (Figure A2.USA). The use of air transportation is presumably also affected by fluctuations in economic activity (although we find a low correlation between the de-trended air passengers' time series and the aggregate unemployment rates). We control for that by comparing the ratio of air passengers to air-fright before and after September 2001.

The use of air transportation by passengers shrank by about 15% percentage point just after September 11th 2001. In fact, we find that by the end of 2003, air passengers' figures were still lower than before September 11th. Controlling for long run trends as well as for economic fluctuations, an even more contrasted picture emerges. We find that the ratio of air passengers to air-fright shrank by about 10 percentage points just after September 11th 2001 (see Figure 1.USA). By the end of 2003 we find no evidence for a recovery in the use of air transportation. It is worth noticing that the ratio of air passengers to air-frights was constant since the mid 1990s, suggesting that the decline in 10 percentage points in this ratio reflects the treatment effect of terror on the use of air transportation. As Table 1.USA shows, the decline in the ratio of air passenger to air freight, since September 2001, is significant.

The labor market outcomes of US pilots In this section we study the effect of September 11th on the labor market outcomes of pilots in the US. We take advantage of the Current Population Survey files over the past 5 years to estimate the effect of September 11th 2001 on the employment and wages of pilots in the US. Two main findings emerge: First, the relative wages of pilots shrank by about 15 percentage points, which was about 1/2 of their wage premium in the period before September 2001. Second, the employment rates of pilots dropped by 5 percentage points. Hence, we find no evidence for an increase in pilots' compensations pointing out the role of the change in the demand for air transportation services in determining pilots' labor market outcomes. In the rest of this sub-section we describe the data set we use and our findings.

The data come from a series of 60 consecutive Current Population Surveys Monthly files (hereafter: CPS) from January 1998 to December 2002. The CPS sample is a probability sample. [5] The vast majority of empirical analyses of the CPS data either use a single cross-section data point, or a series of consecutive CPS surveys, treating

[5]For further details see CPS official web site www.bls.census.gov/cps/cpsmain.htm

them as a series of repeated cross-sections. The CPS data have, in fact, a longitudinal component. In this paper we take advantage of the CPS basic monthly files to construct a panel data.[6]

Using a balanced sub-sample of men aged 25 to 54 who report working before September 2001 we study the effect of September 11th on pilots' employment outcomes.[7] The idea is quite simple, we compare the probability of pilots to be non-employed after September 2001 with the probability of other male workers. We estimate both non-employment and unemployment rates (non-employment for those who choose to participate). We present our findings in Table 2.USA. Panel A and panel B show the probit estimates for the change in the non-employment and the unemployment rates respectively.

The first column in each panel shows the average non-employment rate, since September 2001, of those observed working as pilots before September 2001 relative to the average non-employment rates in the sample population. The number 0.042 at the first column of this table means that the non-employment rate of pilots is 4.2 percentage points higher than the non- employment rate of the average male in this sub-sample. As this table makes clear, pilots post September 2001 employment rates are about 5 percentage points lower than the employment rates of men with similar observed characteristics. Yet, as this table shows, much of it, is common to the air transportation industry rather than a pilot effect. These findings also hold for the sub-sample of participants.

The negligible change in employment rates after September 2001 suggest that cross-section comparison would not be meagerly contaminated from composition bias. We therefore estimate the effect of September 11th on pilots' wages by comparing their

[6]The sample is designed primarily to produce national and state estimates of labor force characteristics of the civilian noninstitutional population 16 years of age and older. Sample is partitioned into eight representative sub-samples called "rotation groups" used in the CPS rotation scheme. The rotation scheme follows a 4-8-4 pattern. Each unit is interviewed for four consecutive months, followed by two quarters of break, and then by another four monthly interviews. Overall, eight interviews are dispersed across 16 months, which means that each household is (potentially) observed at the same months for two consecutive years. Wage data is collected only during the fourth and the eighth interview - among what is known as the "outgoing rotation groups." Data on schooling, employment, occupations and industries, is available for the entire sample.

If there is no change in the composition of occupants, we have a panel of individuals. Yet, since people switch locations, it might be the case that the same id number was being shared by two (or more) individuals over time. Following Madrian and Lefgren (1999) individuals are identified in our panel data not only by their ID number but also by matching a set of time-invariant characteristics. In this way we can be sure that we do not combine different persons into one artificial observation.

[7]Overall we observe about 900 pilots in our sample less than 5 percent of them women. Thus we restrict our sample to include men only.

relative wages before and after. We use a sub-sample of full-time male workers. We present out findings in Tables 3.USA (a and b). As Table 3.USA makes clear male pilots earned, before September 2001, about 30 percentage points more than their counterparts. This does not hold for the period after September 2001. Pilots' hourly wages after September 2001 were about 15 percentage points lower (relative to others' wages) then they used to be.

The use of public bus transportation in Israel and the labor market outcomes of drivers

The use of public bus transportation Public buses were a "popular" target for suicide bombers attacks in Israel. The Israeli CBS provides monthly data about revenues and prices of the bus transportation industry in Israel. Data is disaggregated by type of lines into two main categories: (i) regular lines, within and between cities, and (ii) special lines which stand for tourists or other organized travels. It is worth noticing that none of the terror attacks was carried on a special line bus. We take a first glance at the effect of terror on bus rides by comparing the change in the number of passengers in regular lines – where all terror events on buses took place – with the change in the number of passengers in the special lines.

During the first year of violence, since October 2000, terror was not carried out on buses. (see Figure ISR.2). It is thus not surprising to find that the number of passengers, proxied by price adjusted revenues, shows almost no change between the fourth quarter of 2000 and the third quarter of 2001. To control for other factors than the effect of terror on the usage of public transportation we look at the ratio of passengers in regular lines to passengers in special lines. As this series shows, the period between January 2000 and April 2003 can be divided into two sub periods, before and after October 2001 (! – is it just a coincidence? I am not sure – it is worth checking). As Figure ISR.3 makes clear, the ratio of passengers in regulars lines to special lines after October 2001 was 25 percent lower than this ratio before that. The average number of suicide bomber attacks carried out on buses per month was approximately 1 during the months after October 2001, and zero in the period before that. A simple back of the envelope calculation suggests that the effect of a ("successful") suicide bomber attack carried out on public buses decreased the number of passengers by approximately 25 percentage points.

The negative correlation between the number of passengers in the regular bus lines and the number of suicide bomber attacks carried out on buses might reflect other fac-

tors than the causal effect of terror on the usage of public transportation. We therefore take our analysis one step further. Our data allow us to distinguish between suicide bomber attacks which were carried out on buses and other terror events, including suicide bomber carried out not on buses. We find that (see Table ISR.2) on average in months in which suicide bomber attacks occurred the average number of passengers in regular lines was about 20 percent lower than in months in which no suicide bomber attacks were carried out on buses. As Table ISR.2 makes clear, the number of passengers in regular lines is correlated with other indicators of terror incidents (with fatalities). This holds through a wide range of indicators such as: the total number of suicide bomber attacks (in the present month), the number of terror incidents with fatalities, the number of people killed etc. By introducing all variables together, without restrictions, we find that ONLY suicide bomber attacks carried our ON buses affect the number of passengers in the regular lines. Conditional on the number of suicide bomber attacks carried out on buses, we find that other terror events had no significant effect on the number of passengers in the regular lines. In fact, as Table ISR.2 makes clear, the point estimators (of some of them) are literally zero (0).

The labor market outcomes of Israeli bus drivers We take advantage of the Israeli CBS Labor Force and Income Surveys for estimating the effect of terror incidents, and especially suicide bomber attacks carried out on buses on the real wages and employment of Israeli bus drivers.

We find no change in the conditional wages of bus drivers between quarters with more or less suicide bomber attacks. As for employment outcomes: Israeli workers are less likely to be employed as bus drivers in quarters with more suicide bomber attacks in comparison with quarters with less suicide bomber attacks.

We estimate the likelihood of workers to be employed as bus drivers as a function of the number of suicide bomber attacks carried out on buses. We present our findings in Table ISR.3. The first row shows the probit estimates of the change in the probability to be employed as a bus driver between quarters with N-1 suicide bomber attacks carried out on buses and quarters with N attacks. In the second row we estimate the effect of suicide bomber attacks which were NOT carried out on buses.

We estimate these probabilities first using the population sample of workers and then separately using a sub-sample of all types/classes of professional drivers. All specification include the aggregate controllers such as the total number of buses as well as personal characteristics such as education, origin and marital status. Two main

facts emerge: First, as Table ISR.4 makes clear, while suicide bomber attacks carried out on buses do affect the likelihood to be employed as a bus driver this does not hold for suicide bomber attacks which were not carried out on buses. Second: drivers, as expected, are more likely to be affected than others do.

Do bus driver earn more in periods with higher levels of terror attacks carried out on buses? In this sub-section we take advantage of the Income surveys for the years 2000 through 2002 to study this question. Table ISR.4 shows the OLS estimators for the effect of suicide bomber attack carried out on a bus on the wages of bus drivers. As Table ISR.4 makes clear, we find no effect of terror on the conditional wages of bus drivers.

5 Identifying the effect of terror via fear

The fact that consumption is more likely to be affected by terror than the supply of labor is consistent with our theory, however one could suggest alternative explanations. Investment in specific human capital may cause labor supply for "terror infected" jobs to be sensitive to terror incidents less than consumption. For instance, pilots who invest and accumulate specific skills may find it too expensive to quit. While consumers may easily substitute "infected" for "non infected" goods, this may not be true for substitution between jobs, especially when these involve investment in specific human capital. As Table US.3 shows, pilots still earn 15 percentage points more than their counterparts. This "friction", which may be relevant in labor supply decisions, is less likely to exist in the adjustment of consumption plans.

