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Incremental willingness to pay: a theoretical and empirical exposition

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Abstract

Applications using the standard willingness to pay (WTP) approach (where a respondent is asked his/her WTP for each option) have brought to light inherent difficulties in terms of discriminating between various options. Although an incremental WTP approach (where a less preferred option is used as a point of reference to value more preferred options) has been devised to encourage more discrimination, a theoretical basis for this approach has not been elucidated, and results from initial testing of this approach have proved inconclusive.

We offer a theoretical basis for the incremental approach, based on the theory of reference dependent preferences. Our theory was tested in a study assessing preferences for different emergency care services in France. Our empirical findings are in line with our theoretical framework which shows that, in the standard approach, WTP values for each provider - predominantly reflecting improvements over the status quo - fail to discriminate between alternative options. The incremental approach provides more discriminating values and consequently can be used in priority-setting contexts.

1. Introduction

The use of direct willingness to pay (WTP) methods to value publicly-funded amenities remains a controversial issue. This is partly because it involves monetary valuation of the benefits of such amenities, but also because its use in such contexts involves examining hypothetical scenarios. Nevertheless, given the persistent use of cost-benefit analysis (CBA) methods and the necessity for decision makers to make choices between alternative options, it could be argued that the real question is whether the validity of explicit WTP valuation can be improved upon.

Controversy dates as far back as the National Oceanographic and Atmospheric Administration (NOAA) Panel's recommendations on the conduct of such studies (NOAA, 1993) and the related negative views first expressed by Diamond and Hausman (1994) and recently reinforced (Hausman, 2012). The key point is that when several competing options for public funds are being evaluated, the standard practice of eliciting a WTP value for each option fails to discriminate between all the options, whether using within- or between-respondent comparisons.

This lack of discrimination has been blamed on embedding, which is most commonly portrayed as a failure to discriminate between different sizes of a given good (Schkade and Payne, 1994). In health care, there are many examples of a more general form of embedding, whereby respondents state a preference for one type of health care over another, but WTP values then fail to discriminate these preferences in the same way (Olsen and Donaldson, 1998). Each of these examples of embedding could be attributed to various motives, one of which being the purchase of moral satisfaction, wherein respondents indicate their general sympathy with a broad type of amenity (say, health care) by stating the same WTP for specific forms of that amenity (Kahneman and Knetsch, 1992).

The above challenges to the standard use of WTP led to an alternative incremental WTP approach where a less preferred option is used as a point of reference to value more preferred options (Shackley and Donaldson, 2002). However, initial testing of this approach proved inconclusive, and the authors underlined the need for more evidence. Furthermore the theoretical basis of the approach has never been delineated. This paper deals with both of these issues.

The development of the approach, including potential practical improvements to the survey method, is outlined in the next section. Following this, we present a theoretical basis for the approach based on reference-dependent preferences. This builds on the development of reference-dependent preference frameworks for addressing both the endowment effect and imprecise preferences, whereby the harnessing of reference points can be used to generate more-structured preferences, thus recovering "explanatory power" (Giraud, 2010). In the work outlined, we are less concerned with overcoming the issue of status quo bias (to which reference-dependent theory has been usefully applied (Sagi, 2006; Masatlioglu and Ok, 2005)) and more with examining how to achieve more discriminating answers.

After outlining our hypotheses, we present an empirical test of the incremental WTP theory based on a survey of the general public to assess their preferences for mutually exclusive options for publicly-funded emergency and out-of-hours health services in France. The results of the study are discussed in terms of their implications for the stated theory and for future research and policy.

2. Background and proposed theory

2.1 The incremental approach

By definition values for 'intangibles', including health care, are not easy to validate as it is difficult to make 'real world' market place observations. Given this situation, one can alternatively develop simple tasks, for example by first having consumers rank competing programmes and then compare the WTP elicited (and the ranking implied by these WTP) against this ranking. Why conduct such studies at all? One reason is the competition for public funding which various multiple programmes compete for. These programmes need to be evaluated by every respondent (Boardman et al., 1996; Luchini et al., 2003). Respondents rank various healthcare options in order of preference and provide a WTP for each. Analysts use this latter to elicit extra information about strength and direction of preference. This is particularly important when aggregating responses over several stakeholders who may have conflicting rankings.

