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Destruction and distress: using a quasi-experiment to show the effects of the September 11 attacks on subjective well-being in the UK

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Abstract

Using a longitudinal household panel dataset in the United Kingdom, where most interviews are conducted in September each year, we are able to show that the attacks of September 11 resulted in lower levels of subjective well-being for those interviewed after that date in 2001 compared to those interviewed before it. This quasi-experiment provides one of the first examples of the impact of a terrorist attack in one country on well-being in another country. We value this effect through a cost of illness approach, which is estimated to be between £170million and £380 million.

Keywords: terrorism; September 11; subjective well-being.

JEL: H56; I31.

1. Introduction

Terrorism is a major negative externality (Frey, 2004). Some costs of terrorism are very direct and relatively easy to measure, such as the value of lives lost, reduction in consumption, etc., whilst others are more indirect and much more difficult to measure, such as increased fear and anxiety. One of the most well-known terrorist attacks are the attacks of September 11 2001 in the US. It has been shown that the attacks had detrimental effects to the economy in the US, particularly in the New York region (Chernick and Haughwout, 2006) as well as intangible psychological costs (Galea et al, 2002; Schlenger et al, 2002).

The indirect effects of terrorism, which might be large in their own right, could extend beyond national borders as they dominate media coverage (Eisensee and Stromberg, 2007). It is very difficult to identify the causal effects of terrorist attacks on individuals, regions or countries since there are sometimes no good comparable counterfactuals. As a result of this, one way of valuing the indirect negative externalities would be through a stated preference study, which would elicit a direct willingness-to-pay (WTP) for a reduction in the risk of a terrorist attack.

Smith et al (2009) analysed US households' ex ante WTP for three security policies that all address a terrorist attack on commercial aircraft with shoulder mounted missiles. The main policy being anti-missile laser jamming countermeasures mounted on commercial aircraft, and this was compared to two other policies as well as the prospect of remaining with the status quo. Their WTP estimates for the anti-missile laser jamming intervention ranged from \$100 to \$220 annually per household. Using a random utility model Viscusi (2009) finds that reductions in deaths from terrorism have a value almost twice as great as reductions in deaths from natural disasters, suggesting a large premium for dread risk. To identify the international negative spillovers of the 9/11 attacks in the UK, for example, we could ask the UK population how much they are willing to pay to eliminate the risk of terrorist attacks in another country, such as the US.

This hypothetical WTP approach has already been heavily debated (see Mitchell and Carson, 1989; Diamond and Hausman, 1993; Ariely et al, 2003), but it is only one way of valuing non-market goods. Another way is through people's experienced utility (Kahneman et al, 1997; Dolan and Kahneman, 2008), or what we describe as subjective well-being (SWB). This approach has already been used to value aircraft noise (van Praag and Baarsma, 2005), urban regeneration (Dolan and Metcalfe, 2008), and air pollution (Luechinger, 2009). The use of SWB has shown to be a valid and reliable indicator of well-being (see Diener et al, 1999; Krueger and Schkade, 2008), especially since evolution may have created the sensation of happiness exactly in order to affect our behaviour (Rayo and Becker 2007).

This study presents the first causal evidence of an international spillover of terrorism using people's SWB. We use the British Household Panel Survey (BHPS) to examine how the 9/11 attacks in the US had detrimental effects on the SWB of residents in the UK. The BHPS allows us to examine the 9/11 attacks in a quasi-experimental setting. The BHPS is administered annually between the months of September and December, but the majority of surveys take place in September in a random manner. So comparing the SWB of the UK population before and after the 11h of September in 2001, and comparing this to the same residents in 2000, provides us with a novel and powerful quasi-experiment.

We find that the 9/11 terrorist attacks decreased the SWB of those UK residents who answered the survey after the 11th of September in 2001. This effect is large and robust to a number of alternative specifications and samples. To value such an international negative externality, we use the cost of illness and income compensation approaches. The value of the 9/11 attacks on UK residents is found to be between £170million - £380million.