Thus, we aim at identifying the effect of terror via the fear channel by studying the effect of terror on consumption from "terror infected" goods and services. We take advantage of the Israeli Expenditure survey for the years 1999 through 2002 to estimate the effect of fear caused by terror on consumption plans. We estimate the effect of terror and identify the role of fear using data on the usage of public bus and taxi services and expenditures in coffee shops.

The Statistical Model

To simplify, yet without losing generality let us assume that there are only two types of (potential) consumers: (i) type 0 : those who invest and overcome fear and (ii) type 1 : the others, those who *do not* invest . Let D_i be a binary variable which is equal to 1 if person i belongs to the first groups (type 1) and 0 if she is a type 0.

Let Y denote the outcome of interest, for instance the use of public bus transportation as measured by expenditures (in logs). Let Y^0 and Y^1 denote the <u>*actual*</u> outcomes of a type 0 and a type 1 person respectively. Ignoring other covariates (or assuming that these have already been conditioned out), outcomes are determined by the exogenous exposure to terror incidents (T). To simplify notation, yet without losing generality, let us assume to that consumers are either exposed to terror ($T = 1$) or not ($T = 0$). According our model terror affects consumption from the risk infected good via two channels: *risk* and *fear*. Let $-\delta_0(T_i)$ and $-\delta_1(T_i)$ denote the effect of terror via the *risk* channel for those who invest and for the others respectively. We allow the effect via the risk channel to vary across groups, that is $\delta_0(T_i) \neq \delta_1(T_i)$. Yet if terror has no effect via the risk channel among type 1 persons it also does not have an effect on type 0 persons, that is: $0 = \delta_0(T_i) \iff \delta_1(T_i) = 0$.

For the simplicity of illustration let us assume that Y, the outcome of interest, can be approximated by the following form:

$$Y_i = \left\{ \begin{array}{lllll} Y_i^1 = & \beta_0 & -\delta_0(T_i) \cdot T_i & & +\mu_i \\ Y_i^0 = & \beta_1 & -\delta_1(T_i) \cdot T_i & -\phi_1(T_i) \cdot T_i & +\mu_i \end{array} \right\}, \tag{16}$$

where $\phi_1(T_i)$ is the *"treatment effect"* of terror via the the *fear* channel and μ_i is a mean zero index of unobservable factors which are statistically independent from terror, that is $E(T_i \mu_i) = 0$. In the absence of a controlled experiment the selection into these groups is not random. We control for that by allowing also for unobserved heterogeneity (in the levels) that is $\beta_0 \neq \beta_1$.

Consumption (or other outcome of interest) of person i can be also expressed as:

$$Y_i = D_i Y_i^1 + (1 - D_i) Y_i^0. \tag{17}$$

Equation (17) is Quandt's (1972) switching outcomes model. By substituting (16) into Equation (17) we receive the following regression model:

$$Y_i = \beta_0 + (\beta_1 - \beta_0) D_i - \delta_0(T_i) \cdot T_i - (\Delta + \phi_1(T_i)) \cdot T_i D_i + \mu_i, \tag{18}$$

where $\Delta = \delta_1(T_i) - \delta_0(T_i)$.

Identifying treatment effects

As Equation (18) makes clear we cannot identify the effect via fear (ϕ_1) without recovering Δ. A possible way to identify the effect via fear (ϕ_1) is to estimate Equation (18) using variations in terror incidents that are associated with negligible risk. At this margin we expect to find that $\delta_0(T_i) = 0$ and therefore $\Delta = 0$. Note, that we do not restrict $\delta_0(T_i)$ to be equal zero. We can actually test that. It is possible to recover ϕ_1 only if we find that $\delta_0(T_i) = 0$.

We estimate the following equation:

$$Y_i = b_0 + b_1 D_i + b_2 \cdot T_i + b_3 \cdot T_i D_i + \mu_i, \tag{19}$$

where $b_2 = \delta_0(T_i)$ and $b_3 = -\Delta - \phi_1(T_i)$. When $b_2 = 0$ then $\Delta = 0$ and b_3, which is the Differences-in-Differences (DID) estimator for the effect of fear, is an unbiased estimate of the fear effect :

$$b_3 = \phi_1(T_i) \tag{20}$$

6 Estimating the effect of terror via fear

The fact that consumption is more likely to be affected by terror than the supply of labor is consistent with our theory, however one could suggest alternative explanations. Investment in specific human capital may cause labor supply for "terror infected" jobs to be sensitive to terror incidents less than consumption. For instance, pilots who invest and accumulate specific skills may find it too expensive to quit. While consumers may easily substitute "infected" for "non infected" goods, this may not be true for substitution between jobs, especially when these involve investment in specific human capital. As Table US.3 shows, pilots still earn 15 percentage points more than their counterparts. This "friction", which may be relevant in labor supply decisions, is less likely to exist in the adjustment of consumption plans.

Thus, we aim at identifying the effect of terror via the fear channel by studying the effect of terror on consumption from "terror infected" goods and services. We take advantage of the Israeli Expenditure survey for the years 1999 through 2002 to estimate the effect of fear caused by terror on consumption plans. We estimate the effect of terror and identify the role of fear using data on the usage of public bus and

taxi services and expenditures in coffee shops.

We take advantage of the detailed micro data to compare the effect of terror on frequent consumers and rare consumers of "terror infected" goods in order to identify the *ceteris paribus* effect of fear. We report our findings in Table ISR.5 through Table ISR.10.

Estimating the treatment effect of fear using micro data on the usage of public bus services

The usage of public bus and taxi services

We start by estimating the effect of suicide bomber attacks carried out on buses on the use of public bus services as reported by households. The vast majority of suicide bomber attacks took place in Haifa, Jerusalem and the Tel-Aviv area.[8] Therefore, taking advantage of our micro data, we distinguish between the population in these cities and in the rest of the country. We report our findings in Table ISR.10.

Table ISR.10 consists of three panels: in the first panel we report the results for the entire population sample; the second panel shows our finding for a sub-sample of families in the major Israeli metro cities; the third panel reports our results for the rest of the population sample.

We use two measures for different terror incidents: (i) the average number of suicide bomber attacks curried out on a bus during the current month; (ii) the average number of suicide bomber attacks curried out NOT on a bus during the current month. We estimate the effect of each type of terror activity separately. The dependent variable in all specifications is the family expenditures (in logs) on usage of public bus rides.

The number -0.310 at the first column and the first row of this table means that on average families spend approximately 30% less on usage of public bus transportation during months with N suicide attacks that were carried out on buses in comparison to their average expenditures during months with N-1 attacks on buses. That is, the usage of bus services as measured by family expenditures drop 30 percentage points when suicide attacks on buses increase by 1 (at the margin of 0, and 1). The first number in the second column -0.069 measures the effect of attacks carried out NOT on buses on the consumption of bus ride services.

Three main facts emerge: (i) a suicide bomber attack carried out on a bus decreases the use of public bus transportation by approximately 30 percentage points, (ii) attacks

[8] Disaggregating the population into location which had experienced suicide bomber attacks carried out on a bus and other location makes the difference between the groups even stronger.

carried out NOT on buses have no effect on the average use of public buses, (iii) the effect varies over cities; though it affects the usage of public bus services in the most populated cities (that experienced suicide bomber attacks), it has almost no effect on the use of public bus services in other locations.

The effect of terror carried out on buses is well reflected in the use of taxi services. In Table ISR.6 we repeat this experiment in order to estimate the effect of suicide attacks on the usage of taxi services as measured by family expenditures. As Table ISR.6 shows the effect of suicide attacks carried out on buses on the usage of taxi services is almost the mirror picture of the effect of these attacks on the usage of public bus services. We find that suicide bomber attacks increase the use of taxi services only in the largest cities.

Identifying the effect of fear using daily vs. monthly tickets So far we have shown that the use of public bus services responds to terror as projected by our theory. To distinguish between our theory and alternative explanations we compare the effect of terror on the use of bus services by high and low frequency users. We do so by comparing the effect of terror on the consumption paid by daily tickets with the effect of terror on the use of bus services frequent users as measured by the expenditures on multiple-rides tickets and monthly pass. We report our findings in Table ISR.7.

The first row in the first column in Table ISR.7 shows the effect of a suicide bomber attack curried out on a bus on the usage of public bus services as measured by family expenditures on daily tickets. The first row in the second column reports the effect of a suicide bomber attack curried out on a bus on the usage of public bus services as measured by the monthly expenditure of families on monthly pass and multiple-rides tickets. The difference between these two regression coefficients is the Differences-in-Differences estimator for the effect of terror via the fear channel on the consumption of public bus services - a terror infected service.

We find that a suicide bomber attack carried out on a bus affects the use of public bus transportation solely by affecting low frequency daily use. That is, a suicide bomber attack decreases the use of public bus services paid on a daily basis by almost 40 percentage points, having no effect on the use of public bus services paid on a monthly/weekly basis.

The large effect on the use of public bus services paid on a daily basis may reflect other factors but the causal effect of terror. For instance if low income people are more likely to be frequent bus users than one might argue that the different response

reflect income effects rather than the effect of investment. For this reason we estimate the effect of suicide bomber attacks on the use of public bus services paid on a daily basis separately by income levels. We report our findings in Table ISR.8. As this table makes clear the large effect of suicide bomber attacks on the use of public bus services paid on a daily basis is common to high and low income families.

Estimating the treatment effect of fear using micro data on consumption at coffee shops

Coffee shops, restaurants were as "popular" target for terror attacks as public buses. Some of the most "horrible" took place in restaurants and coffee shops. We take advantage of the Israeli expenditure Survey, which collects data on the consumption of food and beverages in restaurants/coffee shops. Employed with these data we estimate the average effect of terror incidents and identify the role of fear. We present our findings in Table ISR.9 and in Table ISR.10.