If we wish to use the WTP method in improving policy-making, we must ensure that respondents' preferences can be validated. To do this there must be an acceptable degree of convergence between rankings by respondents and those inferred from stated WTP values (e.g. three programmes 1,2,3 ranked in order of preference by an individual with corresponding WTP values of $100, $75 and $50, respectively, shows good agreement). However, early results from 'EuroWill', an EU funded project in the health arena, demonstrated a lack of convergence (Olsen and Donaldson, 1998; Olsen, 1997; Olsen et al., 2005). More generally, the inability of individuals' WTP values to discriminate between various health care programmes has been highlighted in the context of the comparison of multiple programmes. Despite these adverse empirical results, practitioners who use the WTP method argue that such results are the consequence of flawed study designs (Carson et al., 2000; Smith, 2003) and that WTP responses are typically influenced by the individual's reference point (Kahneman et al., 1991; Morrison, 2000). Although "reference dependent preference" theories have been developed to address issues of endowment effects, imprecise preferences, and status quo biases (Sagi, 2005; Masatlioglu and Ok, 2005; Giraud, 2010), they have not been developed specifically to address the issues related to embedding outlined above. We propose an approach wherein we utilize a less preferred option as an explicit point of reference from which to value more preferred options.

Shackley and Donaldson's (2002) incremental WTP approach was developed to deal with the challenges which the EuroWill Project was confronted with. It encourages more differentiated answers and a higher degree of consistency among respondents. A simple example follows: the hypothetical individual gives a value of $50 for her lowest-ranked programme. She is then asked how much more she would be willing to pay for her second-ranked programme. Matching the values from the paragraph above, we would expect the response to be $25 (as $25+$50=$75). It must be noted that the incremental approach applied in EuroWill did not significantly increase convergence (Shackley and Donaldson, 2002). However, the number of consistent responses reported in previous papers (Shackley and Donaldson, 2002) suggested that further development of the method would have the potential to improve the use of WTP in the policy making arena (Olsen et al., 2005).

The survey which we describe here is an improvement on previous work as follows: first, the wording of questions in previous questionnaires may not have been clear for some respondents. In the EuroWill survey, the incremental WTP questions were phrased as "How much more would you be willing to contribute each year to expand the ……. programme compared with the ……. programme?". Some analysts speculated that the term "compared with" may have led respondents to believe they were being asked to pay for all three programmes from their budget rather than any one programme (Shackley and Donaldson, 2002). We removed this term and tried to ensure that respondents understood that their outstanding 'budget' was not diminished by the WTP values they provided for previous (i.e., less preferred) programmes.

Second, moral satisfaction or warm glow could explain inconsistencies between explicit ranking and ranking inferred from WTP values in the EuroWill incremental survey (Andreoni, 1990; Kahneman and Knetsch, 1992). Moral satisfaction is purchased when a respondent states a positive WTP for what he/she believes is a good cause. Contribution size is of secondary importance to the fact of providing a positive WTP. The consequence is that WTP cannot be used to accurately evaluate and discriminate different programmes. Although the EuroWill's incremental approach was designed to avoid this, all the programmes considered were given values above the 'baseline' value stated for the lowest ranked programme. This increased the possibility of inconsistencies. In contrast, in the survey reported here, each successive programme is valued above that ranked immediately below it, thereby providing consistent incremental measures of valuation. One possible criticism of this is that consistency is forced. Nevertheless, one could also argue that such a basic test of rationality is fundamental for any method to be validated. Moreover, the incremental approach has never been compared directly with the conventional approach of providing a total WTP for each competing programme.