2. Background

Terrorism and terror attacks have long been a major international problem, with potentially serious consequences for human welfare (Frey et al, 2007). The attacks of September 11, 2001, were one of the most prominent acts of terrorism in recent times but just what are the consequences of such attacks? Economists use the underlying exogeneity of terrorist attacks as a way to establish the causal relationship from those attacks to various economic outcomes, such as tourism (Enders et al, 1992), national output (Abadie and Gardeazabal, 2002; Eckstein and Tsiddon, 2004), net foreign direct investment (Abadie and Garzeazabal, 2008) and urban expansion (Blomberg and Sheppard, 2007). However, terrorism only directly affects a small fraction of the capital stock (Becker and Murphy, 2001), and there are also studies that show that it does not affect all economic outcomes (e.g. Glaeser and Shapiro (2002) find that terrorism has not altered the urban form). The well-being consequences of terrorism have also been studied in terms of the birth weight of babies in areas with a higher concentration of land mines, where the causal mechanism is thought to be the effects on the stress of mothers during pregnancy (Camacho, 2008).

The terrorist attacks of September 11, 2001, have stimulated quite a bit of research in their own right. For example, there is now evidence to suggest that the attacks had a detrimental effect on the financial market (Chen and Siems, 2004; Straetmans et al, 2008) and New York’s fiscal position (Dolfman and Wasser, 2004; Chernick and Haughwout, 2006). It has also been shown that the 9/11 attacks reduced the demand for air travel (Blunk et al, 2006; Blalock et al, 2007), with estimates ranging from $14 to $43billion a year (Santos and Haimes, 2004) to $214 to $420 billion (Gordon et al, 2007). There was also a significant increase in the number of fatal traffic accidents after 9/11 (Gigerenzer, 2004; Su et al, 2009), which has been found for other terrorist attacks (Stecklov and Goldstein, 2004).

In terms of the intangible effects of 9/11, it has been found that survivors from damaged buildings reported substantial physical and psychological health problems three years after the event (Brackbill et al, 2006). Post-traumatic stress disorder (PTSD) has been shown to be associated with direct exposure to the 9/11 attacks and the prevalence of PTSD in the New York City metropolitan area was substantially higher than elsewhere in the country (Galea et al, 2002; Schlenger et al, 2002). Eidelson et al (2003) find a significant increase in the amount of work – in terms of the number of clients – received by psychologists working closest to Ground Zero compared to those received by their colleagues working elsewhere in the country.

The intangible effects of 9/11 were felt elsewhere in the US. For example, PTSD was not limited to those who experienced the 9/11 attacks directly (Silver et al, 2002), although the actual levels of stress outside of New York are disputed (Schlenger et al, 2002). In a small sample from Wisconsin, Krueger (2007) found that 9/11 increased sadness temporarily and decreased enthusiasm for at least seven days after the attacks. In a nationally representative sample of Americans, Lerner et al (2003) found a heightening level of fear and anger amongst the US population following 9/11. More recently, the terrorist attacks in London in 2005 have been shown to have negative effects on stress and have altered travel behaviour (Rubin et al, 2005) and criminal behaviour through extra policing (Draca et al, 2008).

Despite these and a range of other studies, we are unaware of any attempt to determine the effects of the attacks on the SWB of those outside of the attacked country, let alone quantify such effects.

3. Data and empirical strategy

This study examines the effects of 9/11 on the SWB of those living in the United Kingdom. This study has two main strengths. First, we use a large longitudinal dataset, consisting of approximately 10,000 individuals, which provides us with strong statistical power to discern patterns whist controlling for individual heterogeneity and underlying trends. Second, 9/11 acts as an exogenous shock to the randomised sampled population, which provides us with a very powerful quasi-experiment.

The British Household Panel Survey (BHPS) is a nationally representative of British households, and is conducted between September and December of each year (started in 1991). Respondents are interviewed in successive waves and the sample has remained representative of the British population since the early 1990s. For the study to be thought of a quasi-experiment, the timing of terrorist attacks need to be exogenous and largely randomly assigned in terms of the BHPS interviews. The 9/11 attacks were clearly exogenous to the survey since many respondents are interviewed in September each year but the date in September in which they are interviewed is random.

