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DETERMINANTS OF STUDENTS' WILLINGNESS TO PAY FOR VIOLENT CRIME REDUCTION

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We apply the contingent valuation method to estimate how much a specific group of society, which is relatively prone to falling victim to crime, is willing to pay to reduce the likelihood of being the victim of violent crime. Based on responses from 1122 students, we found that younger and female students revealed that they are more inclined to pay so as to avoid violent crime. Students' field of study, cautious behavior and a strong opinion about policies and payment vehicles with potential to reduce the risk of crime are key determinants of the willingness to pay.

Keywords: Contingent valuation method; willingness to pay; intangible costs; crime costs; higher education.

1. Introduction

Cost-benefit analysis is considered an important tool in analyzing the costs and benefits of criminal justice policies (Jacob, 2011). In a society with limited resources, restricting their allocation to different alternatives, estimating the costs of crime can help policymakers make more informed decisions (Streff *et al.*, 1992; McFadden and Porter, 2011). According to Cohen (2000), costs can be classified generally as tangible or intangible costs. Tangible costs are associated with monetary payments such as medical costs, justice system costs, losses in property value and working days (Cohen, 2000). Intangible costs are not valued in the market (Cohen, 2000) and include the costs of pain, suffering, the loss of quality of life inflicted on crime victims (Atkinson *et al.*, 2005) and the costs of fear of crime (Moore, 2006; Moore and Shepherd, 2006; Dolan and Peasgood, 2007). It is more complicated to measure the intangible costs of crime (Dolan *et al.*, 2005) but the costs of the emotional

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and physical impact of crime may be greater than the financial costs, particularly in the case of violent and sexual offenses (Brand and Price, 2000). In the case of drug abuse programs, Rajkumar and French (1997) argue that including the victims' intangible losses in crime costs may raise considerably the benefits of avoiding criminal activity.

The available literature distinguishes several methodologies to estimate the intangible costs of crime (Cohen, 2000; Rajkumar and French, 1997). One of these methods is the Contingent Valuation (CV) method (Atkinson *et al.*, 2005; Salem and Mercer, 2012), based on surveys which ask respondents how much they would be willing to pay for a small reduction in a particular risk or how much they would be willing to accept as a compensation for a small increase in a particular type of risk (Carthy *et al.*, 1999). The surveys present a hypothetical situation with which respondents are confronted, and scenarios can be tailored to the needs of the researcher. The CV approach elicits willingness to pay (WTP) — a measure provided by the welfare theory (Mitchell and Carson, 1988) — and when applied to criminality, the researcher can determine the value individuals place on reductions in crime (Atkinson *et al.*, 2005).

Although the CV approach has been widely used in other contexts, particularly in health and environmental related issues (e.g., Özdemir and Johnson, 2013), it has not been generally applied to criminal research (Cohen *et al.*, 2004; Atkinson *et al.*, 2005). Ludwig and Cook's (2001) study is among the few on this matter, and was the first one on eliciting WTP in a crime context. Later, Cohen *et al.* (2004) used the CV method to estimate people's WTP for crime control programs, and Atkinson *et al.* (2005) applied this stated preference approach to value the costs of violent crime.[1] These studies used random samples (Ludwig and Cook, 2001; Cohen *et al.*, 2004) or sampling points (Atkinson *et al.*, 2005) drawn from the entire population of selected regions in the US and the UK.

The research undertaken in this paper is, to the best of our knowledge, the first attempt to apply the CV method to estimate how much a specific group of society, university students, is willing to pay to reduce the likelihood of being victims of a violent crime. University students are a relevant population sample as it is possible to assume that a higher level of education enables them to make more informed decisions when estimating the trade-off between costs and safety. Youths, in particular students, are also considered at higher risk of falling victim to (violent) crime (Walker *et al.*, 2009; Piquero *et al.*, 2011; Schreck *et al.*, 2012).

In contrast to the existing literature, our study focuses on a rather unexplored context, Portugal, where criminality and violent crime rates are relatively low by international standards, although they have been on the rise (Tavares *et al.*, 2012). The available literature focuses on the US (Ludwig and Cook, 2001; Cohen *et al.*, 2004) or the UK (Atkinson *et al.*, 2005), where the violent crime rate is substantially higher than in Portugal.[2] The FBI

[1] Violent crime figures include, in general, three main categories (Tavares *et al.*, 2012): violence against the person (such as physical assault), robbery (stealing by force or threat of force) and sexual offences (including rape and sexual assault).

[2] According to a study by a European Consortium funded by the 6th Framework Programme (Van Dijk *et al.*, 2007, p. 2), the "[r]isks of being assaulted were found to be highest in the UK, Ireland, The Netherlands, Belgium, Sweden and Denmark. Risks were lowest in Italy, Portugal, Hungary, Spain and France. Experiences with sexual violence were reported most often by women in Ireland, Sweden, Germany and Austria and least often in Hungary, Spain, France and Portugal".

Uniform Crime Report (UCR) reported that there were 466.9 and 473.5 violent crimes in the US per 100,000 habitants in 2007 and in 2006, respectively.[3] Our calculations, based on absolute values of violent crime (including homicide) and population reported in EUROSTAT, show that the UK has a higher rate of violent crime than the US, whereas Portugal has one of the lowest rates in Europe. The weight of violent crime in total crime recorded is also lower in Portugal. According to the Portuguese Internal Security System's report (Ministério da Administração Interna, 2012), the weight of violent crime in total crime in Portugal, in 2010, was 5.6%, representing an increase of 10.8% compared to 2007.[4] Despite the rise, this figure is significantly lower than the one for the UK, which is over 20%.

Our respondent sample includes 1122 students from the largest Portuguese University (University of Porto), covering individuals from a broad range of (32) academic degrees and (14) faculties/schools, which allowed us to evaluate the extent to which students enrolled in different subjects (e.g., economics versus engineering versus arts or medicine), a proxy for an individuals' distinct lifestyles and personality traits (Roeser, 2006; Korpershoek *et al*., 2013), reveal differing levels of WTP for a reduction in violent crime. We devised an econometric model aimed at empirically assessing which are the most important determinants of students' WTP for violent crime reduction.

This study is structured as follows. Section 2 presents a review of the available literature on the methods of valuation of the costs of crime that include the valuation of intangible costs, as well as the main potential determinants of the WTP for violent crime reduction. The following section focuses on the methodology used to design the questionnaire. Section 4 elaborates on the model specification and variables that are used for the estimation and provides an outline of the main results of the survey. Finally, in conclusions, the key findings of this study are summarized and discussed.

2. Valuation of Intangible Costs of Crime and Determinants of the WTP: A Literature Review

2.1. *On the valuation of intangible costs of crime — the WTP*

In spite of the need to monetize the costs of crime, this is not a consensual approach (Czabanski, 2008). Indeed, it is often defended that life is priceless (Jongejan *et al.*, 2005; Viscusi, 2008) and putting a value on people's suffering is taken as "cold" and "impersonal" (Miller *et al.*, 1996, p. 1). Measuring correctly the emotional and psychological impacts of violent crime is also considered "impossible" and "artificial" (Brand and Price, 2000).

However, it should be noted that the results presented in the literature do not intend to value the pain and suffering of a particular individual, in the sense that putting a value on the suffering of a crime victim would be considered by most inadmissible. Rather, the studies are an attempt to measure *ex ante* the value society places on preventing that suffering (Brand and Price, 2000). It is also worth mentioning that what is being analyzed

[3] Available at http://www.fbi.gov/ucr/cius2006/offenses/violent_crime/index.html. Accessed on 19-08-2009. The FBI considers that violent crime includes four offenses: murder and non-negligent manslaughter, forcible rape, robbery and aggravated assault.

[4] Violent crime includes murder, rape, robbery and aggravated assault.

is not the value of a single crime but the value of crime reduction (Czabanski, 2008). It is the monetary valuation of crime costs that allows policy appraisal and evaluation (Brand and Price, 2000).

In order to make choices, it is necessary to use a common metrics approach to compare costs and benefits. However, certain goods and services are not marketable (e.g., pain and suffering or biodiversity in the environmental context) making economic valuation techniques necessary so as to assign them monetary values (Bateman *et al.*, 2002). Generally, two approaches are used to monetize these goods: the revealed preference approach and the stated preference approach. In the revealed preference approach, economic agents' preferences are inferred by economists by observing their behavior when making decisions where risk is an important factor: when individuals accept riskier jobs in exchange for higher wages (Viscusi, 1993) or decide the location of the house where they are going to live (Viscusi, 2000). The hedonic price methodology (Thaler, 1978; Cohen, 2000; Tita *et al.*, 2006) and averting behavior analysis are examples of techniques used as a revealed preference approach.

In the stated preference approach, individuals are directly faced with a hypothetical situation and asked directly to indicate their preferences. A methodology used in stated preference approach is the CV method. The CV method was first applied by Davis (1963) in the context of environmental policy (Marta-Pedroso *et al.*, 2007). It is used to study trade-offs between money and small reductions in risk using surveys to elicit how much individuals would be willing to pay for an improved state of a provision of a public good or how much they would be willing to accept to be compensated for its reduction (Pearce and Turner, 1990; Bernstein, 2013).[5] For instance, Alberni and Chiabi (2007) surveyed the WTP to reduce the risk of dying of cardiovascular and respiratory causes, whereas Persson *et al.* (2001) surveyed WTP to reduce the risk of dying in a road accident.