Third, it is possible that the ranking exercise and the WTP valuations are seen by respondents as two different processes. In an earlier survey using the incremental approach (Shackley and Donaldson, 2002), the ranking exercise had individuals indicate the importance of programmes while the WTP questions focused on values attributed to each specific programme. It is possible that the former caused respondents to adopt a societal perspective, while the latter invoked a

more individualistic standpoint. In the present study, the wording of the questions was amended to convey the notion of individual value in both contexts as follows: "Rank these programmes in order, according to how highly you value them, starting with the one you like most."

2.2 Theoretical framework

The incremental approach is built on the theory of reference dependent preferences (Koszegi and Rabin, 2006; Munro and Sugden, 2003; Schoemaker, 1982). In line with this theory, we assume an individual's response to a WTP question is influenced by their reference point. In line with our study, we focus on the amenity under evaluation being health care. As we can see in Figure 1, the policy maker must choose an efficient level of the amenity *h*, where $h_i \in H$ is an exogenously determined level of health amenity (e.g., a health policy or service provider) available to an individual among the larger set of services *H*. Individuals also have preferences over ***x***, a vector of *n* consumption goods. An individual's preferences are described by the utility function $u(x, h_i; h_0)$, where h_i is the (exogenously determined) level of the amenity under evaluation, h_0 is the agent's reference level of the amenity (perhaps their status quo level of medical treatment), and $h_i, h_0 \in H$. We assume $u(x, h_i; h_0)$ to be increasing, continuous, concave, and differentiable in *x* and h_i. We also assume that

$$\partial u(.)/\partial x \to 0 \text{ as } x \to 0. \quad (a)$$

In accordance with other theories and empirical research on reference dependency (e.g., Heath et al, 1999; Kahneman and Knetsch, 1992), equation (a) implies that individuals are more sensitive to changes in consumption bundles closer to their reference point than those more distant from their reference point. Experimentally, Heath et al (1999) find support for this assumption in their use characterization of goals as reference points: individuals are more sensitive to marginal changes around a reference point when said reference point is closer to their status quo position. Morrison and Oxoby (2013) find a similar sensitivity to marginal changes in financial decision making environments when the reference point changes. In an empirical investigation using marathon runners, Allen et al (2014) find empirical support for equation (a).

As such, equation (a) assumes that the concavity of $u(\cdot)$ in h_i is relative to the reference level h_0. Thus small changes in h above or below the reference level yield larger changes in marginal utility, with changes declining for subsequent increases or decreases beyond the reference level. This is equivalent to, using Figure 1, the marginal rate of substitution being larger when one is making comparisons around the bundle (x_0, h_1) based on a reference point of h_1 (indifference curve u_1) than when one is making similar comparisons using a reference point of h_0 (indifference curve u_0'). Mathematically, this is equivalent to assuming that

$$\frac{\partial^2 u(\mathbf{x}, h_1; h_0)}{\partial h_i \partial h_0} > \left(\frac{\partial^2 u(\mathbf{x}, h_i; h_0)}{\partial \mathbf{x} \partial h_0}\right)\left(\frac{\partial u(\mathbf{x}, h_i; h_0)}{\partial \mathbf{x}}\right)^{-1} \quad \text{...(b)}$$

Note that if utility is separable in $\mathbf{x}$ and h, it is sufficient to assume that

$$\frac{\partial^2 u(\mathbf{x}, h_1; h_0)}{\partial h_i \partial h_0} > 0. \quad \text{(c)}$$

Reference dependency (see Fig 1) implies that an individual places greater value on marginal changes closer to their reference point. Accordingly, if individuals are initially at (x_0, h_0), with preferences given by u_0, an exogenous increase in h to h_1 will shift their indifference curve to u_0' (Note: since the new level of healthcare is given, the individual cannot trade from (x_0, h_1) to a preferred bundle). However, when h_1 becomes the agent's new reference point, their indifference curve is now represented by u_1 and no longer u_0'. Given their new reference point, the individual now values marginal changes around h_1 (measured by the slope of u_1 at h_1 more than they did when valuing changes from their old reference point of h_0 (measured by the slope of u_0' at h_1)). The crossing of indifference curves at the point (x_0, h_1) does not imply that the individual is indifferent about bundles along u_0' and u_1. Each of these indifference curves is distinct and defined for a different reference level *h*.