The measure of SWB used in this analysis is the twelve items from the negative affect scale of the General Health Questionnaire (Goldberg, 1978). Respondents are asked how often (on a four point category scale) over the past few weeks they: (i) had lost sleep over worry; (ii) felt constantly under strain; (iii) felt they could not overcome difficulties; (iv) been feeling unhappy and depressed; (v) been losing confidence; (vi) been feeling like a worthless person; (vii) were playing a useful part in things; (viii) felt capable of making decisions; (ix) been able to enjoy day-to-day activities; (x) been able to concentrate; (xi) been able to face up to problems; and (xii) been feeling reasonably happy. The number of times a person places himself or herself in the top two categories was given a one, and then all twelve questions were added together to produce what is known as a Caseness measure of SWB. This is a well-being score from zero to 12, coded so that the response with the lowest well-being value scores 12 and that with the highest well-being value scores zero. For simplicity, this count is reversed here, so that higher scores indicate higher levels of well-being.

This composite rating is a good proxy for the transient component of moods (Watson and Clark, 1984) and has been used as a measure of SWB in recent studies by economists (Blanchflower and Oswald, 2008; Clark, 2003; Clark and Etile, 2002; Gardner and Oswald, 2007; Jones and Wildman, 2008) and to value intangible goods (e.g. Oswald and Powdthavee, 2008).

The well-being equation in a difference-in-differences (D-i-D) setting takes the following form:

$$W_{it} = \alpha + \beta_1 Post\,11_{it} + \beta_2 T_t + \beta_3 (Post\,11_{it} \times T_t) + \varepsilon_{it}, \qquad (1)$$

where W_{it} denotes SWB of individual i at time t, $Post\,11_{it}$ is a binary variable which takes the value of 1 if the individual was interviewed post-9/11 attacks (between 12th September 2001 and 30th September 2001), T_t is a year dummy, i.e. year 2001, and ε_{it} is the error term. The parameter β_3 represents the true causal effect of the September 11 attacks on SWB of those interviewed between 12th September 2001 and 30th September 2001. Assuming that in the absence of the September 11 attacks W_{it} would have changed identically in the pre-9/11 and post-9/11 groups between 2000 and 2001. More formally, in the absence of treatment, β_3 would be zero, i.e. there would be no difference in the mean well-being scores between pre- and post-9/11 (see Meyer, 1995). In this case, an unbiased estimate of β_3 can be obtained by D-i-D as:

$$\begin{aligned}\hat{\beta}_3 &= \Delta\overline{W}^{Post911}_{2000} - \Delta\overline{W}^{Pre911}_{2000} \\ &= \overline{W}^{Post911}_{2001} - \overline{W}^{Post911}_{2000} - (\overline{W}^{Pre911}_{2001} - \overline{W}^{Pre911}_{2000}).\end{aligned} \qquad (2)$$

Note that this approach can accommodate multiple time periods and multiple treatment groups. We can then estimate β_3 by applying OLS to equation (1).

The panel nature of the BHPS allows us to follow the same individuals who were interviewed in 200 and September 2001 (excluding September 11 itself). A key assumption here is that, for those interviewed in September of each BHPS year, the date of the interview is orthogonal to the date of treatment, i.e. September 11. This yields for the years 2000-2001 a balanced panel that consists of 9,535 observations (4,908 individuals). Of those, 1,020 individuals were interviewed between 1st and 10th of September in 2001.

4. Results

By applying OLS on equation (1) – without any control variables – we obtain

$$W_{it} = \underset{(0.098)^{*}}{9.842} + \underset{(0.110)}{0.011} \times Post11_{it} + \underset{(0.092)^{*}}{0.334} \times T_t - \underset{(0.105)^{*}}{0.316} \times (Post11_{it} \times T_t)$$

$$R^2 = 0.001;\ N = 9{,}935$$

Standard errors are in parentheses; * < 5%; ** < 1%.

This implies that whilst there is a significant increase in the average SWB scores for the control group from 2000 to 2001, the same cannot be said for the treated group, i.e. those interviewed after the September 11 attacks. The D-i-D estimate is negative, statistically significant, and sizeable; the average treatment effect is -0.316 with a well-determined standard error of 0.105.