We start by estimating the effect of terror incidents on consumption in coffee shops. We present our findings in Table ISR.10. The first panel shows the average effect of terror, as measured by either suicide bomber attacks carried out on a bus or the number of fatalities in the corresponding month on consumption. Note that suicide bomber attacks carried out on a bus have no effect on consumption in restaurants in contracts to the number of fatalities, reflecting other modes of terror. In column (ii) and column (iii) we disaggregated the population sample into those living in one of the three largest cities in Israel and others. We find that the number of fatalities affect consumption in the largest cities.

Finally we proceed to identify the role of fear. We do so by disaggregating the population sample into frequently users of coffee shops and others. We instrument that by peoples' martial status. To control for alternative explanations, we restrict the sample to include households reporting having no children. The first and the second panels show the effect of terror incidents on married and single populations respectively. To ensure that the correlations reflect the effect of terror, we use the number of suicide bomber attacks curried out NOT on a bus to measure terror. As column (i) and column (iii) make clear, terror affects the consumption of low frequency users having no effect on high frequency consumers. While a suicide bomber attack decreases the consumption of married people by 28 percentage points, it has no effect on the consumption of single people. To control for income and age effects (non parametrically) we restrict the sample to include people aged 22 to 35. We report our findings in columns (ii) and

(iv).

Evidence from the "Mad Cow" crisis in France

Another prominent example for the role of fear in explaining large effects caused by low probability events is effect of what is known as "Mad Cow" Disease on the consumption of beef. The "Mad Cow" Disease (MCD) is the commonly used name for Bovine Spongiform Encephalopathy (BSE), and Creutzfeldt-Jacob disease (CJD) in people, is a slowly progressive, degenerative, fatal disease affecting the central nervous system of adult cattle. A variant form of CJD (the vCJD) is believed to be caused by eating contaminated beef products from BSE-affected cattle. BSE in cattle was first reported in 1986 in the United Kingdom (UK). Only since 1996, evidence has been increasing for a causal relationship between ongoing outbreaks in Europe of a disease in cattle, BSE, and a disease in humans, vCJD. To put things in perspective From 1995 through June 2002, a total of 124 human cases of vCJD were reported in the United Kingdom, 6 cases in France, and 1 case each in Ireland, Italy, and the United States.[9]

In this section we provide evidence from the "Mad Cow" crisis in France (1996), as reported by Adda (2001), to support our theory.

Employed with a unique data panel set which follows households before and after March 1996, just after the public was first informed of a causal relationship between the disease in cattle, BSE, and the new variant of the disease in humans, vCJD, Adda estimates the effect of the MCD on beef consumption. Adda estimates the effect of the MCD, as measured by the change in consumption of beef, allowing the effect to vary by the level of consumption households used to have prior to March 1996. According to Adda's (2001) findings, consumers who had previously eaten large quantitative of beef did not change their consumption while those with intermediate levels of past consumption decreased significantly their consumption.

We summarize the main relevant findings as reported by Adda in Table FRC.1.

[9]For further details see: http://www.cdc.gov/ncidod/diseases/cjd/bse_cjd.htm

7 Conclusions

In the aftermath of September 11, terror is no longer a phenomenon limited to particular areas of conflict. Outside academic journals it is common knowledge that the likelihood to be harmed by terror is very low. The "intense fear which is somewhat prolonged and refer to imagined or future dangers" (Webster Encyclopedic Unabridged Dictionary) is often attributed to peoples' "ignorance", either of the objective probabilities or the underlying process that generate a shock to the economy. Contrary to these explanations, we put forward an alternative theory based on the framework of a rational choice model.

We point to the role of *fear.* We argue that an exogenous shock to the underlying probabilities to be harmed affects peoples' choices in two different channels: (i) the *risk* channel: by changing the weights of the "good" and the "bad" states, as in the standard expected utility models; (ii) the *fear* channel: unlike the standard models, the probability to be harmed affects persons' utility in each state of nature. *Fear* can be managed. Persons can handle their fears. They do so by accumulating the necessary skills. Like other investments in human capital, it is not a *free-lunch* and it does not pay back the same to anyone. Those who are more likely to benefit from the risky activity will invest and overcome their fears, while others will substitute the risky activity by other consumption or production plans.

Using data from the US (before and after September 11th) and from Israel (during the last wave of violence starting in the year 2000) we identify the role of fear on economic behavior by comparing the effect of terror on people who face similar objective (and subjective) probability to be harmed, *but* different incentive for overcoming fear. We find that those who are more likely to be paying the fixed costs of overcoming the terror fear effects are less likely to be affected by terror. For instance we show that while terror does generate large effects on consumers, especially in low frequency usage like air passengers or bus passengers, it has little effect on the compensation (wages) of those employed in the infected industries. Suicide bomber attacks decreases the likelihood of drivers to serve as bus drivers, however it has no effect on the likelihood of bus drivers to quit their jobs. Using micro data on the use of public bus routes and taxis we find that suicide bomber attacks carried out on buses have a substantial negative effect on bus rides and positive effect on the use of taxis. Decomposing the treatment effect by the likelihood to use bus we find, consistent with our theory, that suicide bomber attacks affect those who are at the margin of using public buses, having no effect on others.

Fear is not limited to terror. Large scale effects generated by low probability events are part of our daily life. Needless to say that our model shed new insight on that too. Evidence from the "Mad Cow" crisis show, in accordance with our theory, that those who consumed high level of beef did not change their consumption at all while those who consumed less reduced their beef consumption substantially.

Terror takes advantage of people being human and rational. By generating fear, terror, even in the form of a low probability event, may generate substantial effects. Hence, terror generates large scale effect by damaging the quality of our life rather than the "quantity" of life.

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8 Appendix A.1

Insert file #2

9 Appendix A.2

Insert file #3

Figure 1.ISR
Tourist Arrivals to Israel by Year and Month (in thousands)

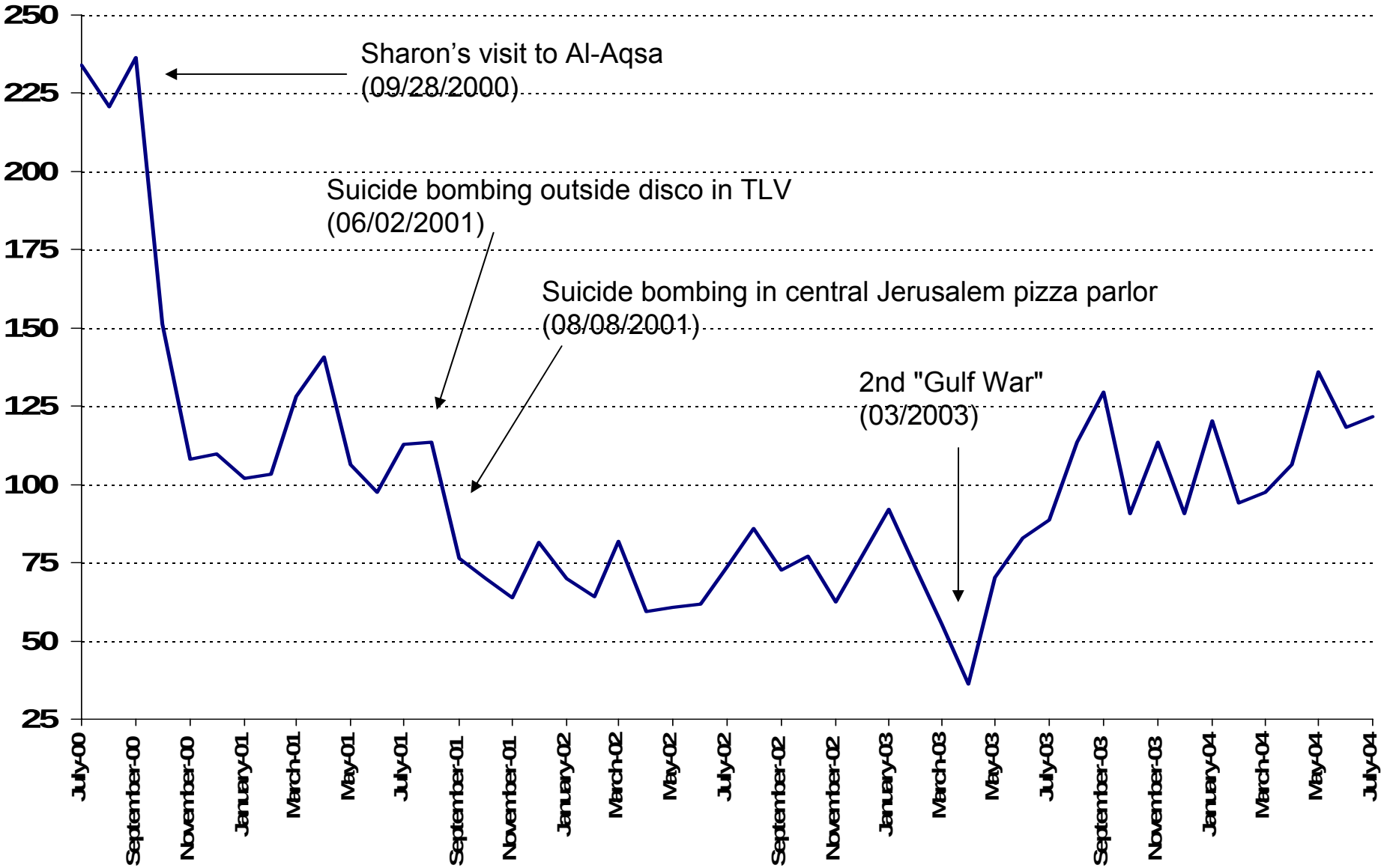


Table ISR.1:
The "Effect" of Terror on the Cost of a One Week Visit to Israel using the Value of a Statistical Life

∆ Cost = ∆ Prob (bad=1) * "Value of a Statistical Life"