The CV method has substantial advantages compared to the techniques of the revealed preference approach (Mitchell and Carson, 1988). One important advantage is the fact that it allows for the direct elicitation of the welfare measure of WTP. Another noticeable advantage refers to the use of hypothetical scenarios that allow researchers to analyze respondents' WTP for goods that may not have been provided yet. These tailored scenarios also enable the study of the transaction of the good in specific contingencies defined by the researcher (Mitchell and Carson, 1988). Respondents may thereafter be informed of the baseline risks and the risk reductions they are requested to value (Alberini and Chiabi, 2007), as well as the payment method or any other information the researcher finds valuable to construct the scenario.

In 1993, a panel of distinguished social scientists chaired by two Nobel Laureates (Kenneth Arrow and Robert Solow) was appointed by the National Oceanic and Atmospheric Administration (NOAA) to assess if the CV method could provide reliable information. This panel concluded that this technique could produce useful information and

[5] The WTA approach has not been commonly used in criminal literature except for the case of jury awards, which incorporates this concept as people are compensated in an *ex post* situation. For policy analysis it is considered more appropriate to elicit respondents about crime reductions and not infer the amount people would ask for a crime rate increase (Cohen, 2007).

suggested a number of guidelines to ensure the reliability of CV surveys (Carson, 2000; Arrow *et al.*, 1993; Marta-Pedroso *et al.*, 2007). CV has since then been used as a popular method to evaluate welfare changes in public policies or programs (Atkinson *et al.*, 2005; Özdemir and Johnson, 2013).

The CV method is not without limitations.[6] One of the criticisms associated with this method is that, because the scenario is hypothetical, individuals do not take into consideration their budget constraints resulting in overestimates of the true WTP (Arrow *et al.*, 1993; Whittington and Pagiola, 2012). Some studies have attempted to overcome this disadvantage by reminding respondents of their budget constraint (Alberini and Chiabi, 2007). However, this is not a consensual matter as empirical studies have concluded that the budget constraint bias is not relevant and reminding individuals about their available income might even lead to errors (Ahlheim, 1998). It is also argued that the hypothetical nature of the transaction leads to possible *hypothetical bias* — differences between the amount people claim to be willing to pay in a constructed scenario and the amounts people actually pay for the good. Efforts have been made by researchers to deal with this problem (for instance, the Learning Design proposed by Bjornstad *et al.* (1997) or cheap talk (Cummings and Taylor, 1999).

The validity of the method has also been tested on the sensitivity of scope (Pouta, 2005; Whitty, 2012). This refers to the fact that economic theory predicts that if individuals are willing to pay a certain amount for a good they desire, then they should be willing to pay more if the quantity of the good offered is increased (as long as the individual does not reach the point of satiation). Empirical evidence has shown, in some cases, insensitivity (Whitty, 2012) and, in others, sensitivity to scope (Pouta, 2005). Carson *et al.* (2001) consider that the main explanation for CV estimates not to vary systematically with the different characteristics of the good is the poor design and administration of the survey. They argue that the CV studies that demonstrate insensitivity to scope were not designed according to the guidelines of the state of the art surveys. Related to this problem are the possible difficulties respondents might have in understanding very small risks changes. Corso *et al*. (2001) try to overcome this limitation, once again, by changing the design of the survey adding visual aids. Furthermore, WTP estimates vary depending on the elicitation formats used in the surveys. However, Carson *et al.* (2001) defend that these differences are not as significant as theoretical models predict.

Notwithstanding its limitations, the CV method has been considered by government agencies an acceptable procedure in the context of environmental economics (Mitchell and Carson, 1988; Özdemir and Johnson, 2013). Many of the problems encountered with CV studies "can be resolved by careful study design and implementation" (Carson *et al.*, 2001, p. 173; Whittington and Pagiola, 2012) and the NOAA panel (Arrow *et al.*, 1993) endorsed this method considering it capable of providing reliable estimates.

In the research field of crime, Ludwig and Cook (2001) presented a first study with the goal of estimating the benefits of reducing crime using the CV Method. In the survey,

[6] For a more comprehensive debate on the controversies of the CV method, particularly applied to environmental economics (see Carson *et al.*, 2001; Arrow *et al.*, 1993).

respondents were asked if they were willing to vote for a program aimed at reducing gun injuries by 30% that requested the payment of a certain amount of money, through an increase in annual taxes. The authors assumed that the respondent's WTP did not value the risk reduction for the individual but for his/her entire household. The authors' estimates implied that the value of a gunshot injury is USD 750,000 (1998 USD) and societal WTP to reduce gun violence is approximately USD 23.8 thousand million dollars (1998 USD). As a limitation of this survey, the authors acknowledged that the baseline risks of being a victim of a gunshot injury was not mentioned nor was it part of the population which would benefit from the gun reducing program.

In a latter study, aimed at determine people's WTP for programs designed for crime control and provided new estimates of the cost of crime, Cohen *et al.* (2004) also resorted to the CV method and did not provide respondents any information regarding crime rates, risk of victimization, average losses or severity of injuries usually related to each type of crime. These details, according to the authors, were omitted intentionally so that respondents could answer based on their own perception of these crimes. Each of the 1300 respondents was then asked if he/she was willing to pay a certain amount of money to continue a successful program in crime control for three types of crime randomly chosen out of five possible ones: burglary, serious assault, armed robbery, rape or sexual assault and murder. The authors found that respondents were willing to pay different amounts to avoid each type of crime. A representative household would be willing to pay an average of between USD 104 (for burglary) and USD 146 (for murder) per year for crime reduction programs that diminished specific crimes by 10%. Using an estimate of the number of crimes avoided with a 10% reduction in crime rates and considering the existence of 103 million households in the United States of America, the authors were able to estimate the cost per type of crime. Based on a WTP of USD 146 in the case of murder, globally the American people would be willing to spend around 15 billion USD in the program. Dividing this amount by the number of murders averted with a reduction of 10% in its number, it is possible to estimate an implicit value of a statistical crime at USD 9,700,000 in the case of murder.[7] The amounts of WTP that result from this study using the CV method are higher than figures estimated using other methods. A possible explanation suggested by the authors refers to the fact that respondents might overestimate the risks and the injuries sustained from violent crime, thus eliciting higher values of WTP. However, it is also possible that these figures are higher because they reflect aspects like the fear of crime and the willingness to live in safer communities making them a relevant contribution to evaluating the cost of crime.

Trying to address one of the limitations of the CV method put forward by Corso *et al.* (2001) — the lack of accurate communication of the magnitude of the risk to the respondents taking the survey,[8] Atkinson *et al.* (2005) opted to inform respondents of the risk change by using visual aids through the inclusion of two grids with shaded and

[7] For a synthesis of these results, see Table A.1 of Appendix A.

[8] According to Corso *et al.* (2001), if the respondents do not understand the proportion of the risk being reduced they will not evaluate their preferences correctly. They suggested the use of visual aids, like tables, pie charts or "risk ladders" as a possible method to overcome this difficulty.

non-shaded squares describing the likelihood of being a victim of the offense before and after the implementation of the risk reduction policy. The authors developed a survey using the CV method in the UK aimed at valuing the benefits of reducing violent crime, especially its intangible impacts. Their study focused on three different categories of offense: "common assault", "serious wounding" and "other wounding" and included a very detailed description of the probable health effects (physical and psychological) that a victim of each of these offenses might sustain. A comprehensive description of symptoms was given to respondents as they might have not been completely aware of the consequences of falling victim to a violent crime.[9] In the scenario used for the elicitation, the respondents were also informed of the probability of being a victim of each type of offense previous to the risk control policy: 1% for other wounding and serious wounding and 4% for common assault. The findings of this study suggested that the costs of common assault (no injury) are £5,300, other (moderate) wounding £31,000 and serious wounding £36,000.

The monetary values conveyed for the few existing studies that estimated the costs of crimes are very important in the economic appraisal of policies that seek to reduce the incidence of (violent) crime (Webber, 2010), as they inform the prioritization of crime prevention efforts and influence the legal, political and cultural stance toward crime (Anderson, 2011). However, up to the present date, published estimates, based on WTP methods, are only available for the US (Ludwig and Cook, 2001; Cohen *et al.*, 2004) and the UK (Atkinson *et al.*, 2005). Thus, new evidence for other settings is on demand.

2.2. *On the determinants the WTP — main hypotheses put forward*

The few studies aiming at explaining the key factors behind individuals' WTP to reduce the probability of being victims of a (violent) crime usually, explicitly or implicitly, assume that that WTP is a function of a set of variables, which can be grouped, for the sake of simplicity, into three main categories: (1) Individual and family related factors, including demographic (age and gender), personality, schooling, individual/family income, number of dependents and family size, (2) Crime associated factors, encompassing real and potential crime victimization and its (physical and psychological) consequences; and (3) Individual and public policy measures for avoiding crime victimization, namely individuals' averting behavior (e.g., lock the door) and payment vehicle and policy for crime prevention.