This formulation of preferences has similarities to recent developments in characterizing reference dependency. While we take a standard modelling approach to reference dependency (incorporating a reference point directly into the utility function), axiomatic approaches to

reference dependency have enabled a more rigorous approach to welfare measurements. Most recently, Ok et al (2015) develop an axiomatic approach to reference dependency in which the weak axiom of revealed preference is relaxed to account for the behavioural phenomena associated with reference dependency. The authors postulate "reference acyclicity," an axiom providing a level of consistency to changes in the reference point and the corresponding effect on choice. A similar "no-cycling" approach is taken by Sagi (2006) to maintain transitivity within a decision environment with changing reference points. Similarly, Masatlioglu and Ok (2005) establish a rational choice framework for reference dependency in which reference dependency is characterized by the use of a nested series of preference relations. Our approach is closer to that of Masatlioglu and Ok (2005) in that one could characterize different reference points as nested relations within our overall utility maximizing framework.

In the current study, we do not postulate reference acyclicity. Rather our consideration is on the application of eliciting WTP valuations where individuals have different reference points in the dimension of h but are measuring a policy option h_i that is more preferred than the reference point. In our application, one should consider a policy maker asking for a ranking of alternatives, and then measurement across a subset of those rankings (e.g., most preferred against next-most preferred) where respondents are asked to consider the least preferred alternative as a reference point. This tried to capture the idea that, if only two policies are to candidates for implementation, the opportunity cost of one alternative is not the status quo, but rather the other alternative under consideration. By fixing the reference point (by the policy maker) we maintain transitivity of choice.

Towards this end, assume a policy maker is contemplating changes that would raise the level of h from h_0, one set raising the level to h_1, another to h_2. In Figure 1 we assume that, for our representative individual, $h_1 > h_2$. However, one could also assume a set of preferences where the individual views $h_2 > h_1$, given her particular health status or medical needs. We interpret $WTP(h_i, h_0) \in [0, y]$ as the income the individual is willing to forgo for an increase in health amenity from h_0 to h_i, such that his utility remains unchanged from when only h_0 was available. To discern the optimal policy (measured in terms of potential Pareto improvements) the policy

maker could ask I_1 individuals for $WTP(h_1, h_0)$ and I_2 individuals for $WTP(h_2, h_0)$. For simplicity and without loss of generality, we assume $I_1 = I_2$. (Alternately, one could measure average valuations in equation d.) If WTP is considered a metric for individuals' preferences, a policy maker can use the reported WTP values to determine the optimal h^* policy. This would be calculated via the index

$$\beta(h_2, h_1; h_0) = \sum_{i \in I_2} WTP\ (h_2; h_0\ ) - \sum_{i \in I_1} WTP\ (h_1; h_0) \qquad \text{(d)}$$

No attempt is made here to discern individuals' preferences between h_1 and h_2. Each is valued relative to the reference point, h_0. In a sense, the individual perceives the opportunity cost of each of h_1 and h_2 to be h_0 (i.e., both options have the same cost). Figure 2 shows the measure $\beta(h_2, h_1; h_0)$ for an individual preferring h_2 to h_1. With x as income (or the numeraire),

$$WTP\ (h_1; h_0) = x_0 - x_1 \text{ and } WTP\ (h_2; h_0) = x_0 - x_2.$$

$\beta(h_2, h_1; h_0)$ is represented by the difference x_1 - x_2, which is small and becomes smaller the larger the improvement in both h_1 and h_2 over h_0. Accordingly one could infer that the individual is effectively indifferent about the two policy options, and this is essentially the embedding problem.

