

ESTIMATING THE ECONOMIC AND SOCIAL COSTS OF THE FEAR OF CRIME

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A recent article in this journal, Dolan et al. (2005) provided a methodology for estimating the intangible costs (or losses in quality of life) from violent crime. Here, we develop that methodology to provide estimates of the intangible costs arising from the anticipation of possible victimisation; that is, estimates of the costs of fear of crime. These costs are categorised according to whether they result in non-health losses or health losses. Non-health losses are associated with a) changes in behaviour and/or b) changes in how society is viewed. Possible methods for measuring and valuing these non-health losses are discussed. However, the paper focuses on measuring and providing a provisional monetary valuation for the health losses arising from anticipating crime.

Introduction

In an earlier paper in this *Journal*, we provided estimates of the economic and social costs associated with victimization in relation to violent crime (Dolan *et al.* 2005). Those estimates, as well as costs reported elsewhere (e.g. Brand and Price 2000), do not include the costs incurred by individuals due to the fear of crime, and so they understate the true costs of crime. The inclusion of the costs of the fear of crime would give a more accurate picture of the true costs of crime and would also facilitate cost–benefit analyses of interventions aimed at reducing crime and/or the fear of crime. This paper builds on our earlier work and investigates a methodology for costing the fear of crime. In so doing, it considers which elements of the total costs of crime on society should be attributed to the ‘fear of crime’, and how those costs should be measured and valued.

Table 1 shows a conceptual framework of all the costs incurred from crime.¹ It highlights those tangible costs (i.e. losses which are relatively easy to quantify in money terms, such as the additional resources required to deal with crime) that are currently included in Brand and Price (2000), and intangible costs (i.e. the more difficult to quantify losses arising from the emotional and physical effects of crime) that were estimated in Dolan *et al.* (2005). There are clear gaps in accounting for the effect of realized crime but the focus here is on costs that arise because people anticipate that they may become future victims of crime.

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¹ This is an individual aggregation framework, which is typical in economics. However, it could be argued that the total impact of crime is greater than the sum of individual losses if the presence of crime damages society directly rather than through individuals. Damage to society is, however, very difficult to conceptualize, measure and, consequently, to cost. But even within an individual aggregation framework, actions at an individual level may impose externalities on others. For example, avoiding a certain area at night has costs for both the individual and others in the community for whom that area becomes quieter and less useable (Dolan and Lees 2005: 9). Although individual actions are acknowledged to have the potential to impose costs on others, the focus here remains on aggregating individual costs arising through crime.

TABLE 1 *Costs of crime categories*

	Realized costs of crime to the victim	Anticipated costs of crime ('fear') to ex-victims and wider public
<i>Tangible cost</i>		
Direct cost for treatment of health losses	Brand and Price (2000)	
Indirect cost due to productivity losses	Brand and Price (2000)	Discussed
Direct costs to the criminal justice system	Brand and Price (2000)	
Direct cost of security measures		Brand and Price (2000)
Direct cost of insurance administration		Brand and Price (2000)
Direct cost from changes in behaviour		Discussed
<i>Intangible cost</i>		
Non-health loss: changes in behaviour		Discussed
Non-health loss: changed view of society		Discussed
Health-related loss: physical	Dolan <i>et al.</i> (2005)	Discussed
Health-related loss: psychological		Discussed and estimated

Brand and Price (2000) estimated some of the direct tangible costs associated with the anticipation of crime. These include direct security measures and the costs of insurance administration. They do not, however, estimate direct tangible costs that result from changes in behaviour (e.g. where people use their own cars or take taxis rather than walk or use public transport because of their fear of crime). Furthermore, no figure is attributed to the intangible costs associated with the 'fear of crime'. It is the estimation of a monetary sum for these quality-of-life losses that is the principal focus of this paper.

Defining the Fear of Crime

The existing literature on the fear of crime is clear about one thing: 'fear of crime' is not a clearly defined concept (Gabriel and Greve 2003). As noted by Hale (1996: 84) in his extensive review of the literature, 'there is considerable theoretical confusion concerning the meaning and measurement of fear of crime'. As with much of survey research, the reported prevalence of the fear of crime is 'partly dependent upon the nature of the measurement instrument rather than a true reflection of "social reality"' (Farrall *et al.* 1997).