Youngsters and very old people are particularly prone to violent crime (Schreck *et al.*, 2012). Although age did not emerged as an explanatory variable for the UK sample gathered by Atkinson *et al.* (2005); Cohen *et al.* (2004) evidenced that WTP, particularly for the more violent crimes, decreased with age. Thus, we hypothesize that:

H1: *The WTP for violent crime decreases with age.*

Schreck *et al.* (2012) argue that due to their limited physical strength females are more likely to experience violent rather than nonviolent forms of crime. Feminist scholars, in

[9]Table A.2 of Appendix A, includes the description of the injury profiles used by the authors.

contrast, emphasize the social vulnerabilities women face because of structural and symbolic facets of gender inequality (Cobbina *et al.*, 2008). The evidence on the gender issue and WTP has been, however, inconclusive (Cohen *et al.*, 2004; Atkinson *et al.*, 2005). Given that extant literature found that women have higher levels of fear of crime (Lee and Hilinski-Rosick, 2012), we conjecture that:

H2: *Females are more willing to pay to avoid being victims of a violent crime.*

Personality and lifestyle characteristics which affect fear of crime (Lee and Hilinski-Rosick, 2012), and ultimately the WTP, include risky lifestyle activities such as consuming alcohol and using illegal drugs, frequently partying and attending leisure activities outside the home, engaging in criminal activities, employment and prior experience with direct or vicarious victimization. According to Holland (1997), vocational interests are an expression of personality (Holland, 1997) as people select environments in which they can express their interests, for example a particular field of study (Korpershoek *et al*., 2013).[10] In this case, we postulate that:

H3: *Personality characteristics, as conveyed by the study field, are likely to affect the WTP of an individual to avoid being victim of a violent crime.*

Income, namely family income, has been transversely accepted as a key factor of the WTP for avoiding violent crimes. Indeed, both Ludwig and Cook (2001) and Atkinson *et al.* (2005) found that higher levels of income impact positively on WTP. Cohen *et al.* (2004) were also able to conclude that WTP varies with the income level of the respondents: low-income respondents are usually willing to pay less to reduce crime victimization than higher-income respondents, even though they have higher victimization rates. It is thus suggested that the ability to pay, plays a role in explaining the amount of WTP:

H4: *Individuals with higher* (*family*) *average income level are more likely pay to avoid being victim of a violent crime.*

Although less referred, the amount of WTP is also influenced by the size of the family and the number of dependents (children) that constitute the household (Ludwig and Cook, 2001). Individuals with larger families, more specifically with higher number of dependents, would be more prone to pay for avoiding being victim of a (violent) crime give

[10] Holland (1997) claims that six interest types (realistic, investigative, artistic, social, enterprising and conventional) explain people's occupational preferences. Engineers tend to reveal strong *realistic* characteristics viewing themselves as practical and conservative. Exact sciences profiles are more associated to *investigative* types, including introvert individuals who prefer to study and understand situations and expand their knowledge. *Artistic* people, such as the one related with arts, literature and other creative occupations often enjoy innovative and open experiences over organized and structured activities, avoiding regimented and routine activities. *Social* types have strong interpersonal and communication skills and tend to be empathetic, patient and understanding being usually associated to medical related subjects. *Enterprising* types are often attracted to economically rewarding endeavors and are comfortable exerting power over others — they tend to be comfortable with their decision-making skills and may be ambitious, competitive and self-confident. Economics and business related subjects tend to be associated with both enterprising and *conventional* types. These latter prefer an orderly, calm and efficiently established routine and are most typically associated to the education field.

his/her fear of letting the family/dependants father/mother/brotherless. Thus, we conjecture that:

H5: *Individuals with larger families/higher number of dependents are more likely pay to avoid being victim of a violent crime.*

Regarding the group of crime related factors, having been victims of a crime in the past is one characteristic of the respondents that was controlled for in Atkinson *et al.*'s (2005) study. Data analysis suggested that although this had a positive impact on the WTP, it did not have a significant influence on the amounts elicited. This could be explained by the small proportion of respondents in the sample that had already been victims of a crime. In this line of evidence, we posit that:

H6: *Individuals who have been victims of crime are more likely pay to avoid being victim of a violent crime.*

Fear of crime affect individuals other than those victimized (Braakmann, 2012). Perceptions about the fear of crime or of neighborhood safety and the effectiveness of police in reducing crime rates tend to impact on WTP (Atkinson *et al.*, 2005). Thus, individuals that perceive higher levels of fear and/or higher insecurity would be, on average, more inclined to pay.

H7: *Individuals who have higher perceived fear of crime and/or insecurity are more likely pay to avoid being victim of a violent crime.*

The analysis of the survey's data led to the conclusion that WTP is very different across respondents and is higher for the crimes that cause the most serious consequences in the respondent's physical and psychological health. This means that WTP varies positively with the severity of the injuries caused by each type of offense (Atkinson *et al.*, 2005). Then,

H8: *Individuals who admit more serious physical and psychological damages of crime are more likely pay to avoid being victim of a violent crime.*

Finally, individual and public policy measures for avoiding crime victimization may also influence WTP. In concrete, individuals' averting behavior, for instance, locking the door (Atkinson *et al.*, 2005), taking taxis instead of walking home (Cohen *et al.*, 2004) and other precautionary behaviors, is positively related to WTP (Piquero *et al.*, 2011).

H9: *Averting behavior individuals tend to be more likely to pay to avoid being victim of a violent crime.*

The payment vehicle is considered a relevant item of the CV method affecting the answers respondents offer regarding the WTP (Morrison *et al.*, 2000; Piquero *et al.*, 2012). Given the sensitiveness of crime prevention issue there may be problems associated with the way the policy scenario that leads to the reduction in the risk of crime is described and

with the chosen payment mechanism (Atkinson *et al.*, 2005). Individuals might not be so willing to pay for crime prevention when that implies increasing the budget for law enforcement as they consider that the taxes they pay should already cover that. Indeed, Piquero *et al.* (2012) found that individuals who perceive that they pay a high amount of taxes are less prone to pay for crime reduction. Thus, we posit that

H10: *Individuals tend to be less likely to pay to avoid being victim of a violent crime when the payment vehicle is through higher taxes.*

3. Methodological Considerations

The CV method is used to directly elicit the WTP of higher education students to reduce the risks of being victims of violent crime (cf. Atkinson *et al.*, 2005). As this approach involves the direct elicitation of values using a questionnaire, the design of the survey and its wording are of utmost importance (Mitchell and Carson, 1988).

Our survey started with socio-economic questions that make it possible to characterize students according to age (H1), gender (H2) and family income (H4) and size (H5). The monthly family income categories mentioned in the survey were calculated using the minimum wage as the range amount. A question was also included where respondents were asked to state the subject of study (course) in which they were enrolled so as to confirm how WTP varies across respondents psychological/personality characteristics (H3). Respondents also had to answer questions related to their personal experience with crime. Following Atkinson *et al.* (2005), respondents were asked if they had ever been victims of a crime (violent or otherwise) (H6), the period in which the crime had occurred and the seriousness of the physical and psychological consequences of the crime (H8). The level of seriousness was classified in five categories ranging from "no damages" to "very serious damages". Following Atkinson *et al.* (2005), we included questions to infer the individual's perception of safety, i.e., fear of crime (H7) and averting behavior (whether individuals lock the door at home) (H9).

Respondents were then elicited to calculate their WTP to reduce the risk of being victims of violent crime

> "Considering the existence of 2,28 violent crimes per 1000 habitants, how much would you be willing to pay to reduce in 10% the probability of being the victim of a violent crime in the next 12 months (regardless of the payment vehicle)?"

Information on the baseline risk and the amount of risk reduction was provided to respondents. Available literature regards the inclusion of the baseline risk and the level of risk reduction as crucial because individuals need a reference point and different levels of risk reductions imply different amounts of WTP (Norinder *et al.*, 2001). The figure of 2.28 violent crimes per 1000 habitants is an approximation of the actual risks of falling victim to a violent crime in Portugal.[11] Information on the timing of the risk change was

[11] Own calculation using data from Eurostat.

also supplied because it can be of significant importance. Given individual time preferences, goods provided today have a different value than goods provided in the future (Bateman *et al.*, 2002). In our survey, it was considered that the risk reduction would take place in the following 12 months. Following Atkinson *et al.* (2005), we chose the *payment card* as the elicitation format providing respondents with a range of values from which to choose the amount they would be willing to pay to reduce the risks of assault.[12] Although other elicitation techniques are available — open-ended, closed-ended and bidding games (see Table A.3 of Appendix A), the payment card technique is preferable to bidding games and close-ended formats as it avoids anchoring and starting biases, i.e., responses are not "anchored" to any amount and are not affected by the starting values presented. Regarding open-ended techniques, these are more informative than the payment card, avoiding as well the anchoring bias. The problem is that this technique fails to help respondents think about their preferences through the process generating many non-responses, zero answers and unreliable amounts (Hanley and Spash, 1993; Bateman *et al.*, 2002; Whynes *et al.*, 2004). The open-ended format has been increasingly abandoned by researchers (Bateman *et al.*, 2002). In contrast, the closed-ended format (or referendum) has been endorsed by the NOAA panel, considering it the choice technique of elicitation (Arrow *et al.*, 1993). However, it was proved that closed-ended technique generates sometimes inconsistent responses (Bateman *et al.*, 2002). The payment card yields to consistent responses (Atkinson *et al.*, 2005) albeit its vulnerability to the ranges of amounts used (Whynes *et al.*, 2004).

It should be noted that, following Cohen *et al.* (2004), our survey did not include a complete description of the scenario — it did not include the institution responsible for the risk change, the means used to achieve that alteration nor the method of payment (payment vehicle). The decision to omit information on the payment vehicle or the policy used to reduce the risk of victimization is explained by the fact that this study intended to estimate higher education students' WTP to reduce the probability of being victims of a violent crime and not to evaluate a specific crime control policy.

Even though it was not our goal to evaluate a specific payment vehicle or instrument used to reduce victimization risks, we decided to add a question specifying a payment vehicle (increase in taxes) and a description of a policy instrument (increase in policing) to understand if these elements affect WTP (H10). Respondents were only asked to state if they would be willing to pay more, less or the same amount compared to the situation where no payment vehicle or instrument was provided.