	"Budget Item"	"Calc-ulation"	"Values"
(1)	The number of casualties during the "worst" month (March 2002; 4 times higher than the average # of casualties)		130
(2)	Effective population		5,000,000
(3)	The "probability" to be killed by terror during a one week visit	(1) / (2)	0.0007%
(4)	Value of a statistical life (upper bound; source: Ashenfelter & Greenstone, 2004)		$1,540,000
(5)	**The change in the effective cost**	**(3) * (4)**	**$10**
(6)	Flight ticket + other cost (lower bound; "staying at your relatives")		$1,000
(7)	**The % change in the cost of a one week visit to Israel**	**(5) / (6)**	**1%**

Figure 1.USA:
Domestic Flights: Index of Air Passengers Air Freight Ratios
Domestic Air Seat and Passenger Miles and Air Freight Ton-Miles (monthly data, not seasonally adjusted)
January 1997 = 100.0

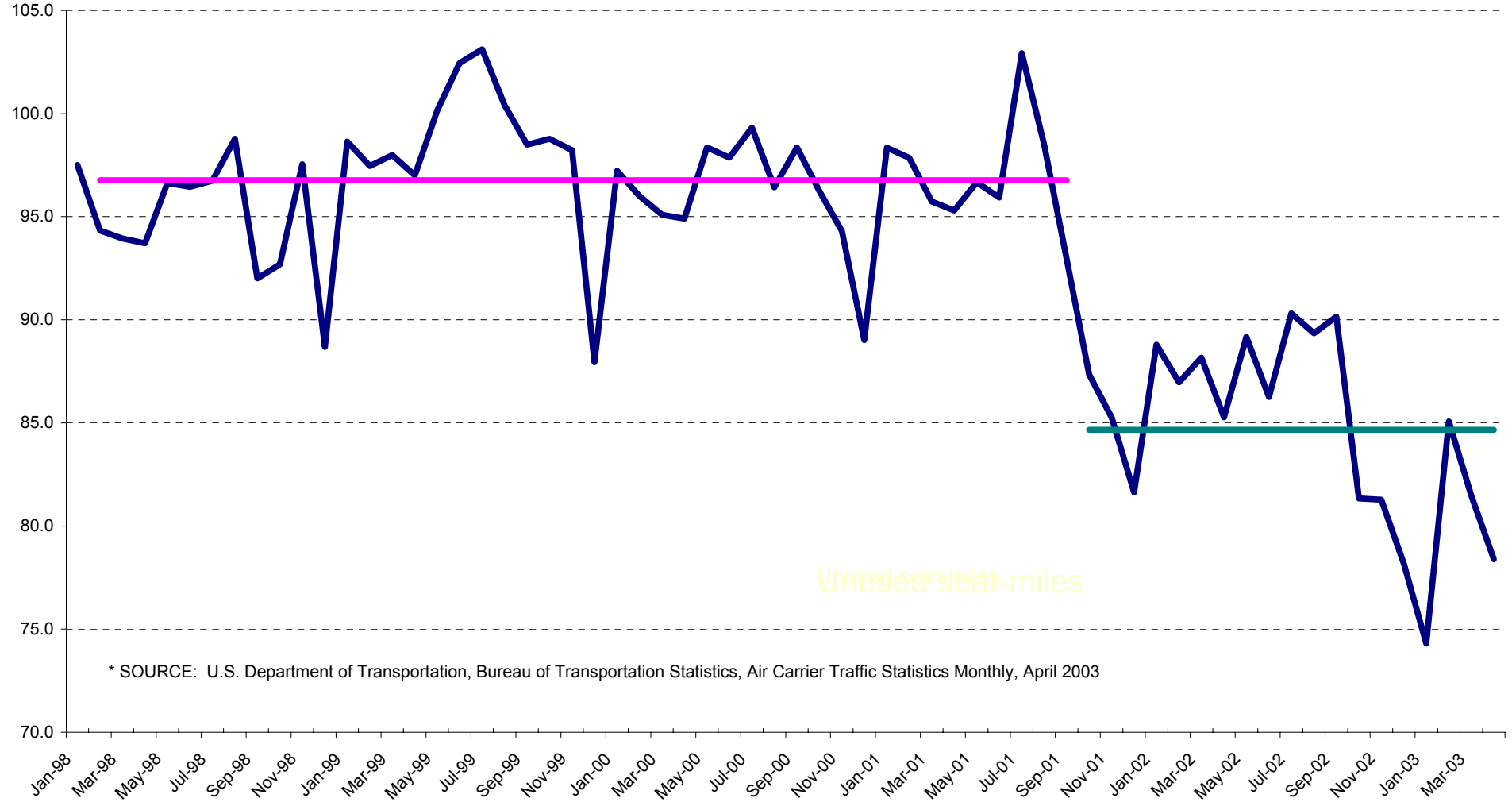


Figure 2.ISR:
The Number Suicide Bomber Attacks and Fatalities by Month: Overall and Carried Out on Buses
Israel, January 2000 through April 2003

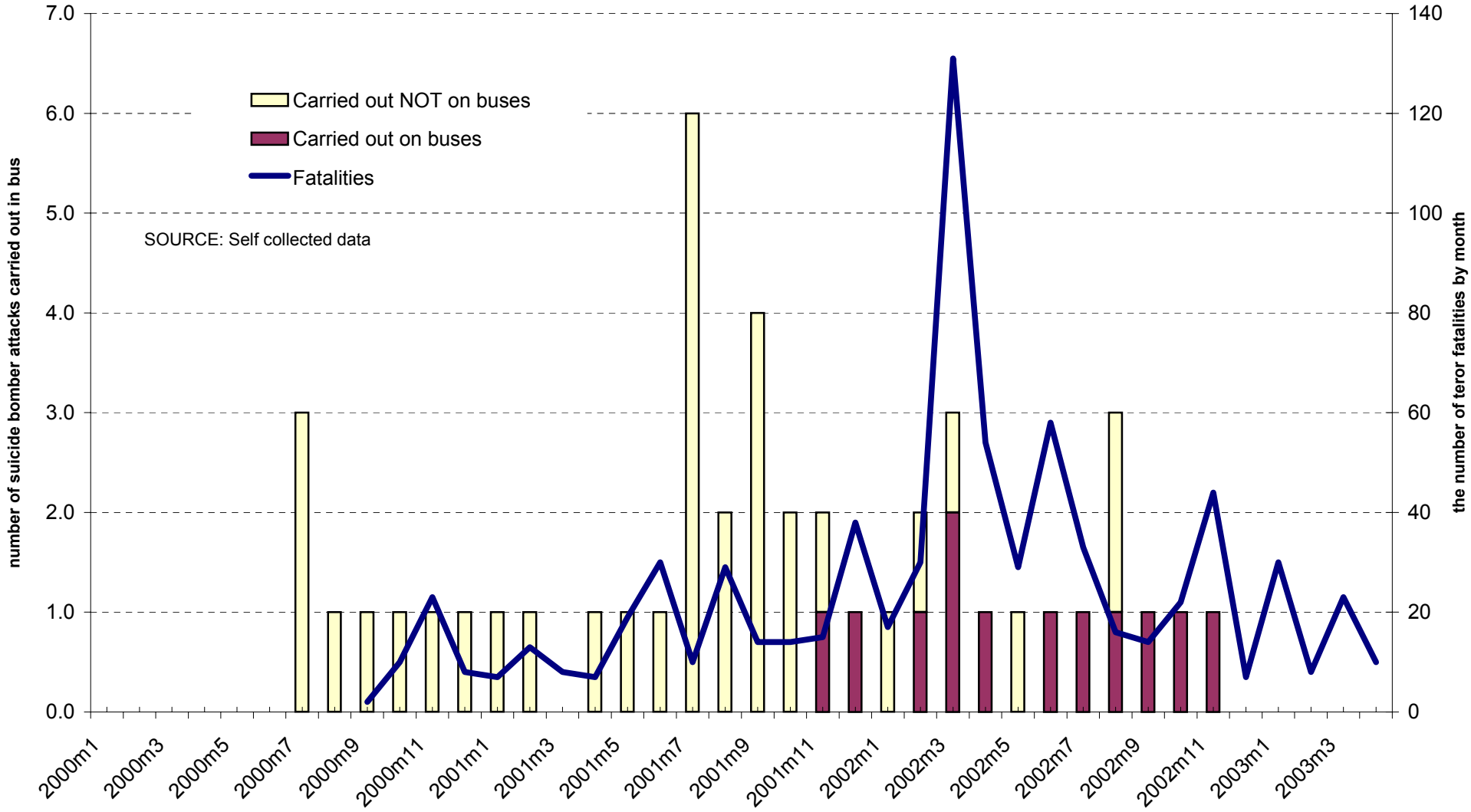
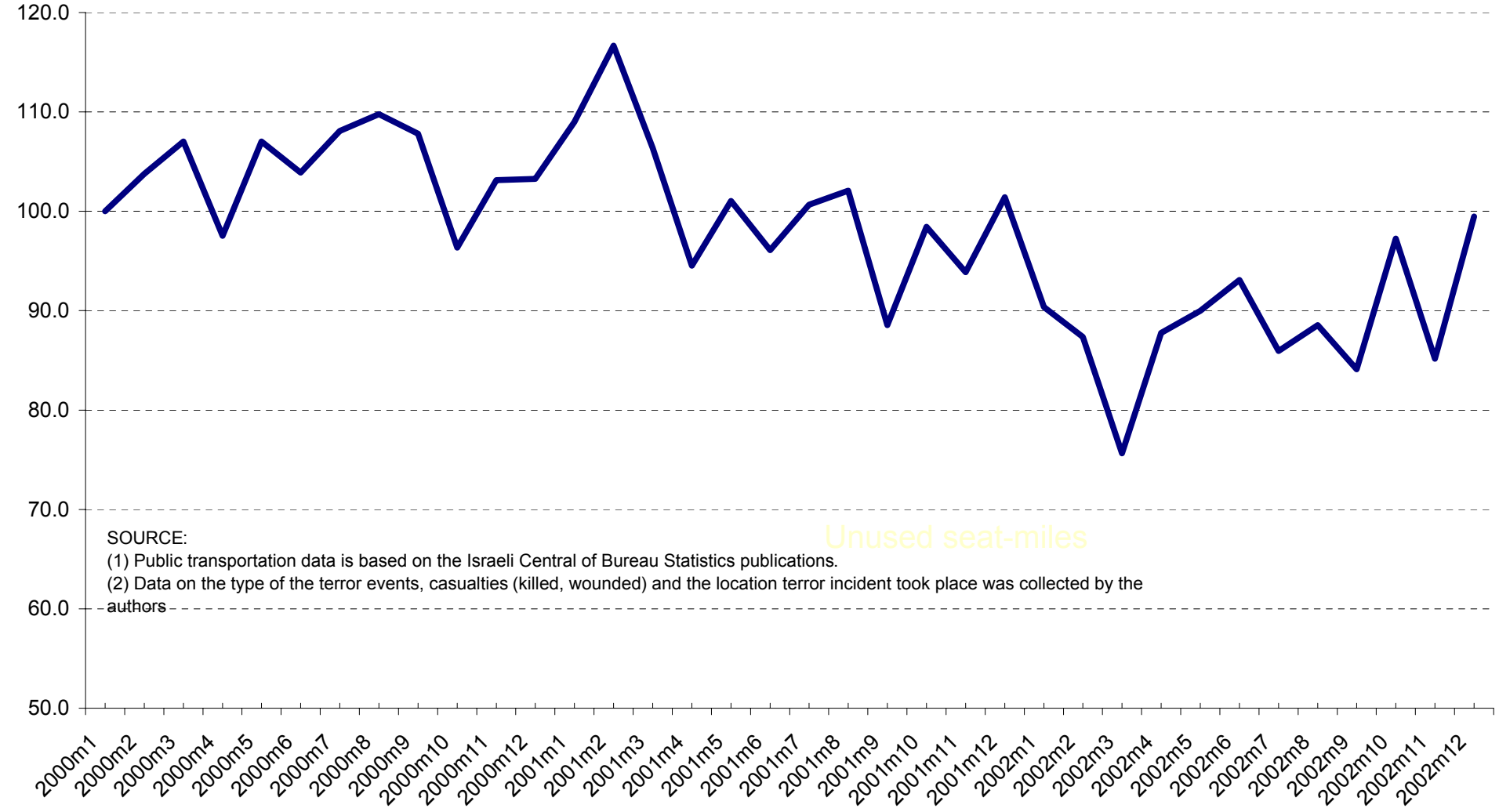