A general concern with fear of crime surveys is that they pick up a whole host of things, including emotions that are quite distinct from risk and fear, such as anger (Ditton *et al.* 1999*a*; 1999*b*), and fear and anxieties caused by non-crime activities which people are unhappy about in their environment (Bannister and Fyfe 2001). Christmann *et al.* (2003: 2) describe the fear of crime as a "dump concept", where the probability of victimisation is elided with nebulous anxieties or "urban unease". Jackson (2004: 951) has similarly argued that fear of crime data 'may reflect expression of values, attitudes and concerns regarding cohesion and order, local identity and change and justice and morality'. Thus, 'fear of crime' incorporates 'expressions' about attitudes towards both crime and society, in addition to actual 'experiences' of vulnerability and fear.

From the perspective of costing the burden of crime, there are also many costs arising because people anticipate that they are at risk of becoming a victim of crime and so they take preventative action. Whilst these can be thought of as a reflection of the expected loss in well-being if victimization were to occur, they are not included in

realized costs of victimization, which focuses only upon losses to actual victims rather than potential victims. The phrase ‘fear of crime’ is therefore inadequate to capture all these preventative costs; hence, for the purposes of costing the burden of crime, we conceptualize ‘fear of crime’ as all the *tangible and intangible costs in anticipation of possible victimization*.

We categorize these costs as non-health losses and health losses. The non-health losses are associated with (a) changes in behaviour and/or (b) changed view of society. Impacts on quality of life that manifest themselves in ways other than health loss may affect a large number of people. For example, a survey of public attitudes to quality of life in the United Kingdom in 2001 found that crime was mentioned by 24 per cent of respondents as an important factor affecting quality of life, which made crime the third largest factor after money and health (DEFRA 2001).²

Since there currently exists little information that allows the value of quality-of-life changes from anticipated crime to be estimated, our primary focus is on losses from the fear of crime that result in reduced physical or psychological health. We begin, though, by setting out the methods that can be used to estimate the different kinds of costs.

Development of a Methodology for Quantifying Costs

Tangible costs

The direct costs of security measures, insurance administration expenditure and costs incurred from crime-averting behaviour can be interpreted as revealing people’s preferences to reduce the risks of victimization and the worry about victimization. As noted above, Brand and Price’s cost-of-crime estimates included direct security expenditures and insurance administration but tangible costs incurred by individuals from changes in behaviour (such as additional transport costs like taking taxis rather than public transport) were not included.

Estimates for these costs could be found from a large-scale representative survey asking people to recall transport expenditures that were motivated out of a desire to reduce the risks of, or worries about, victimization. More expensive forms of transport clearly bring other benefits, such as quicker and more comfortable journeys, and these benefits would need to be controlled for. The estimates for additional taxi fares could be compared to taxi revenues which appear to be caused by crime fears, e.g. single occupancy journeys at night time, either for walking distance or where buses are available. In addition to any such estimates, some firms/organizations may provide their employees with transport to/from early/late shifts as a precaution against them being victimized en route to work.

A further tangible cost attributable to anticipating crime is any loss in productivity caused by the time and energy spent on actions and emotions linked to anticipating possible victimization. This may include leaving work early to avoid walking home alone, or time spent dealing with a burglar alarm that has been accidentally set off.

² Since 1998, the British Crime Survey (BCS) has asked respondents how much their own quality of life is affected by the fear of crime on a scale from 1 (no effect) to 10 (total effect). About half of the respondents give a score of 5 or more (Fletcher and Allen 2003). Although this is further evidence that people perceive that anticipated crime does reduce their well-being, this reduction in quality of life is not compared to anything else, and so it is not possible to measure the loss of quality of life from responses to this question.

No data currently exist which record this potential loss in productivity and the study required to generate such data could well be complicated and expensive.