The method used to apply the survey is also key in preventing errors (Mitchell and Carson, 1988). Surveys may be administered through a variety of instruments. The main survey modes are mail surveys, telephone interviews and face-to-face interviews (Bateman *et al.*, 2002). However, variations of these instruments have been used by combining different modes in an attempt to benefit from the advantages and overcome the difficulties

[12] However, other techniques may be used in a CV survey to elicit the amount individuals are willing to pay. Table A.3 of Appendix A presents the main elicitation techniques, their advantages and disadvantages. Different variants of these main techniques have also been proposed (Bateman *et al.*, 2002).

of each instrument when used separately — e.g., combined mail-telephone surveys (Bateman *et al.*, 2002).[13]

The survey used in our study was disseminated by e-mail with a link to the web-based survey. The primary reason for the choice of this method was the fact that the respondents, as students at the University of Porto (UPorto), have free access to the internet on campus and are provided with an e-mail account upon enrolment. The technology is thus available without costs to all respondents. Secondly, the fact that these respondents are higher education students means an absence of problems associated with illiteracy. This was also the reason why no attempt was made to use visual aids as we assumed that higher education students have a level of reasoning that allows them to understand the scenario and the risk reduction involved. Moreover, in web-based surveys like Google Docs Form, the data is automatically collected on a spreadsheet that can be downloaded to an Excel spreadsheet. Errors in data collection and transcription are thus avoided.

The development of the questionnaire involved a pre-test as recommended by the NOAA panel (Arrow *et al.*, 1993). The questionnaire was administered to students enrolled in the Masters in Innovation and Entrepreneurship (MIETE) at the UPorto's Engineering School. They come from different fields of study and the administration of this survey in the same format as the final survey allowed us to determine if the group understood the questions and to diagnose possible problems with the survey. This group did not report any difficulties in answering the questionnaire.

On the 20th of March 2009 an e-mail was sent to students at the three UPorto Faculties namely, Faculty of Economics, Faculty of Engineering and Faculty of Food Sciences and Nutrition, inviting them to answer the survey. Another e-mail was sent, this time addressed to the contacts listed on UP's website as each Faculty's Communication, Image and Public Relations Office, as well as the university's business school. These contacts were asked to forward the e-mail with the survey link to all students, which also informed respondents of the goal of the questionnaire and the scope of the study. The limited time necessary to answer the questionnaire (approximately 3 min) was also mentioned in an attempt to increase the response rates. Other information was included, namely the restricted use of the data. To increase the response rate of some of the schools from which no responses were obtained, telephone contacts were established with their Communication, Image and Public Relations Offices to understand the reason behind the lack of responses.[14] One last attempt to boost response rates was made in May 2009 by sending an e-mail to the Deans of all the Faculty Boards requesting the dissemination of the questionnaire. We considered the questionnaire response phase closed on the 7th of July 2009 with a total of 1122 responses. Considering that the total number of students of the University was in that academic year of 29,896, the response rate was approximately 4%.

[13] Other methods have been proposed, such as computer assisted interviews (Bateman *et al.*, 2002). Table A.4 of Appendix A summarizes the main advantages and disadvantages of three basic instruments and includes one more that has emerged with the use of the internet: web-based stated preferences surveys (Marta-Pedroso *et al.*, 2007).

[14] We learnt that in some schools students are not used to responding to questionnaires (e.g., Faculty of Medicine where the response rate was 0%) and in other schools, such as the Faculty of Dental Medicine, students are not willing to participate as they are tired of receiving online questionnaires.

4. Empirical Results

4.1. *Descriptive analysis*

A descriptive analysis of our data indicates that most of our respondents were aged 20 to 22 and were female (52.9%). As 52% of UPorto's students are female, gender overrepresentation did not occur in our sample. The majority of our respondents indicated the highest level of family income mentioned in the questionnaire (over 2250€/month) and was integrated in a family of four members. They were mostly undergraduate students (50.3%), with no family dependents (92.9%), studying Engineering (35.8%), Economics and Management (22.5%) and Health Sciences (17.3%).[15]

The Faculty of Engineering and the Faculty of Economics had the highest number of respondents followed by the Faculty of Arts and the Faculty of Nutrition and Food Science. Our respondent sample is overrepresented (compare columns 3 and 5 of Table 1) in the following courses: Engineering, Economics and Nutrition. It underrepresents Architecture, Sports, Medicine and Dental Medicine, courses from which we failed to obtain valid answers.

Table 1. Percentage of Responses per Total Number of Faculty Students at the University of Porto (UP).

Faculty	N° of Students Enrolled at the UP [1]	% Students Enrolled at the UP by Faculty [1]/29896	N° of Responses by Faculty [2]	% of Responses by Faculty [2]/1122	Response Rate Per Faculty [2]/[1]
Faculty of Architecture	1,000	3.3%	0	0.0%	0.0%
Faculty of Fine Arts	800	2.7%	14	1.2%	1.8%
Faculty of Sciences	3,648	12.2%	18	1.6%	0.5%
Faculty of Nutrition and Food Science	449	1.5%	90	8.0%	20.0%
Faculty of Sport	1,494	5.0%	0	0.0%	0.0%
Faculty of Law	998	3.3%	8	0.7%	0.8%
Faculty of Economics	2,859	9.6%	259	23.1%	9.1%
Faculty of Engineering	6,922	23.2%	431	38.4%	6.2%
Faculty of Pharmacy	1,306	4.4%	63	5.6%	4.8%
Faculty of Medicine	2,357	7.9%	0	0.0%	0.0%
Faculty of Dental Medicine	506	1.7%	0	0.0%	0.0%
Faculty of Psychology and Education Science	1,579	5.3%	74	6.6%	4.7%
Institute of Biomedical Sciences Abel Salazar	2,257	7.6%	42	3.7%	2.1%
Faculty of Arts	3,721	12.5%	118	10.5%	3.2%
Total	29,896	100%	1,122	100.0%	3.8%

Source: Own formulation using data from the report "Ensino_Estudantes Inscritos na U. Porto 2008" (31st December 2008).

[15] See Table A.5 of Appendix A.

With regard to the crime-related responses, 33% of our respondents had been crime victims in the past and most of these crimes occurred over a year ago. The crimes did not generally result in physical or psychological injuries. The majority of our respondents worry moderately about being victims of a crime (52.8%) and 37.6% worry considerably. This result is consistent with the fact that almost 84% of our respondents usually lock the door when they leave home.

When asked how much they were willing to pay to reduce the probability of being victims of a violent crime by 10%, 42.1% of our respondents were willing to pay a certain amount but less than 50€, and 20.8% were willing to pay between 50€ and 250€. It is also worth mentioning that 25.5% of respondents were not willing to pay any money at all.[16] Making some simple back of envelop calculus, we obtain that the representative student's average WTP amounts to 188€, which corresponds to a social cost of 331 thousand Euros (th.€) per violent crime,[17] a figure much higher (at 2010 prices, in €) than the ones for serious wounding (48th.€), obtained by Atkinson *et al.* (2005), or for serious assault (60th.€) and rape (204th.€), pointed by Cohen *et al.* (2004), albeit much lower than the one for murder (8359th.€) obtained by these latter authors.

4.2. *Estimation of the econometric models*

Our aim here is to assess which are the main determinants of the WTP of university students to reduce the risks of falling victim to a violent crime. Our theoretical model assumes that our dependent variable, WTP, is a function of a large set of variables as stated by the existing literature in the field (cf. Section 2): individual and family related factors (age and gender, personality/field of study (economics, arts, …), family income, family size, number of dependents), crime related factors (past crime victim, crime time, physical injuries, psychological damages, fear of crime) and individual and public measures and policies (averting behavior and payment vehicle and policy).[18]

The logit model estimated (Table 2) presents a reasonable quality of adjustment (goodness of fit). The Hosmer and Lemeshow test indicates that we can accept the null hypothesis that the estimated model represents reality well. Moreover, more than 75% of the estimated values of the dependent variable are correctly predicted by the model.[19]

[16] We can speculate several reasons to have obtained such a high number of "protesters": respondents may object to the scenario considering it unrealistic or they could have considered that a reduction in 10% in the violent crime rate is negligible when it is so low in Portugal. The high percentage of protesters is a problem that has been previously reported in the literature — Atkinson *et al.* (2005) encountered more than 30% of protesters in their study and future research should focus more on explaining this phenomena.

[17] This figure was computed, in line with (Cohen *et al.*,'s 2004) and Atkinson *et al.*'s (2005) procedures, by multiplying the average estimated WTP (188€) with the number of Portuguese families (4008 thousands) and then dividing this product by the number of violent crimes averted by the 10% measure (2280).

[18] The description of the variables-proxies and the measurement adjustments undertaken on the original questions in order to get these proxies are detailed in Table A.6 of Appendix A.

[19] An analysis of the correlation matrix of the variables (Table A.7 of Appendix A) presents a positive and significant correlation between the variable that represented having been the victim of a crime and the time when the crime occurred, as well as between the variables having been the victim of a crime and the severity of the injuries suffered. Thus the variables representing the time when the crime occurred and the severity of the injuries were not considered in our estimation to avoid multicollinearity problems.

Table 2. Results of the Model Estimation.

	Variables	Categories	β Estimates
Individual/ Family related factors	AGE (ln)		−0,811**
	GENDER — default: Male		0,520***
	PERSONALITY (Study-field — default: Health Sciences)	Exact Sciences	−0,510
		Humanities	0,516*
		Economics and Management Sciences	0,202*
		Engineering	−0,475**
		Psychology and Educational Sciences	−0,556
		Other (Arts, Sport, Law)	−1,106**
	INCOME (Ln)		0,236
	FAMILY SIZE — default: 3 individuals	1	0,745**
		2	−0,040
		4	0,131
		More than 4	0,013
Crime related factors	VCRIME — default: No	Yes	−0,036
	FEAR — Default: no fear	Some fear	1,099***
		Lots of fear	1,454***
Individual and public policy measures	LOCK DOOR (default: No)	Yes	0,386**
	PAYMENT VEHICLE and POLICY (default: the same)	Less	1,290***
		More	0,543***
Constant			1,595
N			1,122
WTP > 0€			836
WTP = 0			286
Goodness of fit			
Hosmer–Lemeshow Test (significance)			6.388 (0.604)
% corrected			75.8

Legend: ***(**)[*] statistically significant at 1% (5%)[10%] level.