Figure 3.ISR:
Revenues (price adjusted) in Regular Bus Lines - Index
Israel, January 2000 - Decmber 2002
January 2000 = 100.0



SOURCE:
(1) Public transportation data is based on the Israeli Central of Bureau Statistics publications.
(2) Data on the type of the terror events, casualties (killed, wounded) and the location terror incident took place was collected by the authors

Figure 4.ISR:
Index of the Raatio of Revenue (price adjusted) in Regular Bus Lines to Revenue in Special Lines and the Average Number of Suicide Bomber Attacks Carried Out on Bus
Israel, Monthly Data, January 2000 - Decmber 2002

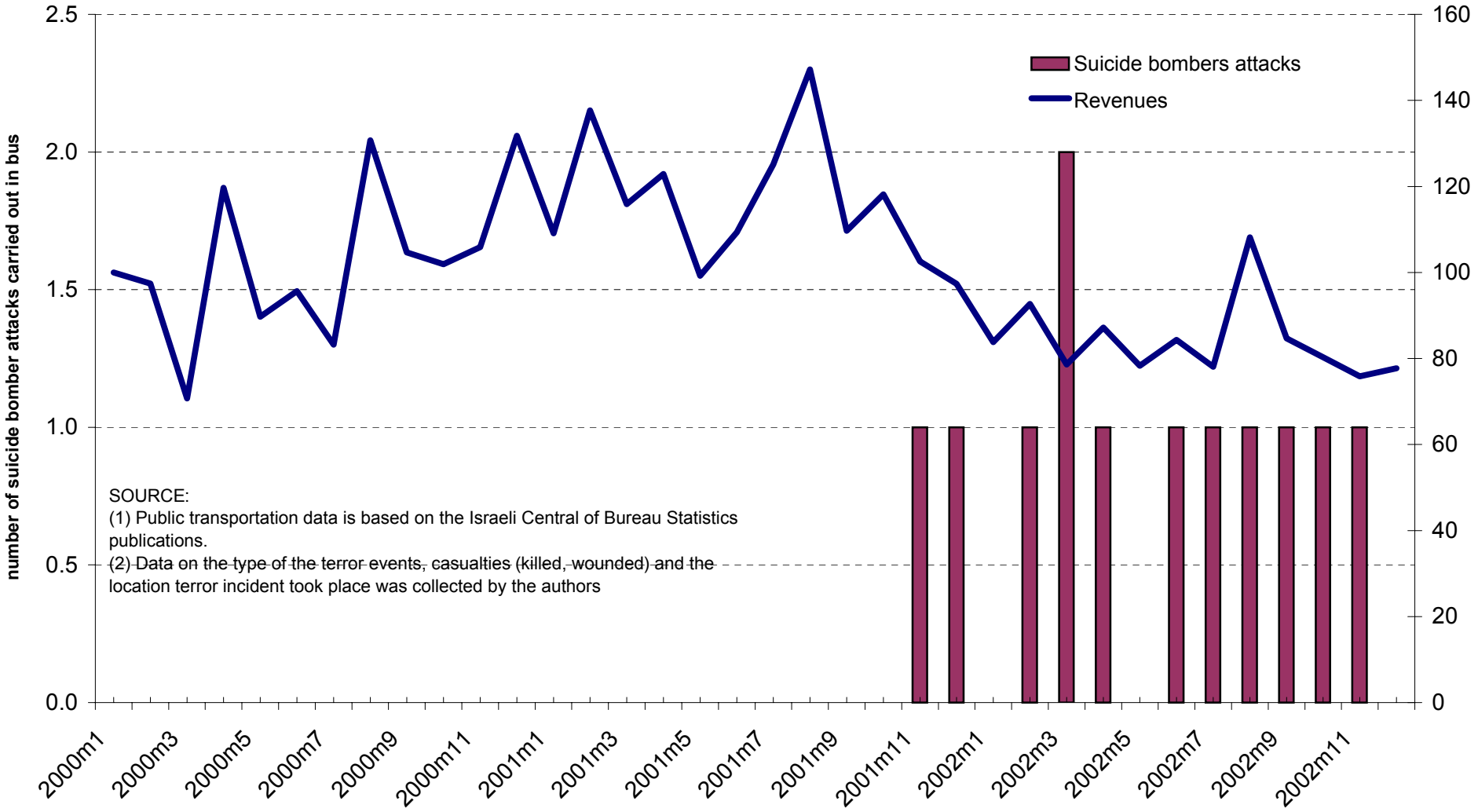


Table 1.USA:
The Effect of September 11th 2001 on the Number of Domestic Air Passengers in the US
Dependent variable: the ratio of air passengers miles to air freight ton-miles (in logs)
USA, January 1995 to April 2003

Variables	(i)	(ii)	(iii)	(iv)	(v)
September 2001 April 2003	-0.147	-0.100			-0.105
	(0.011)	(0.014)			(0.014)
Linear time trend		-0.001	-0.002		-0.001
		(0.000)	(0.000)		(0.000)
September 2001			0.030	-0.029	0.085
			(0.051)	(0.075)	(0.041)
Months / observations	100	100	100	100	100
Adj R-Square	0.6318	0.6993	0.5444	0	0.7091

Note:
* SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, Air Carrier Traffic Statistics Monthly, April 2003
( ) Standard errors in parenthesis

Table 2.USA:
Not Employed After September 2001: Pilots and Air Transportation Relative to All Other Workers
Sample Includes only those Observed Before and After September 2001.^
Male, Aged 21 to 55 when First Observed
CPS, Monthly Files, 2001-2002
Dependent variable: Not Working (0, 1) after September 2001. 1=not working. Probit estimates

	All				**In the Labor Force after September 2001**			
Variables	**(i)**	**(ii)**	**(iii)**	**(iv)**	**(v)**	**(vi)**	**(vii)**	**(viii)**
Pilot* ^^	**0.043**	**0.013**	**0.051**	**0.019**	**0.041**	**0.014**	**0.050**	**0.021**
	(0.024)	(0.017)	(0.026)	(0.019)	(0.024)	(0.018)	(0.026)	(0.020)
Air transportation* ^^		**0.025**		**0.023**		**0.023**		**0.021**
		(0.012)		(0.012)		(0.012)		(0.011)
Other personal characteristics								
Years of schooling completed			-0.002	-0.002			-0.002	-0.002
			(0.0002)	(0.0002)			(0.0003)	(0.0003)
Black*			0.014	0.014			0.019	0.019
			(0.003)	(0.003)			(0.003)	(0.003)
American Indian*			0.026	0.026			0.034	0.033
			(0.008)	(0.008)			(0.010)	(0.009)
Asian*			0.004	0.004			0.005	0.005
			(0.004)	(0.004)			(0.004)	(0.004)
Hispanic*			0.002	0.002			0.001	0.001
			(0.002)	(0.002)			(0.002)	(0.002)
Constant	0.021	0.021	0.020	0.020	0.024	0.024	0.022	0.022
Observations	53509	53509	53509	53509	48692	48692	48692	48692

Notes:
^ Sample includes only those employed (or out of the LF) before September 2001 and Observed after September 2001
(*) dF/dx is for discrete change of dummy variable from 0 to 1
^^ Pilot =1 for occupation 226: Airplane pilots
^^ Air transportation = 1 for industry 421: Air-transportation
( ) Standard errors in parenthesis