However, for a policy maker the two options h_1 and h_2 do not have the same opportunity cost. Namely, if policy makers can only implement one policy (e.g., due to budget constraints) the true opportunity cost of, say, h_1 is not of h_0 but rather h_2. Exploiting reference dependency to provide a more discerning measure of preference and strength of preference, Figure 3 illustrates the incremental approach wherein the individual is asked to rank the alternatives h_1 and h_2 and then asked her willingness to pay for h_2 given a reference point of h_1. Preferences are now described by u_1, and the increase to h_2 shifts the individual's indifference curve to u_1'. We can now define a new statistic to measure the willingness to pay between these two options:

$$\beta'(h_2, h_1; h_1) = \sum_{i \in I_2} WTP\ (h_2; h_1) - \sum_{i \in I_1} WTP\ (h_1; h_1)\,. \qquad \text{(e)}$$

The latter term of β' may be zero (valuation of a reference point from that reference point), but note that, given our initial assumption, $\beta' > \beta$. Thus, vertical difference between the curves at the

relevant point (here h_2) represented by x'_1-x'_2 is greater than the corresponding gap in Figure 2 and our β' index provides a more-discriminating result in terms of strength of preference between h_1 and h_2.

Given that there is a requirement to choose between the specific policy options and that a genuine difference exists between these options in the minds of respondents, then the harnessing of reference dependency in this way provides an improvement through highlighting the differences between the policy options, and in a way that will lead to more consistency between stated preference orderings and orderings derived from WTP. More specifically, we would hypothesise that:

- When asked to value several competing policy alternatives, respondents are likely to compare each of these against a status quo or 'do nothing' option, and, when these policy options are close substitutes, the respondent is essentially evaluating each policy variation against a common opportunity cost, and thus a non-discriminating set of valuations, or β index, will arise; and, conversely,
- When defining a new reference point, which might be based on the respondent's least preferred form of the amenity, a more-discriminating β index will be obtained.

These are the issues to be investigated in the forthcoming empirical study of emergency services in France. This empirical study serves as a good example because it takes place within the context of trying to evaluate several mutually exclusive options competing for limited resources within a cash-limited publicly-funded system.

3. Data

3.1 Emergency and out-of-hours medical services in France

There are six emergency and out-of-hours medical assistance providers in France. Table 1 shows fixed and mobile services. The latter come to the patient's location and include SAMU/SMUR, SOS Doctors, physicians on duty, ambulance/firemen. Fixed services include outpatient emergency centers and emergency hospital units where the patient travels to. All six services are financed by the national social health insurance system. In France granting access to emergency

or out-of-hours medical care is generally preceded by a telephone call, whereby the operator first assesses the seriousness of the emergency, and then either dispatches a mobile service or requests the caller to go to an emergency unit. Despite this system's goal of maximizing scarce resources, the debate surrounding the optimization of emergency and out-of-hours care is still open. Data on public preferences for the different provision services could help inform future choices. We address this issue by presenting a study of WTP for the competing service providers, comparing the incremental WTP approach with explicit ranking and conventional WTP elicitation. This study also contributes to the scarce literature evaluating emergency and out-of-hours medical services (Hackl and Pruckner, 2006; Van Uden et al., 2003).

3.2 Survey

Between July 17th and July 27th 2009 the polling Institute TNS Sofres carried out a telephone survey assessing preferences for these different emergency services from a representative sample of the French adult population living in urban areas with over 100,000 inhabitants[1]. Respondents were randomly assigned either a standard or incremental WTP questionnaire, creating two study samples to test our theory.

3.3 Questionnaires

Both questionnaires were divided into four sections.