To check whether the above results are not driven by seasonality – i.e. the control group may have done their interviews in the doom and gloom winter of 2000, whilst the treated group may have done their interviews in the relatively more cheerful Autumn time of the same year – we can rerun OLS on those interviewed in September of both years only. By restricting to the 'September interviewees' of both years only, OLS yields:

$$W_{it} = \underset{(0.180)^{*}}{9.700} + \underset{(0.207)^{*}}{0.655} \times Post11_{it} + \underset{(0.152)^{*}}{0.895} \times T_t - \underset{(0.187)^{*}}{0.430} \times (Post11_{it} \times T_t)$$

$$R^2 = 0.073;\ N = 1{,}965$$

Standard errors are in parentheses; * < 5%; ** < 1%.

The average treatment effect continues to be negative and statistically significant at the 1% level; those interviewed post-9/11 report a 0.430 lower SWB score than they should have experienced in absence of the September 11 attacks. The slight difference in size between the first (no seasonal adjustment) and second (restricting to September interviewees in both years) average treatment effect implies that we may need to control for the seasonal effects, i.e. the month of the interview before or after the September 11 attacks, if multiple time periods were to be incorporated into the D-i-D estimation.

One of the key assumptions underlying validity of the above D-i-D estimate is that differences between treatment and control group would have remained constant in absence of treatment (Meyer, 1995). We can check whether this is the case for the September 11 attacks by plotting the well-being trends for the control and the treated groups prior to 2001. Here, a 5-year period before and 1-year after the event is arbitrarily chosen to generate the plot, although similar patterns (but with significantly smaller N) can be obtained with longer leads and lags.

We can see from Figure 1 that the average levels of SWB for both pre and post-9/11 groups follow a very similar trend in the years that precede 2001. The trend however diverges in the year of the September 11 attacks. That is, there is a noticeable increase in the average level of SWB of those interviewed pre-9/11 from 2000 to 2001, which could be due to a number of a reasons such as a very good summer, general mood in the country after the 2001 general election (see Dolan et al (2008) for the effects of national elections on SWB). However, consistent with the estimated average treatment effects obtained in the previous OLS regressions, the average SWB levels for those interviewed post-9/11 hardly changes at all from 2000. In other words, there appears to be an 'offsetting' effect on the rising trend of SWB for the treated group, thus providing some validations for the average treatment effect obtained in our D-i-D model. Since both groups have already been exposed to the event by the time the survey was conducted in 2002, it is not surprising to see that the trend of SWB converges again one year after the 9/11 attacks. What is very interesting is that the actual SWB levels do not return to the same levels as the previous year for the treated group.

Table 1 provides further robustness checks on the D-i-D estimates. Column 1 of Table 1 controls for a number of covariates that are consistent with the determinants of well-being (Clark et al, 2007; Dolan et al, 2008b), including household income, age, age squared, gender, education, employment status, health status, number of children, and regional dummies. We also control for the pre- and post-9/11 seasonal effects by including dummies for the month interviewed in 2000. In the full specification, OLS continues to produce a negative and statistically significant average treatment effect; the coefficient on the interaction between the post-9/11 group and the year (=2001) dummy is -0.342 with a statistically well-determined standard error of 0.107.

The results might be driven by those individuals who were interviewed immediately after 9/11 in 2001. To check for this, the second column of Table 1 splits the post-9/11 group into two groups: interviews that took place September 12-20 and 21-30. Whilst those interviewed between 21st and 30th September 2001 reported a slightly lower average well-being score than those interviewed immediately after the September 11 attacks, i.e. between 12th and 20th September 2001, both still reported a significant drop in SWB between 2000 and 2001 compared to the control group. It is interesting here that those who were interviewed later on in the month (i.e. 21st – 30th) were more affected by the terrorist attacks than those interviewed closer to the attacks (i.e. 12th – 20th).

To provide further robustness checks, we could argue that the selection process into the treated group is not random, i.e. the selection process may be correlated with unobserved factors that are also correlated with measures of SWB. To check for this, we estimate in the first column of Table 2 a D-i-D model with multiple time periods using fixed effects estimator. Using a seven-year balanced panel (1996-2002), fixed effects estimator produces an interaction coefficient between post-9/11 and T=2001 of -0.345 with a statistically significant standard error of 0.138. This average treatment effect is remarkably similar to the one obtained in the OLS regressions, which suggests that even if there was selection by unobserved time-invariant factors into the treated group, the effect is negligible. The absence of unobserved heterogeneity bias also means that we can estimate equation (1) using either OLS or random effects models.