Intangible non-health losses in quality of life

The intangible costs of the fear of crime could be inferred from people's behaviour, using revealed preference studies. For example, 'hedonic pricing' studies of house prices in different areas try to estimate how much of the variation in house prices is due to crime by controlling for as many of the other factors that affect house prices as possible (e.g. Lynch and Rasmussen 2001). However, such studies suffer from difficulties in separating out other undesirable characteristics of areas with higher levels of crime and/or fear of crime, such as poorer-quality schools. Furthermore, studies will also suffer from difficulties in disentangling the preference for reduced fear and those for reduced actual risk of victimization. Gibbons (2004) hedonic pricing model of inner London finds lower property prices in areas with criminal damage than in high-burglary areas. These results may suggest that people give additional value to living in an area where they think they will worry less about crime regardless of their actual perceived risk of crime, or that they value social order and cohesion above and beyond the relationships it has to actual crime. Alternatively, people may use the incorrect assumption that signs of physical disorder are a good actual predictor of property crime rates.

Other behavioural changes that involve additional time costs, such as locking windows or fitting steering locks, could be valued using wage rates, or using the time-saving rates used in current transport cost-benefit analysis. Based on survey observations in the United States, on average, an adult spends two minutes locking and unlocking doors each day and just over two minutes a day looking for keys, which is valued at \$437 per year (Anderson 1999). Another study reported in Anderson (1999) found an average willingness to pay to avoid locking or unlocking assets of \$804 (from a sample of 140 respondents). The extra time taken walking home to avoid potentially dangerous shortcuts could, in principle, be valued in a similar way.

Stated preference or willingness-to-pay (WTP) studies could also be used to elicit valuations for reductions in quality of life due to anticipating possible crime. One such study in the United States found an implied WTP per avoided crime well in excess of previous estimates based on victim costs and criminal justice-related costs (Cohen *et al.* 2004). The authors suggest the difference may be in part due to this study incorporating costs that have been overlooked in previous studies, including general concerns that people have about community safety and their anxieties over anticipated crime. WTP figures in this study were insensitive to the absolute risk of victimization of the specific crimes, with mean WTP for a 10 per cent reduction in burglary, rape/sexual assault and murder being fairly similar (\$104, \$127 and \$146, respectively) yet the implied WTP for avoiding each of these being substantially different (\$25,000, \$237,000 and \$9,700,000, respectively) due to the differences in absolute risk of each crime type occurring. The authors argue that this insensitivity to the absolute risk of victimization of the specific crimes arises because people are responding to their understanding of these crimes, and it is that which generates reduced well-being. However, the dominance of probabilities on the final WTP figures (Hammitt and Graham 1999), which is a common problem in such studies, may be thought to raise serious doubts about the reliability of the results.

Intangible health losses in quality of life

Given the problems with revealed and stated preference studies, it may be more useful to estimate the health losses associated with the fear of crime using the quality-adjusted life year (QALY) approach that was used to value the costs of crime in Dolan *et al.* (2005). When people feel that they may be about to become a victim of crime, they will experience anxiety and stress. The frequency with which people are in this state and the intensity of the anxiety is one measure of the health loss from anticipated crime.

To the extent that fears arise from an accurate reflection of risk, or an overstatement of risk, which is a genuine concern about crime, it is appropriate to attribute this well-being loss to the anticipation of future crime. However, if non-crime-related fears are being expressed as crime-related fears, while this still represents a reduction in well-being and health, it would overstate the health loss attributable to fear of crime. There is some evidence from survey data in Chile that non-crime fears can be expressed as crime fears, as the fear of crime was best predicted by social, political and economic insecurities, with crime being perceived as a 'scapegoat for all types of insecurities' (Dammert and Malone 2003: 80).

Having said this, it may still be possible to get survey respondents to recall occasions on which they have been fearful of crime and describe the health state that this feeling induced and how long respondents spent in that health state. The health loss attributable to each fearful episode could then be estimated using QALYs. The approach assumes that any profile of health can be represented in terms of years of life weighted by some index of health-related quality of life. Full health and dead are given values of 1 and 0, respectively, and intermediate health states are assigned scores between 0 and 1 (Dolan 2000). Thus, a year in which four weeks were assigned a health state value of 0.7 would be given a QALY score of $4/52 \times 0.7 + 48/52 \times 1 = 0.977$ QALYs. Hence, the four weeks of less than full health would result in a loss of 0.023 QALYs.