Table 3.a.USA:
The Wages of Risky Jobs Before and After September 2001
CPS Monthly Data, 1998 to 2002
Male, Full-Time workers
Dependent variable: Hourly wage (in logs)

	Age			
	22 - 65	25 - 55	25 - 55	25 - 55
Variables	(i)	(i)	(i)	(i)
Pilot	**0.297**	**0.291**	**0.291**	**0.292**
	(0.032)	(0.034)	(0.034)	(0.034)
Ait-transportation	-0.003	-0.008	-0.007	-0.006
	(0.013)	(0.014)	(0.014)	(0.014)
Firefighting			-0.032	-0.032
			(0.019)	(0.019)
Police			0.096	0.096
			(0.012)	(0.012)
Oct20001-Dec2002	0.014	0.014	0.014	0.021
	(0.004)	(0.004)	(0.004)	(0.002)
Before - After:				
Oct20001-Dec2002 * Pilot	**-0.154**	**-0.145**	**-0.145**	**-0.145**
	(0.064)	(0.069)	(0.069)	(0.069)
Oct20001-Dec2002 * Aifr-transportation	**0.006**	**0.001**	**0.001**	**0.000**
	(0.025)	(0.027)	(0.027)	(0.027)
Oct20001-Dec2002 * Firefighting			0.038	0.038
			(0.035)	(0.035)
Oct20001-Dec2002 * Police			-0.021	-0.020
			(0.023)	(0.023)
Other personal characteristics				
Experience	0.032	0.026	0.026	0.026
	(0.000)	(0.001)	(0.001)	(0.001)
Experience square	-0.001	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
School years completed	0.088	0.089	0.089	0.089
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Educational category FE	No	No	No	No
Year dummies	Yes	Yes	Yes	No
Adj R-square	0.232	0.217	0.218	0.218
Observations	296901	251983	251983	251983

Note:
CPS monthly files: January 1998 to December 2002
All specification include dummies for region of residence, and weekly worked hours (in logs)
( ) Standard errors in parenthesis

Table 3.b.USA:
The Wages of Risky Jobs Before and After September 2001
CPS Monthly Data, 1998 to 2002
Male, fFull-Time workers
Dependent variable: Hourly wage (in logs)

	Age			
	22 - 65	25 - 55	25 - 55	25 - 55
Variables	(i)	(ii)	(iii)	(iv)
Pilot	**0.252**	**0.245**	**0.245**	**0.246**
	(0.032)	(0.033)	(0.033)	(0.033)
Ait-transportation	0.009	0.004	0.005	0.006
	(0.012)	(0.013)	(0.013)	(0.013)
Firefighting			0.000	0.000
			(0.019)	(0.019)
Police			0.106	0.106
			(0.012)	(0.012)
Oct20001-Dec2002	0.013	0.014	0.014	0.021
	(0.004)	(0.004)	(0.004)	(0.002)
Before - After:				
Oct20001-Dec2002 * Pilot	**-0.150**	**-0.147**	**-0.147**	**-0.148**
	(0.063)	(0.068)	(0.068)	(0.068)
Oct20001-Dec2002 * Aifr-transportation	**0.005**	**-0.001**	**-0.001**	**-0.002**
	(0.025)	(0.027)	(0.027)	(0.027)
Oct20001-Dec2002 * Firefighting			0.034	0.034
			(0.035)	(0.035)
Oct20001-Dec2002 * Police			-0.027	-0.026
			(0.023)	(0.023)
Other personal characteristics				
Experience	0.034	0.031	0.031	0.031
	(0.000)	(0.001)	(0.001)	(0.001)
Experience square	-0.001	-0.001	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)
School years completed				
Educational category FE	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	No
Adj R-square	0.248	0.233	0.233	0.233
Observations	296901	251983	251983	251983

Note:
CPS monthly files: January 1998 to December 2002
All specification include dummies for region of residence, and weekly worked hours (in logs)
( ) Standard errors in parenthesis

Table ISR.2:
The Effect of Suicide Bombers on the Number of Passengers in Regular Bus Lines
Israel, October 2001 to April 2003
Dependent variable: the ratio of passegers in regular lines to passengers in special lines (in logs)

Variables	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Num. of suicide bomber events - on buses only - this month	-0.191			-0.168	-0.187	-0.206	-0.219
	(0.054)			(0.059)	(0.064)	(0.067)	(0.089)
Num. of all suicide bomber events this month		-0.053		-0.023	-0.036	-0.053	-0.046
		(0.026)		(0.025)	(0.029)	(0.035)	(0.043)
Fatal incidets			-0.008		0.007	0.003	-0.002
			(0.007)		(0.007)	(0.008)	(0.011)
Fatal incidents with 1967 borders						0.020	0.034
						(0.022)	(0.025)
Num people killed by terror action this month							0.004
							(0.005)
Num. people wounded							-0.001
							(0.001)
Months / observations	28	28	28	28	28	28	28
Adj R-Square	0.2998	0.1076	0.0228	0.2958	0.29	0.2848	0.2627

Note:
Sources:
1. Public transportation data is based on Israeli Central of Bureau Statistics datasets
2. Data on the type of the terror events, casualties (killed, wounded) and location was collected by the authors
( ) Standard errors in parenthesis

Table ISR.3:
The Effect of Suicide Bomber Attacks on the Wages of Bus Drivers
Matched Income and Labor Force Surveys, Israel, 2000 to 2002 *, **
Dependent variable: (log) Hourly Wage ***

Variables	(i)	(ii)
(1) Bus driver	0.081	0.108
	(0.096)	(0.090)
(2) Taxi driver	-0.401	-0.469
	(0.177)	(0.121)
The effect of suicide bomber attacks:		
(3) Num. of suicide bomber events carried out on buses this quarter^ (SBB t)	**-0.008**	
	(0.009)	
(4) Num. of suicide bomber events carried out on buses last quarter (SBB t-1)		**0.014**
		(0.009)
Interactions:		
(5) SBB t * Bus driver	**-0.009**	
	(0.065)	
(6) SBB t-1 * Bus driver		**-0.034**
		(0.056)
(7) SBB t * Taxi driver	**-0.063**	
	(0.121)	
(8) SBB t-1 * Taxi driver		**0.016**
		(0.038)
Personal Characteristics:		
(9) Years of schooling completed	0.077	0.077
	(0.002)	(0.002)
(10) Yeshiva (last school)	-0.054	-0.054
	(0.020)	(0.020)
(11) Immigrated to Israel after 1988	-0.424	-0.424
	(0.023)	(0.023)
(12) Quarter fixed effect	Yes	Yes
(13) Observations	5633	5633
(14) Adj. R-square	0.317	0.317

Notes:

Based on the Israeli Income and Labor Force Surveys for the years 2000 through 2002

* For reasons of privacy the Israeli CBS excludes income data from the Labor Force surveys.
Income data is provided in a separate file known as the Income Survey.
Personal (or household) IDs were scrambled to avoid the (easy) possibility of merging back these files.
Using personal characteristics available in both files we were able to match observations from both files.

** The sample excludes (i) Israeli Arabs, (ii) workers who earn less then 1500 NIS (less than 1/2 of minimum wage)
(iii) workers who work less than 10 hours a week

*** All specifications include experience and experience square, origin related dummies and marital status

^ Suicide bomber attacks carried out on buses = the average of suicide bomber attacks carried out on buses in the q

( ) Standard errors in parenthesis

Table ISR.4:
The Effect of Suicide Bomber Attacks on the Likelihood of Male Workers to be Employed as Bus Drivers
Dprobit Estimators (dF/dX): the change in the probability for an infinitesimal change in each variable
CBS, Labor Force Surveys, Israel, 2000 to 2002
Dependent variable: Bus driver (0, 1)

	Population					
	All			Drivers		
Variables						
(1) Num. of suicide bomber events carried out on buses this quarter	**-0.002**		**-0.002**	**-0.098**		**-0.122**
	(0.001)		(0.001)	(0.033)		(0.048)
(2) Num. of suicide bomber events carried out NOT on buses this quarter		**-0.001**			**-0.020**	
		(0.001)			(0.014)	
Time Trend / Aggregates:						
(3) Number of buses in the public transporation ^			0.000			-0.149
			(0.007)			(0.242)
Personal characteristics:						
(4) Years of schooling completed	-0.001	-0.001	-0.001	0.022	0.024	0.022
	(0.000)	(0.000)	(0.000)	(0.007)	(0.008)	(0.007)
(5) Observations	37482	37482	37482	885	885	885
(6) Observed Probability	0.009	0.009	0.009	0.152	0.152	0.152
(7) Predicted Probability at X bar	0.007	0.007	0.007	0.132	0.135	0.132
(8) Pseudo R-Square	0.059	0.059	0.059	0.076	0.063	0.077
(9) % effect of suicide bomber attacks at X bar (1)/(7)	-0.287	-0.122	-0.282	-0.744	-0.151	-0.929

Notes:
Based on the Israeli Labor Force Surveys for the years 2000 through 2002
* The sample excludes (i) Israeli Arabs and (ii) workers in rural areas
Workers are those who report being employed during the week of interview
^ Suicide bomber attacks carried out on buses = the average number of suicide bomber attacks carried out on buses during the quarter

Table ISR.5:
The Effect of Suicide Bomber Attacks Carried Out on Buses on the Use of Public Bus Transportation
Family Expenditure Surveys, 1999 through 2002
Dependent variable: family expenditures (in logs) on public bus rides