Given that we have more than two time periods in our analysis, there is the potential for serial correlation which could understate the standard deviation of the estimated treatment effects, leading to an overestimation of the *t*-statistic (Bertrand et al, 2004). However, the introduction of AR(1) errors into the random effects regression in the second column of Table 2 does not lead to a substantial increase in the standard errors, and a virtually identical average treatment effect to the one obtained in OLS can still be obtained in a random effects model.

5. Valuing the losses in SWB

The effect of the 9/11 attacks on SWB seems large and robust, and valuing the impact in monetary terms would facilitate cost-benefit analysis. We can estimate monetary values in two ways: (i) cost of illness; and (ii) income compensations.

5.1 Cost of illness

A GHQ score of around 2 is a conservative threshold level at which lower levels of SWB can be diagnosed as clinical depression (Goldberg et al, 1998), and so we can see how many people in the United Kingdom may have suffered the equivalent of clinical depression as a result of the 9/11 attacks. From the BHPS sample in 2001, there were 253 people between a GHQ value of 2 and 1.01. A 0.316 or 0.430 change in the GHQ (the range of values from our estimates) at this part of the distribution represents 80 to 109 people. That is, 0.47% to 0.64% of the BHPS sample could have been diagnosed with clinical depression as a result of 9/11. Aggregating this up to the 45.5 million adults in the UK in 2001, around 214,000 to 291,000 UK residents may have experienced clinical depression as a result of 9/11.

To treat such clinical depression, GPs usually provide a course of cognitive behavioural therapy (CBT). The cost of one course of CBT is around £800 (NICE, 2008). Therefore, aggregating this up, we could argue that the 9/11 attacks had the equivalent effect of costing £171million to £233million. This range of values can be seen as a lower bound estimate for three reasons. First, the depression threshold used here is a relatively conservative one. If we used the threshold as being 3 on the GHQ, the costs would become in the range of £211million to £273million. Second, CBT is not fully effective. The current effect rates are around 60% (Layard et al, 2007). So if we gave another course of CBT treatment to the 40% of people who did not recover first-time around, and using the conservative threshold value of 2 on the GHQ, our estimates would rise to £214million - £290million. Third, these estimates are local effects since they are based on one particular threshold – they are not average effects.

5.2 Income compensations

Income compensations (ICs) have been used to value a range of non-market goods (see Dolan and Metcalfe, 2008). The calculation of the IC for the terrorist attacks is the implicit utility-constant trade-off between the terrorist attacks and income. The IC is defined as the increase in income necessary to hold utility constant if the individual has been exposed to the terrorist attacks. In an indirect utility function, this would be given by:

$$v(T_1, y_0 + IC) = v(T_0, y_0) \qquad (3)$$

where $v(.)$ is the indirect utility function, y_0 is the initial income, T_0 is the pre-9/11 attacks condition, and T_1 is the post-9/11 attacks condition. Given this, and the micro-econometric specification in (1), the IC (at mean income levels) can be defined as:

$$IC = e^{\left\{\frac{\hat{\beta}_2 (T_1 - T_0)}{\hat{\beta}_1} + \ln(y_0)\right\}} - \bar{y}_0 \qquad (4)$$

where $\bar{y}_i$ is average household income of the sample population.

In our sample, we did not find a significant income effect due to our sample restrictions. As a result, we use the IC as a guide to what the costs could look like using this approach but it would not be definitive. There have been other studies, however, that have shown that an income effect in GHQ regressions can be found, especially using instrumental variables (IV). We could, for example, use Oswald and Powdthavee's (2008) estimate of the natural logarithm of personal income on GHQ being 0.818 (fixed effects – IV) to 1.159 (random effects – IV).

We can use these estimates in equation (4) to estimate the value of terrorism from SWB. The estimates of 0.316 (OLS no controls) to 0.430 (OLS seasonality controlled) represent our best causal effects of the terrorist attacks. Using these estimates, and an average UK personal income of £24,000, we find that the average treatment effect for each individual is worth between £7,500 and £17,000. This is a very large amount of income needed to compensate each individual for experiencing the 9/11 attacks. The cause of this large IC, apart from the large effect the 9/11 attacks have on SWB, is the income coefficient. This income coefficient is low because of the use of panel data, where the effects of income seem to be small. While the income-SWB debate will shed further light on our estimates, we do not currently have good estimates of the causal effect of income on SWB throughout the income distribution to know what coefficient to use and how to weight it. Therefore, these costs are a representation of what could be, and we arrive at the same conclusion as Deaton et al (2009) that without a more robust income coefficient, we cannot provide accurate income compensations.