Estimating Intangible Health Losses

Even in the absence of personal victimization, there are many ways by which living in a world with crime can impact upon health. Fear of crime can impact directly on people's psychological health through experiences of worry and anxiety, and it may also impact indirectly on physical and mental health. Many pathways from fear of crime to health have been discussed in the literature. These include fear leading to increases in health-reducing behaviours (McCabe and Raine 1997; Dowdell and Santucci 2003), impairments to health from repeated exposure to threatening conditions (Ross and Mirowsky 2001; Elstad 1998), reductions in physical activity due to not feeling safe outside (Kilgour 2003; Ravenscroft *et al.* 2003; Seefeldt *et al.* 2002) and a reluctance to leave the house, leading to reduced social activity and social capital (McCabe and Raine 1997; Patsois 1999) which has been linked to reduced health (Kawachi *et al.* 1997; 1999; Kennelly *et al.* 2003; Wen *et al.* 2003; Lindström *et al.* 2001; Lindström 2004; Lochner *et al.* 2003).

The relationship between anticipating crime and health is complex, not least because the direction of causality is not clear. Those suffering from poor mental health may be more fearful of crime because they are more fearful generally. And those with poor physical health, particularly limited mobility, hearing and eyesight problems, may

feel more unsafe and vulnerable both in the home and outside it, especially at night. Consequently, it is necessary to interpret evidence of an association between fear of crime and health with caution. As a result, the intangible health losses we focus on here are those associated with the direct link between anticipated crime and health, which arises when people actually experience moments of worry and anxiety.

The British Crime Survey (BCS; Home Office, Research and Statistics Directorate and BMRB International 2004) asks about people's crime-related fears and worries. However, the questions are not a particularly robust basis for estimating QALYs. In particular, the questions may conflate respondents' assessments of: (1) probability or risk of becoming a victim of a particular crime (over a time period which is not specified); (2) seriousness of victimization of a particular crime; (3) vulnerability to a particular crime; (4) how anticipation of a crime impacts upon their behaviour; (5) how often (and for how long, and with what intensity) they are worried about the possibility of victimization (again, over a non-specified time period). Therefore, the worry questions, while being very useful to track changes in worry from one year to the next, cannot be used on their own to give a direct measure of health loss. Moreover, and most importantly for quantifying losses in relation to the fear of crime, knowing that someone worries about a particular crime does not give much indication of how this crime impacts on their overall quality of life.

Fortunately, data do exist that provide a more useful basis for calculating QALYs. Data collected by Farrall and Gadd (2004) tap into the immediate fearful response that people have to anticipating possible crime. Data were collected in 2002 on 977 respondents in one Omnibus survey from a range of sampling points across the United Kingdom. The survey asked 'In the past year have you ever felt fearful about becoming a victim of crime?'. Those who respond positively were asked 'How frequently have you felt like this in the past year?', and also asked 'On the last occasion, how fearful did you feel?' (with response categories of 'not very fearful', 'a little bit', 'quite fearful' and 'very fearful'). If assumptions are made about the health state experienced at different fear levels, and about how long each state lasts for, a health loss in this sample due to fearful episodes could be estimated.

To enable the loss of health from these incidents to be measured and valued, assumptions are required about the health-related quality of life and duration of each fearful incident. The level of fear can be matched to a score on the EQ5D (Brooks *et al.* 1996), which reports health according to five dimensions—mobility, self-care, usual activities, pain/discomfort and anxiety/depression—with three levels for each (1 for no problems, 2 for some problems and 3 for extreme problems). There now exists a 'tariff' of general population valuations for all the 243 health states defined by the EQ5D (Dolan 1997) and, so, by matching the Farrall and Gadd data into the EQ5D, we are able to calculate the QALY losses associated with the fear of crime.