Demographic variables — age and gender — are key determinants of the WTP to reduce violent crime among Portuguese higher education students. On average, all other determinants held constant, senior students present a lower WTP, whereas female students are more inclined to pay to avoid being the victim of violent crime than their male counterparts. The first result corroborates H1 and is in line with findings in the existing literature. Cohen *et al.* (2004) also found that WTP decreases with age; thus, in this regard, Portuguese university students are not different from the general individuals living in more developed, high crime rate countries. Regarding the impact of gender on WTP, our results also corroborates hypothesis H2 but contrast with extant literature which failed to find a statistically significant estimate. Still, our results (female respondents reveal, ceteris paribus, a higher propensity to pay for avoiding being victims of a violent crime than their

male counterparts) are in accordance with psychological literature which suggests that traditional female gender roles are associated with avoidance (Rubinstein, 2005): women are the main targets of certain types of crime (sexual assault, domestic battery, etc.) (Suarez and Gadalla, 2010), committed primarily by men (Rennison, 2009).[20]

The literature does not account for the impact of the field of study as a determinant of WTP but our results suggest that this variable has an important role in eliciting WTP. Researchers have found evidence of a relationship between people's personalities and their areas of interest (Tokar *et al.*, 1998). Several authors have found an association between the field of study of university students and personality traits (Rubinstein, 2005; Silver and Malone, 1993; Kline and Lapham, 1992). Silver and Malone (1993) for instance, found that engineers tend to be mostly obsessive, accountants are predominantly paranoid and medical students are particularly narcissistic. As referred in Section 2, psychological literature uses the field of study as a proxy for personality traits of individuals. By estimating that distinct fields of study are associated with different amounts of WTP, we suggest that different personality traits might play a determinant role in eliciting WTP to reduce violent crime victimization. Results convey that students characterized by artistic personalities (e.g., Humanities, Arts), who often enjoy innovative and open experiences over organized and structured activities, as well as those with strong realistic characteristics (e.g., Engineers) (who tend to enjoy being outdoors but not so much interacting with groups and using interpersonal skills) are less willing to pay for avoiding being victims o a violent crime. In contrast, students characterized by enterprising personality (e.g., those in Economics and Management), often attracted to economically rewarding endeavors, being comfortable exerting power over others (Holland, 1997), reveal a higher WTP. In this vein, H3 (*Personality characteristics, as conveyed by the study field, are likely to affect the WTP of an individual to avoid being victim of a violent crime*) is corroborated by our data.

No relation was found between students' family income level and WTP (H4) — low and high family income students do not differ, on average and all else constant, in their WTP more to avoid being a victim of violent crime.[21] The literature on this relationship suggests in contrast that higher family income positively influence individuals' WTP (Atkinson *et al.*, 2005; Ludwig and Cook, 2001). Cohen *et al.* (2004) further reinforces this evidence claiming that the ability to pay plays a role in explaining the amount in WTP as low (family) income individuals, despite having higher victimization rates, are willing to pay less.

The relationship between the number of household members and WTP (H5) is at odds with existing literature. We find statistical support to suggest that a single person is, on average, much more inclined to pay to reduce the probability of being the victim of a violent crime than a student living with a large family (three members). One would expect that the household size applies quite differently for students, who often live with many other students, or find rooms in other people's family homes, than a head of family,

[20] We acknowledge one of the reviewers for highlighting this issue.

[21] It is important to note that the income of reference is that of the student's family, not that of the individual student. One third of the students belong to the upper family income level class, whereas relatively poorer family income students represent about 18% of the respondents (see Table A.5 of Appendix A).

parenting a large family of children and who might worry more about protecting their family.[22] In this line of argument, the contrasting findings as compared to that of Ludwig and Cook's (2001) are understandable. Recall that these latter authors reported a positive impact of household size on WTP, which was associated with altruistic reasons as individuals in families with several members would be willing to pay more than individuals who live alone.

After controlling for all other variables likely to impact on the WTP, a higher level of concern about being a possible victim of a violent crime is associated to a higher WTP, on average, which corroborates both H7 and the findings in the literature (Atkinson *et al.*, 2005).

Another relevant aspect to take into account is an averting behavior towards crime, reflected in locking the door at home, is positively associated with the WTP (H9). This evidence is not in line with the estimates presented by Atkinson *et al.* (2005) that suggest that people who do not lock their door are actually willing to pay more. The authors speculate that people whose behavior puts them more at risk are willing to pay more for a policy that reduces their probability of victimization. Our estimates, on the contrary, might be explained by the fact that people who lock their doors may be more concerned about crime issues and are thus willing to pay more.

Payment vehicle and policy emerge as a strongly significant variable in explaining Portuguese higher education students' WTP (H10). However, results are not clear-cut, as both groups of students would pay less and more (in relation to those that would pay the same) in the case where payment is made through higher taxes to increase policing reveal a higher WTP to avoid being victims of violent crime. We suggest that students with a strong opinion on the policies and payment vehicles used to reduce crime risks are willing to pay more than students who are neutral to these variables. CV literature emphasizes that payment vehicle and policy are considered relevant variables that should be included in the surveys given their impact on individual's responses (cf. Section 2). In crime costs literature, Ludwig and Cook (2001) do not address this issue directly in the survey by changing the payment vehicle or policy when eliciting the amounts of WTP. However, they used the answers of individuals that stated "that taxes are too high" as a proxy for respondents who did not agree with the payment vehicle. By removing these responses from the sample, the estimates of WTP were 13% higher (Ludwig and Cook, 2001). With regard to the policy used to reduce risks of victimization, Atkinson *et al.* (2005) estimate that the belief in the effectiveness of policing has a positive impact on WTP. We provide further evidence supporting the hypothesis that this/these variable(s) is (are) an important determinant in explaining WTP for crime risk reduction.

5. Conclusion

The cost of crime literature is relatively small and new (Webber, 2010). Estimates of the cost of crime are important because they form the basis of quantifying benefits of crime

[22] We acknowledge one of the referees for this insight.

prevention programs in cost-benefit analyses. In a society with limited resources that can be allocated to different uses, the need to find instruments to analyze the costs and benefits of different policies will help policymakers make more informed decisions (Cohen, 2000). Crime policy is no exception and estimating the costs of crime is part of the cost-benefit analysis. When deciding whether to fund a program, policy authorities seek to know how much the public expects to benefit-hence how much they would be willing to pay. Thus, *ex ante* measures of WTP tend to be preferable to *ex post* analysis of victim costs when conducting cost-benefit analysis (Cook and Graham, 1977). Tangible costs have been calculated but not including estimates of pain, suffering or changes in lifestyle — particularly important in violent crime — has resulted in biased estimates of the total costs of crime (Czabanski, 2008). Several methodologies have been used to incorporate the intangible costs of crime and the CV method offers a "fresh perspective" (Czabanski, 2008, p. 122) on this problem.

Our study applied the CV method to estimate higher education students' WTP to avoid being victims of violent crime and the respective determinants. It contributes to the existing literature in two main ways. Firstly it is, to the best of our knowledge, the first study conducted in a relatively low crime country. Our research indicates that even though crime rates are lower in Portugal, the main elements that have an impact on WTP in countries like the UK or the US — with high crime rates — are the same for Portuguese university students (cf. Table 3). They have in common the positive influence of characteristics such as higher income and fear of crime on WTP to reduce the risk of violent crime. The negative impact of age is also common to both types of countries. The payment vehicle and the policy used to reduce this risk are also strongly significant in both contexts. However, unlike the results presented for high crime rate countries, our results show that gender is a statistically significant variable, with female individuals willing to pay more to reduce the risk of being victimized, and single students willing to pay more than students that live with a family of three members. Psychology literature supports our results by explaining the different gender roles and confirming that women are more prone to avoidance (Rubinstein, 2005).

Locking the door at home was found to have a negative impact on WTP in the UK whereas in Portugal, individuals who lock their doors are willing to pay more to reduce their risks. We explain the opposite findings of our study by suggesting that people who lock doors at home demonstrate a crime avoidance behavior that is compatible with a higher WTP.

Our study also contributes to the existing literature by being the first study that uses the CV method to estimate the amount that a particular sector of the population — university students — is willing to pay to reduce the risk of being victims of violent crime. Literature on WTP to avoid crime victimization does not discuss the impact of the individuals' different fields of study on WTP. In this study, we concluded that psychological traits, as indicated by the field of study, play a key role in determining the amount people are willing to pay. We found that enterprising students (those enrolled in Economics and Management courses) are the ones presenting a higher WTP and students with artistic traits (Humanities and Arts) the ones likely to pay less for avoiding being victim of a violent crime. Thus,

Table 3. Comparison of the Present Study with Some Existing Studies in the Literature.