6. Discussion

This study has shown that the 9/11 attacks in the United States lowered the psychological well-being of United Kingdom residents – by a GHQ well-being score of approximately 0.3-0.4. Comparing this magnitude with other life events within our data is difficult since many events, such as marriage or being unemployed, are endogenous. Notwithstanding this, the magnitude of the 9/11 effect is potentially worse than becoming divorced, and about one-third of the effect of being unemployed or widowed in the same sample using the same methods. These are significant and robust effects.

The effects provide us with cost estimates of the effect of the 9/11 attacks on UK SWB of around the £170million-£380million range. Using an income compensation seriously inflates these numbers but we do not have a robust income coefficient to use, which renders such values as imprecise. These cost estimates go some way towards demonstrating that the fear and psychological cost induced by terrorism is substantial and might greatly exceed the discounted physical harm (Sunstein, 2003; Becker and Rubinstein, 2004). This is due to the fact that 'dread' makes up a significant part of the risks from terrorism (Viscusi, 2009), and this especially true given that recent media coverage has been dominated by the 9/11 attacks (Eisensee and Stromberg, 2007).

Whatever the precise scale the impact of 9/11 across the UK population, it is possible that individuals in the UK were affected by 9/11 because they believed that such events were more likely to happen in the UK in the near future, thereby increasing their fear and uncertainty. Given Krueger and Laitin's (2008) finding that terrorists are more likely to attack wealthy countries, it seems natural for individuals in other wealthy countries to be affected by terrorist attacks overseas. Indeed, the results from our study support the Caplin and Leahy (2001) model where the events that caused the initial fear and uncertainty took place in another country.

We can only speculate about such issues here as there has certainly been little discussion of the international spillover effects of security or terrorism. The US Congress Joint Economic Committee (2002) has suggested that some of the largest costs of terrorism were the difficult to measure costs of added anxiety, stress, and psychological disorders associated with the increased threat of terrorism. This paper has shown that these costs may also have been very significant outside of the US.

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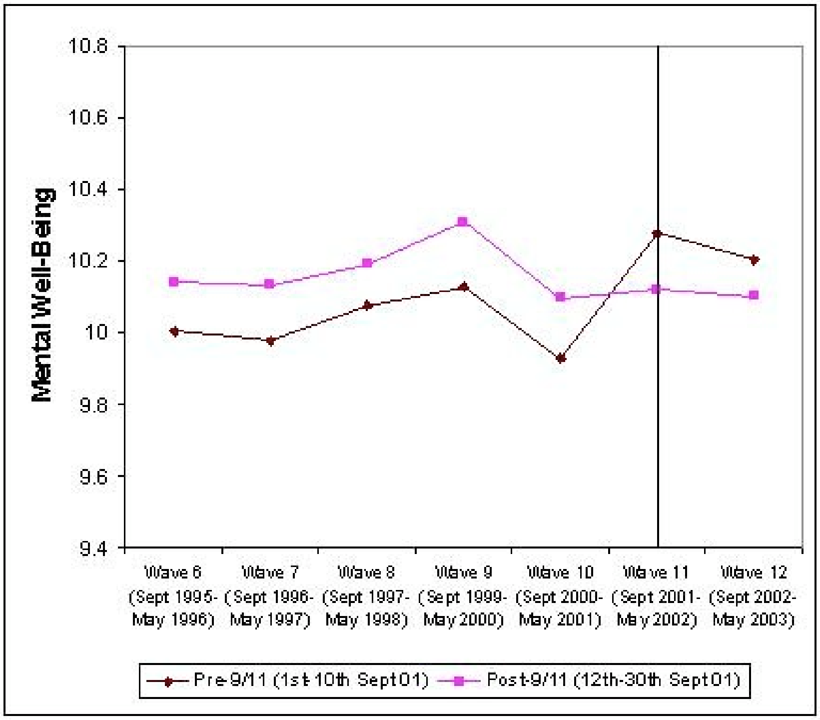
Figure 1: Trends in subjective well-being before and after 9/11/2001



Note: This is a balanced panel, with 691 individuals completed the survey between 1st of September 2001 and 10th of September 2001, and 2,320 individuals completed the survey between September 12th 2001 and September 30th 2001. The same individuals are then tracked over the 7-year period from 1996 to 2003. The vertical line represents the year of the September 11 attacks.