Since we are concerned with the change in health, we can arbitrarily assume that people are at full health in the absence of these incidents in question. Where respondents report being 'not very fearful', it is assumed that this would not involve sufficient health loss to move respondents from level 1 to level 2 on the anxiety/depression dimension of the EQ5D. Where respondents report being 'a little bit fearful', this is assumed to be an episode in which people are moderately anxious for one hour. Where they report 'quite fearful', this is assumed to be an episode in which people are moderately anxious for two hours. And where they report 'very fearful', it is assumed to

TABLE 2 Assumptions for QALY health loss from Farrall and Gadd data

'On the last occasion how fearful did you feel?'	Assumed health state	Assumed average length of time in that health state	Health loss from each fearful occasion, in QALYs
Not very fearful	Full health		0
A little bit fearful	EQ5D state 11112	1 hour	0.0000174
Quite fearful	EQ5D state 11112	2 hours	0.0000437
Very fearful	EQ5D state 11113	2 hours and 1 hour	0.0001511
Can't remember	Full health		0

TABLE 3 Distribution of health loss in the Farrall and Gadd data

Weighted health loss	Frequency	Percentage	Cumulative percentage
0	626	64.74	64.74
> 0 to ≤ 0.000025	63	6.51	71.25
> 0.000025 to ≤ 0.00005	70	7.24	78.49
> 0.00005 to ≤ 0.0001	54	5.58	84.07
> 0.0001 to ≤ 0.0005	82	8.48	92.55
> 0.0005 to ≤ 0.001	22	2.28	94.83
> 0.001 to ≤ 0.005	21	2.17	97.00
> 0.005 to ≤ 0.01	12	1.24	98.24
> 0.01	17	1.76	100.00
Total	967	100	

be an occasion that involved two hours of being extremely anxious, followed by one hour of being moderately anxious. These assumptions are set out in Table 2.

Applying these assumptions to the data gives the distribution of losses shown in Table 3, and an average health loss in the previous year due to the fear of crime of 0.00065 QALYs (s.d. 0.0042). One of the striking features of Table 3 is the skewed nature of the data. Nearly two-thirds of the sample experience no health loss at all, primarily because they record no fearful episodes (62 per cent) or, in a small number of cases, because they are 'not very fearful' (2.7 per cent), which is assumed to result in no psychological health loss. A minority of the sample experience considerably more health loss than the average, the 5 per cent most fearful having an average QALY loss of 0.01262, and the most fearful 1 per cent having an average QALY loss of 0.03675.

To convert the QALY loss into a monetary amount requires an exchange rate between QALYs and money. As no definitive exchange rate is available, we shall use a similar methodology to that used by Dolan *et al.* (2005) in which values were estimated from two different approaches. The first approach uses the implicit value of a QALY from recommendations made by the National Institute for Clinical Excellence (NICE). Although never explicitly stated, decisions are broadly consistent with a value of an additional QALY of between £20,000 and £30,000 (Raftery 2001; NICE 2003). As noted in Dolan *et al.* (2005), this figure is not based on public preferences but the yardstick does offer the potential for consistency across public sector decision making.

The second approach takes a public WTP to avoid a particular road accident injury (one which was labelled Injury W), estimates the QALY loss from this type of injury and then infers the WTP for one full QALY. Using data from Carthy *et al.* (1999), a QALY is estimated as being valued at £81,000 (see Dolan *et al.* (2005) for more detail on this

TABLE 4 *Health loss from anticipated victimization in monetary terms*

	NICE threshold QALY valued at £30,000	Injury W method QALY valued at £81,000
Average annual per capita monetary loss	£19.50	£52.65
Total annual monetary loss for England and Wales	£776.5 million	£2,097.6 million

methodology). This method has the advantage of being based on direct elicitation of money values for a relatively modest loss of health from a representative sample of the population.

As can be seen in Table 4, if the NICE value of a QALY is used, the monetary loss attributed to this immediate health loss from the fear of crime is £19.50 per person, per year. This increases to £52.65 per person per year if the WTP injury W value is used. Aggregating across the population for England and Wales, the NICE threshold value would imply a cost of £776.5 million and the WTP Injury W-based value for this figure would be £2,097.6 million. Of course, if the fear of crime is a pervasive emotional response to a chronic state, then focusing on specific occurrences of immediate feelings of fear will mean that these figures understate the direct health impact of fear of crime.