Variables	Location: All (i)	All (ii)	Metro Cities(&) (iii)	Metro Cities(&) (iv)	Others(&&) (v)	Others(&&) (vi)
(1) Suicide bomber attacks curried out on a bus^	**-0.310**		**-0.427**		**-0.065**	
	(0.108)**		**(0.120)****		**(0.231)**	
(2) Suicide bomber attacks curried out not on a bus^		-0.069		-0.069		-0.125
		(0.046)		(0.046)		(0.099)
Personal characteristics:						
(3) School years completed	0.088	0.088	0.052	0.088	0.133	0.134
	(0.016)**	(0.016)**	(0.018)**	(0.016)**	(0.034)**	(0.034)**
(4) Income (in logs)^^	-1.336	-1.337	-1.505	-1.337	-1.102	-1.099
	-(0.101)**	(0.101)**	(0.114)**	(0.101)**	(0.222)**	(0.222)**
(5) Age^^^	0.035	0.035	0.023	0.035	0.073	0.073
	(0.004)**	(0.005)**	(0.005)**	(0.005)**	(0.011)**	(0.011)**
(6) Female^^^	0.311	0.298	0.082	0.298	0.668	0.672
	(0.124)*	(0.124)*	(0.137)	(0.124)*	(0.272)*	(0.271)*
(6) Family size	0.228	0.228	0.381	0.228	0.245	0.245
	(0.036)**	(0.035)**	(0.042)**	(0.035)**	(0.071)**	(0.071)**
(6) Recent immigrant^^^^^	1.328	1.342	0.805	1.342	2.388	2.375
	(0.153)**	(0.153)**	(0.162)**	(0.153)**	(0.390)**	(0.389)**
(7) Observations	9811	9811	6566	6566	3245	3245

Notes:
& Jerusalem, Tel-Aviv and Haifa.
&& All other locations
^ Suicide bomber attacks = the average number of suicide bomber attacks
^^ Income = all source of income
^^^ Head's age / gender.
^^^^ Recent immigrant is a dummy variable which equals 1 if person immigrated to Israel since 1990
( ) Robust standard errors in parenthesis

Table ISR.6:
The Effect of Suicide Bomber Attacks Carried Out on Buses on the Use of Taxi Services
Family Expenditure Surveys, 1999 through 2002
Dependent variable: family expenditures (in logs) on taxi services

Variables	Location: All (i)	Metro Cities(&) (ii)	Others(&&) (iii)
(1) Suicide bomber attacks curried out on a bus^	-0.085	0.758	-0.314
	(0.158)	(0.342)*	(0.179)
Personal characteristics:			
(2) School years completed	0.016	0.194	-0.062
	(0.023)	(0.045)**	(0.028)*
(3) Income (in logs)^^	-1.132	-1.072	-1.076
	(0.150)**	(0.283)**	(0.177)**
(4) Age^^^	-0.016	-0.019	-0.018
	(0.007)*	(0.014)	(0.008)*
(5) Female^^^	0.420	-0.129	0.592
	(0.183)*	(0.401)	(0.205)**
(6) Family size	0.107	0.036	0.130
	(0.052)*	(0.107)	(0.060)*
(7) Recent immigrant^^^^^	0.463	-0.428	0.777
	(0.227)*	(0.516)	(0.254)**
(8) Observations	9811	1898	7913

Notes:
& Jerusalem, Tel-Aviv and Haifa.
&& All other locations
^ Suicide bomber attacks = the average number of suicide bomber attacks
^^ Income = all source of income
^^^ Head's age / gender.
^^^^ Recent immigrant is a dummy variable which equals 1 if person immigrated to Israel since 1990
( ) Robust standard errors in parenthesis

Table ISR.7:
The Effect of Suicide Bomber Attacks Carried Out on Buses on the Use of Public Bus Transportation
Consumption by Daily Tickets Vs. Consumption by Multiple-Rides ticket or Monthly Passes
Family Expenditure Surveys, 1999 through 2002
Dependent variable: family expenditures (in logs) on public bus rides

Variables	Daily	Multiple-Rides / Monthly
	(i)	(ii)
(1) Suicide bomber attacks curried out on a bus^	-0.390	-0.007
	(0.125)**	(0.279)
Personal characteristics:		
(3) School years completed	0.032	0.115
	(0.019)	(0.044)**
(4) Income (in logs)^^	-1.462	-1.541
	(0.122)**	(0.279)**
(5) Age^^^	0.025	0.033
	(0.005)**	(0.013)*
(6) Female^^^	0.345	0.541
	(0.148)*	(0.338)
(6) Family size	0.300	0.883
	(0.044)**	(0.099)**
(6) Recent immigrant^^^^^	0.624	2.562
	(0.185)**	(0.409)**

Notes:
^ Suicide bomber attacks = the average number of suicide bomber attacks
^^ Income = all source of income
^^^ Head's age / gender.
^^^^ Recent immigrant is a dummy variable which equals 1 if person immigrated to Israel since 1990
( ) Robust standard errors in parenthesis

Table ISR.8:
The Effect of Suicide Bomber Attacks Carried Out on Buses on the Use of Public Bus Transportation
Daily Rides by Family Income
Family Expenditure Surveys, 1999 through 2002
Dependent variable: family expenditures (in logs) on public bus rides

Variables	Income level		
	All	5 to 10K	10 to 20K
	(i)	(ii)	(ii)
(1) Suicide bomber attacks curried out on a bus^	**-0.499**	**-0.552**	**-0.483**
	(0.171)**	(0.242)*	(0.241)*
Personal characteristics:			
(2) School years completed	0.005	-0.005	-0.014
	(0.029)	(0.041)	(0.040)
(3) Income (in logs)^^	-1.124	-0.917	-1.314
	(0.299)**	(0.546)	(0.650)*
(4) Age^^^	0.032	0.015	0.050
	(0.008)**	(0.012)	(0.013)**
(5) Female^^^	0.304	-0.283	0.807
	(0.205)	(0.294)	(0.288)**
(6) Family size	0.281	0.217	0.332
	(0.061)**	(0.086)*	(0.088)**
(7) Recent immigrant^^^^^	0.893	0.764	0.952
	(0.251)**	(0.343)*	(0.371)*
(8) Observations	4757	2209	2548

Notes:
& Jerusalem, Tel-Aviv and Haifa.
&& All other locations
^ Suicide bomber attacks = the average number of suicide bomber attacks
^^ Income = all source of income
^^^ Head's age / gender.
^^^^ Recent immigrant is a dummy variable which equals 1 if person immigrated to Israel since 1990
( ) Robust standard errors in parenthesis

Table ISR.9:
The Effect of Terror Fatalities and Suicide Bomber Attacks Carried Out on Buses on Coffee Shops Consumption
Family Expenditure Surveys, 1999 through 2002
Dependent variable: family expenditures (in logs) in Coffee Shops

Variables	Location: All (i)	Metro Cities(&) (ii)	Others(&&) (iii)
(1) Suicide bomber attacks curried out on a bus^	0.076	0.276	-0.018
	(0.191)	(0.358)	(0.224)
(2) Fatalities^^	-0.011	-0.020	-0.008
	(0.005)*	(0.009)*	(0.005)
Personal characteristics:			
(3) School years completed	0.141	0.139	0.112
	(0.021)**	(0.037)**	(0.025)**
(4) Income (in logs)^^^	2.223	1.907	2.423
	(0.130)**	(0.216)**	(0.161)**
(5) Age^^^^	-0.066	-0.083	-0.058
	(0.006)**	(0.011)**	(0.007)**
(6) Female^^^^	0.355	0.558	0.301
	(0.152)*	(0.290)	(0.178)
(7) Family size	-0.717	-0.710	-0.630
	(0.049)**	(0.093)**	(0.058)**
(8) Recent immigrant^^^^^^	-1.386	-2.029	-1.037
	(0.216)**	(0.434)**	(0.249)**
(9) Observations	9811	1898	7913

Notes:
& Jerusalem, Tel-Aviv and Haifa.
&& All other locations
^ Suicide bomber attacks = the average number of suicide bomber attacks
^^ Fatalities during the month
^^^ Income = all source of income
^^^^ Head's age / gender.
^^^^^ Recent immigrant is a dummy variable which equals 1 if person immigrated to Israel since 1990
( ) Robust standard errors in parenthesis

Table ISR.10:
The Effect of Suicide Bomber Attacks Carried Out NOT on Buses on Coffee Shops Consumption by Marital Status
Family Expenditure Surveys, 1999 through 2002
Dependent variable: family expenditures (in logs) in Coffee Shops

Variables	Marital Status			
	Married, no children		Singles	
	(i)	(ii)	(iii)	(iv)
(1) Suicide bomber attacks curried out on a bus^	-0.276 (0.081)**	-0.797 (0.364)*	0.035 (0.120)	0.356 (0.245)
Personal characteristics:				
(2) School years completed	0.111 (0.030)**	0.016 (0.155)	0.210 (0.046)**	0.063 (0.130)
(3) Income (in logs)^^^	3.060 (0.199)**	0.734 (0.606)	1.364 (0.261)**	-0.131 (0.462)
(4) Age^^^^	-0.056 (0.009)**	0.293 (0.129)*	-0.084 (0.012)**	0.220 (0.095)*
(5) Female^^^^	0.429 (0.224)	0.711 (0.849)	-0.236 (0.332)	1.106 (0.655)
(6) Family size	-0.517 (0.073)**		-0.185 (0.140)	
(7) Recent immigrant^^^^^^	-1.386 (0.319)**	-1.445 (1.171)	-1.705 (0.410)**	-1.779 (0.910)
Age	All	22-35	All	22-35
(8) Observations	6346	291	2070	327

Notes:
& Jerusalem, Tel-Aviv and Haifa.
&& All other locations
^ Suicide bomber attacks = the average number of suicide bomber attacks
^^ Fatalities during the month
^^^ Income = all source of income
^^^^ Head's age / gender.
^^^^^ Recent immigrant is a dummy variable which equals 1 if person immigrated to Israel since 1990
( ) Robust standard errors in parenthesis

Table FRC.1:
The Effect of Stock on Changes in the Demand for Quality
Source: Adda (2001)

Variable	Before Crisis	During Crisis
Stock [20%,40%]	**-0.410**	**1.89**
	(0.513)	(0.995)
Stock [40%,60%]	**0.280**	**1.92**
	(0.467)	(0.960)
Stock [60%,80%]	**-0.210**	**0.37**
	(0.420)	(0.925)

Notes:
Adda Jerome (2001):
Behavior Towards Health Risks: An Empirical Study Using the CJD Crisis as an Experiment"
Heteroscedastic corrected standard errors were computed.
Regression also controls for lagged changes in quality, region of living, size
of city, occupation, education, family size and income.