	Prior Studies			
	Ludwig and Cook (2001)	Cohen *et al.* (2004)	Atkinson *et al.* (2005)	Current study
Determinants of WTP				
Individual and family related factors				
Age	n.c.	–	0	–
Gender (default: male)	n.c.	0	0	+
Field of studies	n.c.	n.c.	n.c.	Significant
Income	+	+	+	0
Family members	+	n.c.	n.c.	–
Crime related factors				
Victim of a crime	n.c.	n.c.	0	0
Fear of crime	n.c.	n.c.	+	+
Severity of injuries/ crime type	n.c.	+	+	n.c.
Individual and public policy measures				
Lock Door	n.c.	n.c.		+
Payment vehicle and policy	+	n.c.	+	+
Study frame				
Type of crime and risk reduction	Gun violence (injuries) by 30%	Several crimes by 10% (burglary, serious assault, armed robbery, rape or sexual assault, murder)	Violent crime by 50% (categorized in three different types of offences — common assault, other wounding, serious wounding)	Violent crime by 10%
Policy	Programme to reduce gun thefts and illegal gun dealers	n.c.	Increase policing	n.c.
Payment vehicle	Tax Increase	n.c.	Rise in local charges	n.c.

Source: Own formulation.
Legend: 0 — not statistically significant; n.c — not considered.

corroborating psychological literature, our results seem to convey that lifestyle and personality traits do seem to matter in this regard.

The fact that our results suggest a relationship between the field of study and WTP could have an impact on policy, particularly insurance policy. In light of these results, insurance companies may be interested in designing different insurance packages for individuals depending on their psychological traits as indicated by their field of study. These packages would be tailored to include different benefits and costs depending on the individual's preferences that should include some features based on their field of study.

Government policy can also be affected as crime policies aimed at reducing the risks of assault are perceived differently by people with different educational background, and thus distinct lifestyles. Governments should be aware of this distinction to tailor crime policies depending on the geographical distribution of individuals with different educational backgrounds in the city/country.

Despite the results obtained in this study, we have to acknowledge some limitations. Firstly, it should be mentioned that to tailor our scenario we used official statistics on violent crime in Portugal to present respondents with the baseline risk. However, official statistics underreport the number of criminal offenses, as it is estimated that a high number of crimes are not reported (MacDonald, 2002), particularly sex crimes (Rice *et al.*, 2006). Future research should focus on the impact of different baseline risks and different percentages in the change of risk reduction on WTP, so that reliable and robust estimates can be produced and used in the definition of crime policy. Moreover, as stated by Cohen *et al.* (2004), different results could have been obtained if a detailed description of the consequences of victimization had been provided. Future research should investigate if different amounts of WTP would be reported in those circumstances.

Our study reported 25.5% of protesters (individuals who are not willing to pay any amount) and Atkinson *et al.* (2005) stated having more than 30% of responses classified as protests. Even though this high percentage of protesters did not bias our results as the logistic regression estimated using the maximum likelihood method produced the same results as the ordinary least squares estimation (not reported in the text), several explanations can be suggested, such as the fact that respondents object to the valuation scenario (e.g., the percentage of risk reduction involved). However, a comprehensive study of the reasons behind the protests should be conducted. Future research should thus focus on trying to explain the high percentage of protesters that are encountered in the CV studies applied to the costs of crime.

Finally, an in-depth analysis of the relationship between individual's educational background (used as a proxy for psychological traits) and WTP to avoid being victims of crime should also be conducted. We have suggested that there is an association between these two variables but given the implications it could have in crime policies, further research is recommended.

Appendix A

Table A.1. Individuals' WTP to Avoid Each Type of Crime (US, 2000).

Type of Crime	N° of Crimes Associated with a 10% Crime Reduction	WTP for a 10% Reduction (USD)	Implicit Value of a Statistical Crime (USD)
Burglary	426,113	104	25,000
Armed Robbery	48,681	110	232,000
Serious Assault	177,836	121	70,000
Rape and Sexual Assault	54,747	126	237,000
Murder	1,553	146	9,700,000

Source: Adapted from Cohen *et al.* (2004).

Table A.2. Injury Descriptions.

	Common Assault	Other Wounding	Serious Wounding
Physical injury	No injury profile	Moderate injury profile	Serious injury profile
	None	Cuts and grazes	Concussion
		Extensive bruising to body and face	Cuts (needing stitches)
		No medical attention required	Two broken ribs
		Bruising to body	Immediate medical attention required and two nights in hospital
		Minor physical discomfort for three weeks followed by complete recovery	Pain and discomfort for a month followed by complete recovery
Psychological distress	Short-term	Medium-term	Long-term
	Distress profile	Distress profile	Distress profile
	Repeated recollections of assault	Repeated recollections of assault	Repeated recollections of assault
	Feel shaken after a few hours after assault	Difficulty falling asleep or staying asleep (1 or 2 nights each week)	Difficulty falling asleep or staying asleep (1 or 2 nights a week)
	Symptoms last for 1–2 days	Difficulty concentrating on daily tasks	Difficulty concentrating on daily tasks
		Symptoms last for 2 weeks	Feelings of nervousness
			Symptoms last for 6 months

Source: Atkinson *et al.* (2005).

Table A.3. Advantages and Disadvantages of CV Elicitation Techniques.

Elicitation Technique	Description	Advantages	Disadvantages
Open-ended	Individuals are asked their maximum WTP without being given any suggestion as to a value	No anchoring bias — as no value is given to the respondent he/she is not "anchored" to any amount	Leads to many non-responses, zero answers or unreliable amounts — it is difficult for respondents to find an amount without any guidance particularly when they are not familiar with the good in question
		Very informative as to what the maximum amount is	Individuals are used to thinking in terms of prices of goods and not in maximum amounts
Bidding game	Higher amounts of WTP are consecutively suggested to individuals (like in an auction) until the maximum WTP is found.	Helps respondents think about their preferences through this process	Anchoring bias: responses are affected by the starting values presented and the bids used
			Yea-saying: respondents are led to accept paying the amounts included in the bid to avoid the social embarrassment of saying no
Payment card	Presents respondents with a range of values on a card from which to choose the maximum WTP. It may also indicate the expenditures of a representative household to help respondents with their answer.	Avoids anchoring bias Avoids yea-saying Avoids starting bias	Range bias — Vulnerable to the ranges of amounts used

Table A.3. (*Continued*)

Elicitation Technique	Description	Advantages	Disadvantages
Closed-ended format	Single bounded dichotomous choice — the respondent is asked if he/she is willing to pay a specified amount of money (the amounts usually vary across respondents)	Easier for respondents to answer as they are already given a specific amount	The amounts of WTP are higher than the ones found with other elicitation formats
		Lowers the non-response rates	Nay-saying (protesting)
		Avoids outliers	Less information provided by the respondent
	Double bounded dichotomous choice — after the first question respondents are given a follow-up question where they are asked if they would be willing to pay another amount. This second price is higher if respondents answered "yes" to the first question, and lower if the answer to the first question was "no"	More information available from the respondent	Inconsistent responses
			Anchoring bias
			Yea-saying

Source: Own formulation from information taken from Hanley and Spash (1993); Bateman *et al.* (2002) and Whynes *et al.* (2004).

Table A.4. Advantages and Disadvantages of CV Survey Modes.

Survey Mode	Description	Advantages	Disadvantages
Mail Survey	The questionnaires are sent by mail to the respondents, who complete them and send them back to the researchers	Low cost Permits the use of visual aids	Low response rates Require the respondents to read and understand the scenario — the level of literacy of the respondent may be a problem
		Respondents can answer the survey in their own time	Prevents the use of questionnaires where respondents should answer questions in a fixed sequence because they can read the whole questionnaire before starting to fill it in
		Easy to answer sensitive questions	Possible self-selection bias — the people who answer the questionnaires are more likely the ones that are more interested in the topic. This might lead to unrepresentative samples. No control over who fills in the questionnaire (head of the household or another individual?)
Face-to-face interviews	The interviewer conducts an interview face-to-face with the respondent	High response rates Permits the use of visual aids Allows the interviewer to explain complex scenarios and assist the respondent if he doesn't understand the questions Allows the use of questionnaires where the information must unfold sequentially for the respondent.	High costs Time consuming Possible interviewer bias — the interviewer may affect the respondent's answer

Table A.4. (*Continued*)

Survey Mode	Description	Advantages	Disadvantages
Telephone interviews	The interviewer telephones a sample of individuals and interviews them.	Less expensive than face-to-face interviews	Do not allow the use of visual aids
		Intermediate level of response rate	Do not allow lengthy questionnaires — respondents may not be willing to answer a questionnaire for more than just a few minutes
		Allow the interviewer to explain complex scenarios and assist the respondent if he doesn't understand the questions	Respondents who do not have a telephone will not be represented in the sample
		Allow the use of questionnaires where the information must unfold sequentially for the respondent	
Web-based surveys	Surveys hosted on a web page	Respondents can answer the survey in their own time	Sample representativeness — there is no control over who fills in the questionnaire — the same person can fill it in several times and people who are not supposed to answer may have access
		Easy to answer sensitive questions	Sample selectivity
		Low costs	Difficult to use visual aids
	Surveys accessed following an e-mail message link or a link hosted on another website	Possibility of designing an interactive survey (the respondent only has access to the next question if he has submitted the previous one — controls for question sequencing)	Require the respondents to read and understand the scenario — level of literacy of the respondent may be a problem
		Answers may be downloaded directly into a database (e.g., Excel spreadsheet)	Possible self-selection bias

Source: Own formulation from information available in Bateman *et al.* (2002), Mitchell and Carson (1988) and Marta-Pedroso *et al.* (2007).

Table A.5. Descriptive Statistics.