The interviewer first provided introductory information, describing the characteristics of emergency and out-of-hours medical providers (as described above) to ensure all respondents had the same knowledge. The interviewer also told respondents to assume that the costs of the six providers were equal when answering the questionnaire. Respondents then ranked the providers in order of preference, from their most (ranked 1) to their least (ranked 6) preferred provider. In the third section of the questionnaire, they were asked to imagine that financing mechanisms for all six providers had been changed, and consequently the necessary resources would have to be paid for by private households through insurance premia. Only those subscribing to the

[1] This choice was driven by the fact that the number of emergency and out-of-hours providers is much lower in rural areas

corresponding insurance contracts would be able to benefit from emergency care or out-of-hours services. Given this hypothetical situation, respondents were asked what their maximum WTP was in terms of monthly insurance premia. The fourth section collected information about socio-demographic variables, health status, and supplementary coverage. Respondents were also asked whether they had contacted any of the six emergency providers during the previous year.

The third section of the standard and incremental WTP questionnaires differed. In the former, respondents were asked about the maximum premium they would pay for each emergency and out-of-hours provider (Appendix 1), one question per each provider. The order of these questions was randomized to avoid sequence effects (Payne et al., 2000). Furthermore to avoid respondents 'totalling' their WTP amounts (and thereby paying less for later options because of perceived budget constraints), it was indicated to the respondents to imagine that they were given back all the money they indicated for the previous provider before valuing the subsequent provider. Instead, in the incremental questionnaire, after the ranking exercise in the second section, the lowest ranked provider was selected for the first WTP valuation. This became the reference point for each respondent, beyond which each successive programme was valued above that ranked immediately below it. Respondents were asked about the maximum premium that they would pay for the provider ranked sixth and then asked how much more they would pay for the fifth-ranked provider over and above that ranked sixth, for the fourth over and above that ranked fifth, and so on. Again, they were told to imagine they were given back the full amount they were willing to pay for the previously valued provider before valuing the subsequent one.

The following method was used to elicit WTP values in the standard approach: the interviewer first randomly cited one of 20 possible amounts ranging from "5" to "more than 180 euros" per month (Appendix 1). These amounts coincided with the range of the most popular complementary health insurance products offered at the time of the study. If a respondent indicated that this was an amount he/she would definitely pay, the interviewer cited the next highest amount until the respondent said "no" or until the category "more than 180 euros" was reached. If the respondent answered "no" to the first cited amount, the interviewer cited the next lowest amount until the respondents said yes or until "5 euros" was reached. The last (first) value to which the respondents said "yes", going up (down) the scale, was defined as the maximum

WTP. If the respondent said "no" to "5 euros", she/he was asked whether he would be willing to pay anything for the offered product: if he/she answered "no", this was treated as a zero value; if he/she answered "yes", a WTP equal to 2.5 euros was assigned.
The same method was used to elicit incremental WTP values, except for the fact that we used a range of smaller amounts (5 – 100 euros).

An *ex ante* WTP approach (where neither the need for care nor the outcomes are known for certain) was chosen over an *ex post* WTP approach (where respondents' conditions, but not necessarily the outcome, are known for certain) because of the emergency care-based context. In case of extreme emergencies WTP may converge to infinity if respondents are made to imagine that they suffer from acute pain. To date, *ex ante* type approaches have used both insurance premiums and taxation contributions (Olsen et al, 2004). We chose the former as most French people pay (and understand) premiums for complementary health insurance coverage. Instead, a tax increase approach might have induced many protest answers.

In order for the valuation question to be meaningful, we followed Mitchell and Carson's guidelines (1989). First, the overall scenario can be seen as meaningful, in that respondents knew that these services were alternatives to each other. Second, the scenario can be regarded as policy relevant, in that there is a need to optimize across the options. Finally, it is theoretically accurate, in that the opportunity cost of more resources for one option would mean fewer for another (so it is important to know strength of preference of each individual for each option).

3.4 Statistical and econometric methods

We used empirical analysis to test the validity of the incremental approach as follows: (i) did this approach make it possible to differentiate between the various providers? and (ii) did it improve consistency between provider ranking by respondents and their WTP value ranking?