Figure A1.USA: Domestic Flights: Air Passengers

Domestic Air Seat and Passenger Miles (monthly data, not seasonally adjusted)

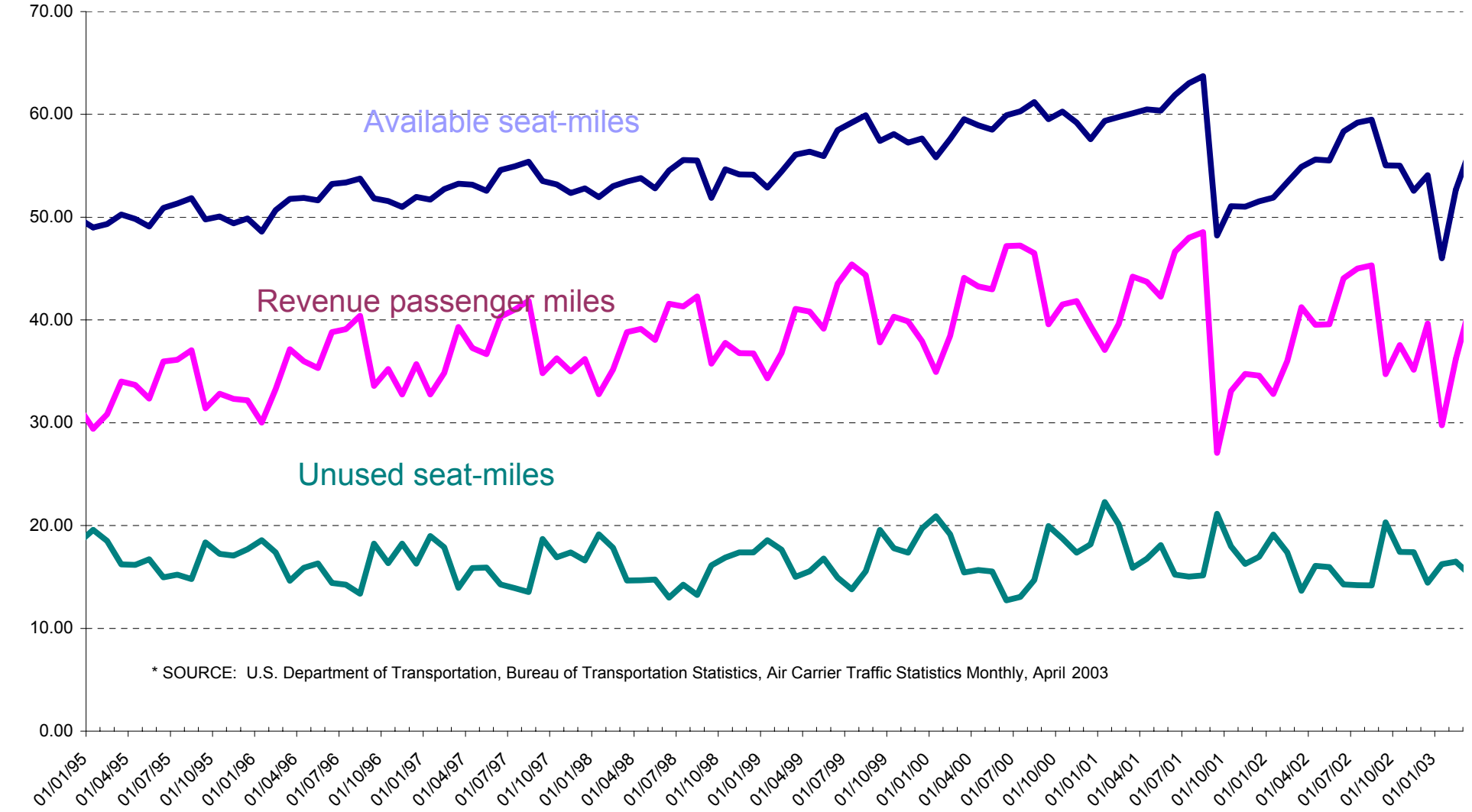


Figure A2.USA: Domestic Flights: Air Freight

Domestic Air Freight Ton-Miles (monthly data, not seasonally adjusted)

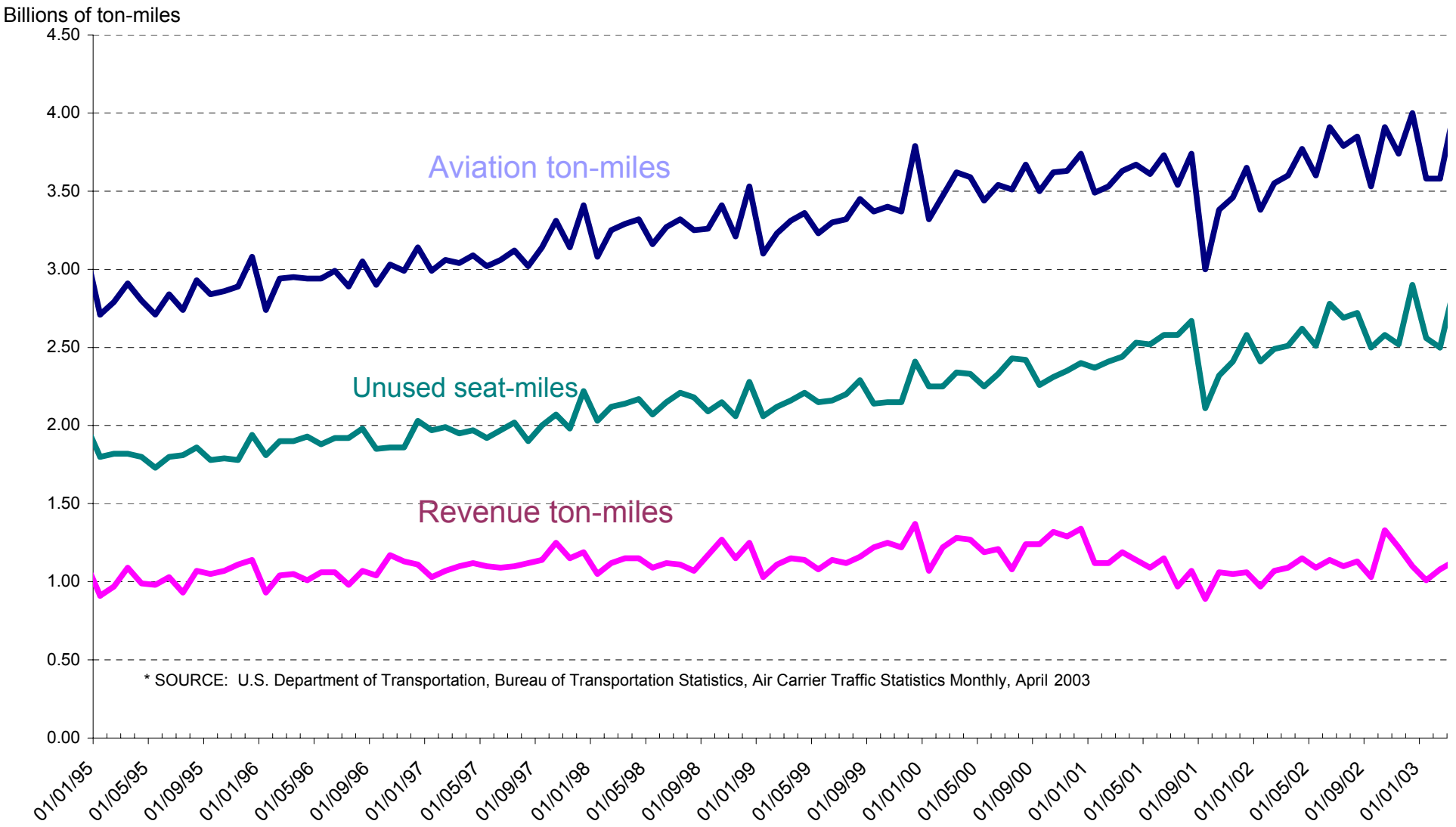


Table ISR.1A:
The Effect of Suicide Bombers on the Number of Passengers in Regular Bus Lines
Israel, October 2001 to April 2003
Dependent variable: the ratio of passegers in regular lines to passengers in special lines (in logs)

Variables	(i)
Num. of suicide bomber events - on buses only - this month	-0.082
	(0.061)
Num. of suicide bomber events - on buses only - last month	-0.179
	(0.061)
Num. of ALL suicide bomber events - this month	-0.017
	(0.023)
Num. of ALL suicide bomber events - last month	0.003
	(0.023)
Months / observations	28
Adj R-Square	0.2998

Note:
Sources:
1. Public transportation data is based on Israeli Central of Bureau Statistics datasets
2. Data on the type of the terror events, casualties (killed, wounded) and location was collected by the authors
( ) Standard errors in parenthesis

Table ISR.2A:
The Effect of Suicide Bombers on the Number of Passengers in Regular Bus Lines
Israel, October 2001 to April 2003
Dependent variable: the ratio of passegers in regular lines to passengers in special lines (in logs)

Variables	(ii)	(iii)	(iv)
Num. of suicide bomber events - on buses only - this month	-0.232	-0.208	-0.201
	(0.049)	(0.056)	(0.064)
Months / observations	27	21	18
Adj R-Square	0.1076	0.0228	0.2958

Note:
Sources:
1. Public transportation data is based on the Israeli Central of Bureau Statistics publications.
2. Data on the type of the terror events, casualties (killed, wounded) and the location terror incident took place was collected by the authors
( ) Standard errors in parenthesis