Discussion

In this paper, we conceptualize losses from the fear of crime as all costs in anticipation of possible victimization. These costs are not likely to be stable, and may fluctuate with factors other than the risk of victimization, such as political manoeuvring, attention paid to crime in the media, actions of the police (such as a change in the visibility of their presence) and actions of neighbours (such as adding security bars to windows). They may also vary according to an individual's physical and psychological health.

Tangible costs incurred from anticipating possible crime should include costs incurred from changes in behaviour to reduce risk of victimization, such as additional transport expenditures. Currently, there are no data available to enable an estimation of the intangible costs from changes in behaviour from anticipating future crime. Attempts to estimate the intangible costs incurred by a worsened view of society following anticipating crime are fraught with practical and theoretical limitations and, again, no suitable data exist. Where people experience a loss in freedom, they may not find it easy/possible to place a value on that loss of freedom, perhaps because they have fully adapted to that loss of freedom, or have never known anything other than a restriction in freedom. However, it is still possible to argue that their well-being is reduced (see the work of Sen (1987), for example). So, whilst it is not possible to value that loss of freedom from aggregating individual valuations, we may not wish to disregard this reduction in well-being.

Valuing health loss from episodes of fearfulness reported by a representative sample (the 'Farrall' data) gives a mean health annual loss of 0.00065 QALYs. If valued at £30,000 per QALY, this would represent an intangible cost of £19.50 per capita per year. Valued at £81,000 per QALY, this would represent an intangible cost of £52.65 per capita per year. For England and Wales, this represents a total cost of £776.5 million

using £30,000 per QALY, and £2,097.6 million using £81,000 per QALY. The total intangible victim costs of violent crime reported in Dolan *et al.* (2005) were £11,280 million using the higher QALY value. Therefore, the estimates for the costs of the fear of crime are about one-fifth of this amount, which has some face validity.

The accuracy of the values reported here is dependent on how realistic are the assumptions made about the health state experienced when people incur a fearful or very fearful incident, the assumptions on the length of time of this incident and the validity of the initial questions. Since the multiplication of health state experienced, the duration of time in the health state and the valuation given to that health state all contain considerable uncertainty, it is important to acknowledge that the final costs given are provisional estimates only.

Assumptions relating to health state and duration could, and ideally would, be further tested. Farrall (2004) suggests these questions may pick up fear 'spikes' or 'sharp increases in fear levels which stand out from the norm' (Farrall 2004: 178), implying that these incidents may be very short-term in duration. This may mean that durations used here are an overestimate of the health losses from the fear of crime.

These costs are arguably a small subset of the total costs of fear of crime, since they do not include the non-health costs of changes in behaviour and changes in views about society. They also do not include the health costs from health-reducing behaviour, indirect and longer-term psychosomatic reactions, reduced physical activity and reduced social capital. On the other hand, valuing the health loss from fear of crime may risk being an overestimate if fear of crime is interpreted as a displacement of other fears. If the fear of crime was serving 'unconsciously as a relatively reassuring site for displaced anxieties, which would otherwise be too threatening to cope with' (Hollway and Jefferson 1997), reductions in the fear of crime may not, in fact, be welfare enhancing. We can only suggest here that future research should take due account of this possibility.

The current chronic lack of data in relation to the tangible and intangible costs in anticipation of possible victimization provides enormous scope for future research. We recommend that generic health index measures, like the SF36 or EQ5D, be used in the BCS. Both these health index measures can be converted into QALY values. If the BCS adopts a panel structure, this would enable a greater exploration of the links between changes in fear and worry and subsequent changes in health state. A survey could also be conducted that includes all the BCS safety and worry questions and generic health index measures. The Farrall study could be repeated (perhaps on a smaller scale) to gain an understanding of what these fearful experiences were and how long the fearful state lasted. More useful still would be a longitudinal study that looks at, amongst other things, the fear of crime and health status, so as to begin to address the issue of causality.

Having said all of this, we hope to have provided some stimulation and a starting point for future research into the economic and social costs associated with the fear of crime. Only with better data about the losses from anticipation of victimization will better decisions about the allocation of scarce resources be possible.

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