Table 1: Well-being and the September 11 attacks: OLS regressions

Subjective well-being	**(1)**	**(2)**
Post-9/11 (12th Sept-30th Sept 2001)	0.239	
	[0.112]*	
Post-9/11 (12th Sept-20th Sept 2001)		0.239
		[0.121]*
Post-9/11 (21st Sept-30th Sept 2001)		0.219
		[0.127]
T = 2001	0.308	0.311
	[0.095]**	[0.095]**
T = 2001 x Post-9/11 (12th Sept-30th Sept 2001)	-0.342	
	[0.107]**	
T = 2001 x Post-9/11 (12th Sept-20th Sept 2001)		-0.268
		[0.115]*
T = 2001 x Post-9/11 (21st Sept-30th Sept 2001)		-0.425
		[0.123]**
Regional dummies (20)	Yes	Yes
Month interviewed dummies (9)	Yes	Yes
Background variables (20)	Yes	Yes
Observations	9521	9240
Overall R-squared	0.0635	0.0644

Note: Standard errors are in parentheses. **<1%; *<5% significance levels. Background variables include $age^2/100$, log of household income, employment status (9), education (6), and marital status (5). All unique individuals interviewed after September in 2001 are dropped from the analysis. All of our regressions are available upon request.

Table 2: Well-being and the September 11 attacks: FE and AR(1) errors RE regressions

Dependent variable: Subjective well-being	**Fixed effects**	**AR(1) errors RE**
Post-9/11 (12th Sept-30th Sept 2001)		0.213
		[0.126]
T = 1996	-0.134	0.136
	[0.159]	[0.124]
T = 1997	-0.104	0.099
	[0.144]	[0.124]
T = 1998	0.032	0.167
	[0.132]	[0.123]
T = 1999	0.158	0.229
	[0.125]	[0.116]*
T = 2001	0.383	0.315
	[0.125]**	[0.116]**
T = 2002	0.365	0.226
	[0.134]**	[0.124]
T = 1996 x Post-9/11 (12th Sept-30th Sept 2001)	0.003	-0.038
	[0.138]	[0.140]
T = 1997 x Post-9/11 (12th Sept-30th Sept 2001)	-0.015	-0.044
	[0.137]	[0.140]
T = 1998 x Post-9/11 (12th Sept-30th Sept 2001)	-0.041	-0.056
	[0.137]	[0.139]
T = 1999 x Post-9/11 (12th Sept-30th Sept 2001)	0.032	0.022
	[0.137]	[0.131]
T = 2001 x Post-9/11 (12th Sept-30th Sept 2001)	**-0.345**	**-0.331**
	[0.138]*	**[0.132]***
T = 2002 x Post-9/11 (12th Sept-30th Sept 2001)	-0.244	-0.222
	[0.138]	[0.140]
Regional dummies (20)	Yes	Yes
Month interviewed dummies (9)	Yes	Yes
Background variables (20)	Yes	Yes
Observations	22,168	
Number of individuals	3,209	
Overall R-squared	0.02	

Note: Standard errors are in parentheses. **<1%; *<5% significance levels. Background variables include $age^2/100$, log of household income, employment status (9), education (6), and marital status (5). All unique individuals interviewed after September in 2001 are dropped from the analysis.

Table 3: The valuation of the 9/11 attacks on UK SWB

	Lower bound estimate	Upper bound estimate
Cost of illness		
(i) GHQ threshold of 2 – 100% CBT effectiveness	£171 million	£233 million
(ii) GHQ threshold of 2 – 60% CBT effectiveness	£239 million	£326 million
(iii) GHQ threshold of 3 – 100% CBT effectiveness	£211 million	£273 million
(iv) GHQ threshold of 3 – 60% CBT effectiveness	£295 million	£382 million