Variable		Frequency (% of Each Group Total)
WTP, in € ($N = 1{,}122$)	0	25.5
	[0;50[	42.1
	[50;250[	20.8
	[250;750[	5.5
	[750;1250[	1.9
	[1250;1750[	0.7
	[1750;2250[	0.8
	[2250;2750[	0.2
	More than 2,750	2.6
WTP if there is an increase in policing financed by an increase in taxes — payment vehicle and policy ($N = 1{,}122$)	More	13.4
	The same	58.6
	Less	26.6
	No answer	1.5
Age ($N = 1{,}122$)	[17,19]	16.8
	[20,22]	42.1
	[23,25]	20.7
	[26,30]	11.1
	[31,68]	9.4
Gender ($N = 1{,}122$)	Male	47.1
	Female	52.9
Level of Study ($N = 1{,}122$)	Undergraduate	50.3
	Integrated Masters	18.0
	Postgraduate	0.6
	Master Programmes	23.7
	PHD/Doctoral programme	6.9
	Other	0.5
Field of study ($N = 1{,}122$)	Exact Sciences	4.7
	Humanities	11.1
	Economics and management sciences	22.5
	Engineering	35.8
	Psychology and Educational Sciences	6.0
	Health Sciences	17.3
	Other (Arts, Sport, Law)	2.7
	Faculty of Fine Arts	1.2
	Faculty of Sciences	1.6
	Faculty of Nutrition and Food Science	8.0
	Faculty of Law	0.7
	Faculty of Economics	23.1
	Faculty of Engineering	38.4

Table A.5. (*Continued*)

Variable		Frequency (% of Each Group Total)
	Faculty of Pharmacy	5.6
	Faculty of Psychology and Education Science	6.6
	Institute of Biomedical Sciences Abel Salazar	4.2
	Faculty of Arts	10.5
Income, in € ($N = 1{,}122$)	[0;450[	4.0
	[450;900[	13.8
	[900;1350[	21.7
	[1350;1800[	15.2
	[1800;2250[	14.9
	More than 2,250	30.4
N° Family elements ($N = 1{,}122$)	1	7.7
	2	11.4
	3	29.2
	4	37.6
	More than 4	14.1
Family dependents ($N = 1{,}122$)	No	92.9
	Yes	7.1
Victim of a previous crime ($N = 1{,}122$)	No	67.0
	Yes	33.0
Date of previous crime ($N = 376$)	Less than 1 year	20.2
	Between 1 to 5 years	40.7
	Over 5 years	39.1
Severity of physical injuries related to the crime ($N = 374$)	No injuries	78.9
	Some injuries	13.1
	Serious injuries	8.0
Severity of psychological damages related to the crime ($N = 374$)	No damages	78.9
	Some damages	19.5
	Serious damages	1.6
Worries about being the victim of a crime ($N = 1{,}122$)	Does not worry	9.6
	Worries moderately	52.8
	Worries a lot	37.6
Locks the door of the residence ($N = 1{,}122$)	No	16.6
	Yes	83.4

Source: Authors calculation based on direct survey, March–July 2009.

Table A.6. Variables Description.

Variable	Description
Age	Age — The questionnaire included an open question that required respondents to state their age. The age of the students that answered the survey varied between 17 and 68 years. For estimation purposes, respondent's ages were grouped into five intervals: [17,19]; [20,22]; [23,25];[26,30] and [31,68].
Gend	Gender — This variable refers to the gender of the respondent: male or female.
FieldRed	Field of study (reduced) — Respondents were asked the area of their basic training as a proxy for individual's distinct inclinations or psychological traits. A few adjustments were made in this variable. First of all, for the respondents who were aged under 23 years that stated an area of study different from the one provided by the faculty of enrolment, we assumed that the area of study was actually the one available at the faculty of enrolment because the respondent might have interpreted the area of study as the one he followed in high school. In the case of students that were aged more than 23 years we maintained the area of study even if it was different from the areas provided by the Faculty of enrolment as the respondent might be enrolled in a second level of study in a different area. Finally, we grouped the responses from three areas and categorized them under "Other". This category includes the respondents from Arts, Sports and Law. This procedure was necessary to guarantee a minimum number of responses per category. Thus the areas of training considered in the estimation of the regressions were Exact Sciences, Humanities, Economics and Management, Engineering, Psychology and Educational Sciences, Health Sciences and Other (Arts, Sports and Law).
Inc	Income — Represents monthly family income. The questionnaire referred six intervals of income, in euros, that were also used in our regressions: [0,450[; [450,900[; [900,1350[; [1350,1800[; [1800,2250[and more than 2250.
Fam	Number of family members — In the questionnaire respondents were asked to state how many individuals lived in their household; 1, 2, 3, 4 or more than 4. These were also the figures used in the estimation of our regressions.
Fam Dep	This variable incorporates the answers respondents gave about having individuals that were financially dependent on them. The possible answers were "yes" or "no". This variable was not included in our estimation as over 90% of the students in the sample do not have family dependents. We thus lack observations for the case where there are family dependents to include in the estimation.
Vcrime	Victim of crime — This variable represents if the respondent has previously been the victim of a crime.

Table A.6. (*Continued*)

Variable	Description
Fear	Fear of crime — This variable illustrates the answers respondents gave when asked if they worried about being victims of a violent crime. Three possible answers were presented: does not worry, worries moderately, worries a lot.
Physical injuries	The severity of the physical injuries and psychological damages suffered in a crime could be stated by the respondent using five levels of severity ranging from "no injuries" to "very serious injuries". For practical purposes we decided to group them in three levels of severity: no injuries, some injuries and serious injuries. As 80% of respondents reported having suffered no damages we created a dummy variable that grouped both physical and psychological consequences of a crime: the variable represented the situation of "no injuries" versus "some injuries".
Psychological damages	
LockDoor	Lock the door — respondents could answer yes or no to usually locking the door at home.
PV	Payment vehicle and policy — Respondents could state paying more, the same or less when confronted with the possibility of risk reduction being achieved by increasing policing financed by higher taxes.

Table A.7. Correlation Matrix.

Variables	lnWTP	Age	Gender	Income	Family Elements	Field Reduced	Crime Victim	Fear of Crime	Lock Door	Payment Vehicle	Victim Past 5 Years	Dummy_ Injuries
lnWTP	1	−0.069**	0.146***	0.043	0.025	0.051*	−0.050*	0.244***	0.082***	−0.045	−0.065**	−0.007
Age		1	−0.078***	0.056*	−0.287***	−0.135***	0.018	−0.001	0.018	0.006	−0.061**	0.025
Gender			1	0.144***	−0.006	0.080***	−0.243**	0.149***	0.053*	0.113***	−0.166***	−0.079***
Income				1	0.316***	0.065**	0.078***	−0.66**	−0.008	0.025	0.035	−0.053*
Family elements					1	0.144***	0.003	−0.006	−0.076**	−0.18	0.026	−0.002
Field reduced						1	0.028	0.016	0.012	−0.031	0.009	−0.003
Crime victim							1	−0.052*	−0.001	0.031	0.689***	0.387***
Fear of crime								1	0.151***	0.043	−0.058*	0.049
Lock Door									1	0.049	−0.016	0.026
Payment vehicle and policy										1	−0.004	−0.007
Victim past five years											1	0.299***
Dummy_injuries												1

Legend: ***(**)[*] statistically significant at 1% (5%) [10%] level.

References

Ahlheim, M (1998). Contingent valuation and the budget constraint. *Ecological Economics*, 27, 205–211.

Alberini, A and A Chiabi (2007). Urban environmental health and sensitive populations: How much are the Italians willing to pay to reduce their risks. *Regional Science and Urban Economics*, 37, 239–258.

Anderson, DA (2011). The cost of crime. *Foundations and Trends in Microeconomics*, 7(3), 209–265.

Arrow, K, R Solow, P Portney, E Leamer, R Radner and H Schuman (1993). Report of the NOAA Panel on Contingent Valuation. Available at http://www.cbe.csueastbay.edu/∼alima/courses/4306/articles/NOAA%20on%20contingent%20valuation%201993.pdf. Accessed January 2013.

Atkinson, G, A Healy and S Mourato (2005). Valuing the costs of violent crime: A stated preference approach. *Oxford Economic Papers*, 57, 559–585.

Bateman, I, R Carson, B Day, M Hanemann, N Hanley, T Hett, M Jones-Lee, G Loomes, S Mourato, E Ozdemiroglu, D Pearce, R Sugden and J Swanson (2002). *Economic Valuation with Stated Preference Techniques: A Mannual*. Cheltenham, UK: Edward Elgar.

Bernstein, P, TC Kinnaman and M Wu (2013). Estimating willingness to pay for river amenities and safety measures associated with shale gas extraction. *Eastern Economic Journal*, 39(1), 28–44.

Bjornstad, D, R Cummings and L Osborne (1997). A learning design for reducing hypothetical bias in the contingent valuation method. *Environmental and Resource Economics*, 10, 207–221.

Braakmann, N (2012). How individuals deal with victimization and victimization risk? Longitudinal evidence from Mexico. *Journal of Economic Behavior and Organization*, 84, 223–344.

Brand, S and N Price (2000). The economic and social costs of crime. Home Office Research Study, 217.

Carson, R (2000). Contingent valuation: A user's guide. *Environmental Science and Technology*, 34(8), 1413–1418.

Carson, R, N Flores and N Meade (2001). Contingent valuation: Controversies and evidence. *Environmental and Resource Economics*, 19, 173–210.

Carthy, T, S Chilton, J Covey, L Hopkins, M Jones-Lee, G Loomes, N Pidgeon and A Spencer (1999). On the contingent valuation of safety and the safety of contingent valuation: Part 2 — The CV/SG "chained" approach. *Journal of Risk and Uncertainty*, 17(3), 187–213.