In the incremental questionnaires, WTP for each provider was computed on the basis of incremental answers. For example, if SOS doctors was the 5th preferred provider, then WTP for SOS doctors = WTP for the sixth preferred provider plus the additional WTP for SOS. If SOS

was the 4th preferred provider, then WTP for SOS = WTP for the sixth preferred provider plus the additional WTP for the 5th preferred provider + the additional WTP for SOS. Mean and median WTP values were computed for each provider in both questionnaires. Within each study sample, tests of comparison for WTP for each possible pair of providers were performed using a paired Student t-test and the Pearson chi-square test of the equality of the medians. For each provider, differences in WTP were also tested between the standard and incremental questionnaires.

We computed the ranking distribution for each type of emergency service in both the incremental and standard questionnaires. Chi-squared statistics tested for differences in the distribution of respondents' answers to the ranking question between both questionnaire types.

The ability of the incremental approach to discriminate between various policy options and to improve consistency between respondents' provider ranking and the ranking implied by their WTP values was examined through econometric analyses. We estimated an ordered probit model based on the explicit ranking of providers (1) and a Tobit model based on WTP values (2), controlling for respondents' characteristics as follows:

$$RANK_{ij}^{*} = Z_j\alpha + X_{ij}\beta + \varepsilon_{ij} \quad (1)$$

$$WTP_{ij}^{*} = Z_j a + X_{ij} b + e_{ij} \quad (2)$$

$RANK_{ij}$ is the explicit rank provided by individual i for provider j ($RANK_{ij} \in \{1,...,6\}$, 1 = most preferred provider .... 6 = least preferred provider).

WTP_{ij}^{*} is the maximum WTP of respondent i for provider j. Some WTP values may be left-censored (zero answers) or right-censored (above 180 euros).

X_{ij} is a vector of individual characteristics.

Z_j represents a set of option dummies. "SOS doctors" was used as the reference provider. ε_{ij} and e_{ij} are assumed to be normally distributed.

We tested the assumptions of normality and homoscedasticity in the Tobit models as suggested by Cameron and Trivedi (2009). We used the cluster option in all regressions because each respondent assessed all six emergency providers.

Models were run in incremental and standard questionnaire subsamples. The estimations provided us with a ranking of providers for each questionnaire type and each preference question (implicit ranking based on WTP or explicit ranking). The extent of consistency between the rankings of providers obtained in equation (2) and the ranking based on equation (1) made it possible to assess whether the incremental questionnaire improved consistency with explicit ranking or not.

All statistical analyses and regressions were run excluding those individuals who provided zero answers for all six options. As is usual in contingent valuation studies, we did this to exclude protest answers (Dziegielewska and Mendelsohn, 2007).

4. Results

4.1 Descriptive statistics

The study sample comprised 280 people representative of the adult French population living in urban areas with over 100 000 inhabitants. Half received the incremental version, the other half the standard version. Respondents' characteristics are shown in Table 2. The average age was 50 years old. Twenty-two percent of all respondents assessed their health status as poor. One third had used at least one of the six emergency providers in the previous year. As could be expected by the randomization procedure, there were no significant differences between the two groups in terms of age, education level, marital status, number of children under 15 years old living in the household, income, subjective health status and having supplementary coverage. However, a significant difference was found in terms of gender distribution.

4.2 Results concerning WTP values and explicit ranking of providers

Thirty-four respondents declared zero WTP for all six options (12.14 % in both the incremental and standard questionnaires). The results presented below exclude these people.

Mean and median WTP values for each provider in both questionnaires are shown in Table 3. Outpatient emergency centres had the lowest mean WTP in both (47.8 (incremental) and 29.8 euros (standard)) and paired Student t-tests suggested that this provider was significantly less preferred than all the others (Table 4). In both questionnaires SAMU/SMUR had the highest mean WTP, 117.6 and 47 euros, respectively. However the difference between SAMU/SMUR and ambulance/firemen was not significant in the incremental questionnaire. The same was true for the differences between SAMU/SMUR and SOS doctors and between SAMU/SMUR and doctors on duty in the standard questionnaire. Furthermore, no significant difference was observed between ambulance/firemen, SOS doctors, doctors on duty and hospital emergency units in the standard questionnaire. Instead, in the incremental questionnaire, ambulance/firemen was significantly preferred to SOS doctors, doctors on duty, and hospital emergency units. No significant differences were observed between these three latter providers.