Cobbina, JE, J Miller and RK Brunson (2008). Gender, neighborhood danger, and risk-avoidance strategies among urban African-American youths. *Criminology*, 46(3), 673–708.

Cohen, M (2000). Measuring the costs and benefits of crime and justice. In *Measurement and Analysis of Crime and Justice*, Vol. 4, Criminal Justice 2000, National Institute of Justice (July 2000), NCJ 182411. Available at http://www.ncjrs.gov/criminal_justice2000/vol_4/04f.pdf.

Cohen, M (2007). Valuing crime control benefits using stated preference approaches. Working Paper Number 08-09, Vanderbilt University Law School — Law and Economics. Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1091456. Accessed January 2013.

Cohen, M, R Rust, S Steen and S Tidd (2004). Willingness to pay for crime control programs. *Criminology*, 42(1), 89–109.

Cook, PJ and DA Graham (1977). The demand for insurance and protection: The case of irreplaceable commodities. *Quarterly Journal of Economics*, 91(1), 143–156.

Corso, H, J Hammitt and J Graham (2001). Valuing mortality — risk reduction: Using visual aids to improve the validity of contingent valuation. *Journal of Risk and Uncertainty*, 23(2), 165–184.

Cummings, R and L Taylor (1999). Unbiased value estimates for environmental goods: A cheap talk design for the contingent valuation method. *The American Economic Review*, 89(3), 649–665.

Czabanski, J (2008). *Estimates of Cost of Crime — History, Methodologies, and Implications*. Berlin/Heidelberg: Springer.

Davis, R (1963). The value of outdoor recreation: An economic study of the Maine Woods. *Doctoral Dissertation in Economics, Harvard University.*

Dolan, P, G Loomes, T Peasgood and A Tsuchiya (2005). Estimating the intangible victim costs of violent crime. *British Journal of Criminology*, 45, 958–976.

Dolan, P and T Peasgood (2007). Estimating the economic and social costs of the fear of crime. *British Journal of Criminology*, 47, 121–132.

Hanley, N and C Spash (1993). *Cost-Benefit Analysis and the Environment*. England: Edward Elgar Publishing Company.

Holland, JL (1997). Making vocational choices: A theory of vocational personalities and work environments (3rd ed.). Lutz, FL: Psychological Assessment Resources, Inc.

Jongejan, R, S Jonkman and J Vrijling (2005). Methods for the economic valuation of the loss of life. In *Proc. Conf. Int. Law and Management of Large Scale Risks 2005*, M Boyer, N de Marcellis and B Sinclair-Desgagne (eds.), Montreal, Canada.

Kline, P and S Lapham (1992). Personality and faculty in British universities. *Personality and Individual Differences,* 13(7), 855–857.

Korpershoek, H, H Kuyper, R Bosker and G van der Werf (2013). Students' preconceptions and perceptions of science-oriented studies. *International Journal of Science Education*, 35(14), 2356–2375.

Lee, DR and CM Hilinski-Rosick (2012). The role of lifestyle and personal characteristics on fear of victimization among university students. *American Journal of Criminal Justice*, 37(4), 647–668.

Ludwig, J and P Cook (2001). The benefits of reducing gun violence: Evidence from contingent valuation survey data. *Journal of Risk and Uncertainty*, 22(3), 207–226.

MacDonald, Z (2002). Official crime statistics: Their use and interpretation. *The Economic Journal*, 112, 85–106.

Marta-Pedroso, C, H Freitas and T Domingos (2007). Testing for the survey mode effect on contingent valuation data quality: A case study of web based *versus* in-person interviews. *Ecological Economics*, 62, 388–398.

McFadden, M and T-L Porter (2011). Australian Federal Police drug investigations: benefit-cost analysis. *International Journal of Public Sector Management*, 24(4), 368–378.

Miller, T, M Cohen and B Wiersema (1996). *Victim Costs and Consequences: A New Look.* National Institute of Justice, Washington DC: US Department of Justice.

Ministério da Administração Interna (2012). Relatório anual de segurança interna — Ano 2010, *Gabinete do Secretário-Geral do Sistema de Segurança Interna*, Portugal, http://www.portugal.gov.pt/media/564302/rasi_2010.pdf. Accessed January 2013.

Mitchell, R and R Carson (1988). Evaluating the validity of contingent valuation studies. In *Amenity Resource Valuation: Integrating Economics with Other Disciplines*, G Peterson, B Driver and R Gregory (eds.). State College, PA: Venture Publishing Co., pp. 187–200.

Moore, S (2006). The value of reducing fear: an analysis using the European social survey. *Applied Economics*, 38, 115–117.

Moore, S and SP Shepherd (2006). The cost of fear: shadow pricing the intangible costs of crime. *Applied Economics*, 38, 293–300.

Morrison, MD, RK Blamey and JW Bennett (2000). Minimising payment vehicle bias in contingent valuation studies. *Environmental and Resource Economics*, 16, 407–422.

Norinder, A, K Hjalte and U Persson (2001). Scope and scale insensitivities in a contingent valuation study of risk reductions. *Health Policy*, 57, 141–153.

Özdemir, S and FR Johnson (2013). Estimating willingness to pay: Do health and environmental researchers have different methodological standards? *Applied Economics*, 45(16), 2215–2229.

Pearce, D and R Turner (1990). *Economics of Natural Resources and the Environment*. New York: Harvester Wheatsheaf.

Persson, U, A Norinder, K Hjalte and K Grálen (2001). The value of a statistical life in transport: Findings from a new contingent valuation study in Sweden. *Journal of Risk and Uncertainty,* 23(2), 121–134.

Piquero, NL, MA Cohen and AR Piquero (2011). How much is the public willing to pay to be protected from identity theft? *Justice Quarterly*, 28(3), 437–459.

Pouta, E (2005). Sensitivity to scope of environmental regulation in contingent valuation of forest cutting practices in Finland. *Forest Policy and Economics*, 7, 539–550.

Rajkumar, A and M French (1997). Drug abuse, crime costs, and the economic benefits of treatment. *Journal of Quantitative Criminology*, 13(3), 291–323.

Rennison, CM (2009). A new look at the gender gap in offending. *Women and Criminal Justice*, 19(3), 171–190.

Rice, M, G Harris, C Lang and C Cormier (2006). Violent sex offences: How are they best measured from official records? *Law and Human Behaviour*, 30(4), 525–541.

Roeser, R (2006). On the study of educational and occupational life-paths in psychology: Commentary on the special issue. *Educational Research and Evaluation*, 12(4), 409–421.

Rubinstein, G (2005). The big five among male and female students of different faculties. *Personality and Individual Differences*, 38, 1495–1503.

Salem, ME and DE Mercer (2012). The economic value of mangroves: A meta-analysis. *Sustainability*, 4(3), 359–383.

Schreck, JC, GC Ousey, BS Fisher and P Wilcox (2012). Examining what makes violent crime victims unique: Extending statistical methods for studying specialization to the analysis of crime victims. *Journal of Quantitative Criminology*, 28, 651–671.

Silver, C and J Malone (1993). A scale of personality styles based on DSM-III-R for investigating occupational choice and leisure activities. *Journal of Career Assessment*, 1(4), 427–440.

Streff, F, L Molnar, M Cohen, T Miller and S Rossman (1992). Estimating cost of traffic crashes and crime: Tools for informed decision making. *Journal of Public Health Policy*, 13(4), 471–471.

Suarez, E and TM Gadalla (2010). Stop blaming the victim: A meta-analysis on rape myths. *Journal of Interpersonal Violence*, 25(11), 2010–2035.

Tavares, C, G Thomas and F Bulut (2012). Population and social conditions statistics in focus. *Eurostat: Statistics in Focus*, 6/2012, European Commission.

Thaler, R (1978). A note on the value of crime control: Evidence from the property market. *Journal of Urban Economics*, 5, 137–145.

Tita, G, T Petras and R Greenbaum (2006). Crime and residential choice: A neighboorhood level analysis of the impact of crime on housing prices. *Journal of Quantitative Criminology*, 22, 299–317.

Tokar, D, A Fischer and M Subich (1998). Personality and vocational behavior: A selective review of the literature, 1993–1997. *Journal of Vocational Behavior*, 53, 115–153.

Van Dijk, J, R Manchin, J Van Kesteren, S Nevala and G Hideg (2007). The burden of crime in the EU: A comparative analysis of the European Crime and Safety Survey (EU ICS) 2005. Available at http://www.europeansafetyobservatory.eu/downloads/EUICS_The%20Burden%20of%20Crime%20in%20the%20EU.pdf. Accessed January 2013.

Viscusi, W (2000). The value of life in legal contexts: Survey and critique. *American Law and Economics Review*, 2(1), 195–222.

Viscusi, WK (1993). The value of risks to life and health. *Journal of Economic Literature*, XXXI, 121–134.

Viscusi, WK (2008). How to value a life. *Journal of Economics and Finance*, 32, 311–323.

Walker, A, J Flatley, C Kershaw and D Moon (2009). Crime in England and Wales 2008/2009, Vol. 1 — Findings from the British Crime Survey and police recorded crime. Home Office Statistical Bulletin.

Webber, A (2010). *Literature Review: Cost of Crime*. Australia: Attorney General & Justice.

Whittington, D and S Pagiola (2012). Using contingent valuation in the design of payments for environmental services mechanisms: A review and assessment. *World Bank Research Observer*, 27(2), 261–287.

Whitty, JA (2012). Insensitivity to scope in contingent valuation studies: New direction for an old problem. *Applied Health Economics and Health Policy*, 10(6), 361–363.

Whynes, D, J Wolstenholme and E Frew (2004). Evidence of range bias in contingent valuation payment scales. *Health Economics*, 13, 183–190.