Mean WTP values for all six care providers were significantly higher in the incremental questionnaires. Table 3 shows that the lowest WTP in the incremental group was higher than that in the standard group, which may suggest a kind of bias in one or other of the groups. To investigate this further, for each of the six providers, we examined the number of times it was ranked 5th or 6th, and compared WTP values across incremental and standard groups in those situations[2]. We repeated this analysis for situations in which each provider was ranked 1st to 4th. Looking at the results of this analysis in Table 5, for the least preferred providers (ranked 5-6), the mean WTP is not significantly different between the incremental and standard versions (except for hospital emergency units), while the mean WTP is substantially higher in the incremental questionnaire for providers ranked 1st to 4th. This result provides further evidence of the possibility that respondents found it more difficult to discriminate between various providers in the standard questionnaire.

[2] We bundled ranks 5 and 6 in order to have enough answers in this least preferred category. We also looked at rank 6th versus ranks 1-5 and the results are not qualitatively different from those displayed in Table 5.

Table 6 shows the distribution of provider ranking based on the explicit ranking question. Overall, the most frequently first ranked provider was SMUR/SAMU (34.6% of respondents) followed by ambulance/firemen (29.7%). The least preferred provider was emergency outpatient centres. Both questionnaires reflected the same pattern. However, the third and fourth most frequently first-ranked options differed between questionnaires (Table 6). Performing a chi-square test of differences in the distribution of respondents' answers to the ranking question revealed no significant differences between both questionnaire types.

4.3 Assessing the ability of the incremental approach to provide discriminating values

Table 7 displays econometric results. The results based on equations (1) and (2)[3] are shown for the standard and incremental subsamples.

First, the results suggest that the incremental approach makes it possible to discriminate between the various options while the standard approach does not (see columns 2). SAMU/SMUR and ambulance/firemen are significantly preferred to SOS doctors while in turn the latter is significantly preferred to doctors on duty and outpatient emergency centres. The evaluation is not significantly different between SOS doctors and hospital emergency units. The standard approach does not highlight any significant difference between SOS doctors and other providers except for outpatient emergency centres. This proves the inability to differentiate between the five most preferred providers.

Second, our regression results show that the incremental approach is fully consistent with the explicit ranking of options while the standard approach is only partially consistent (comparing columns 1 and 2). Controlling for respondents' characteristics, the declared WTP based on the incremental approach provides the same ranking of providers (with SOS doctors as the reference category) as the explicit ranking question. Note that the ranking of providers provided by the explicit ranking question (Equation 1) is the same in the standard and incremental subsamples.

[3]Note that the ordered probit model is run on a variable for which the preferred option is equal to one and the least preferred option is equal to 6. This is the reason why the signs of the coefficients differ between columns 1 and 2.

Some other results also confirm that the incremental approach performs well. For example, individuals in the incremental group (but not in the standard one) with higher income were significantly more likely to declare higher WTP. Furthermore, those with "poor" or "excellent" health were more likely to declare higher WTP than those with "good" health. One possible reason for this is that those with poor health were probably more likely to need emergency care, while having excellent health may have captured an income effect and/or an education/information effect, given that those with excellent health had a significantly higher income level ($p < 0.01$) and were significantly more likely to have a university educational level ($p = 0.01$). Moreover, respondents with supplementary coverage were significantly more likely to declare higher WTP for emergency services in the incremental approach. This is in line with the phenomenon of moral hazard in the French context (Buchmueller et al., 2004) and again supports the validity of the incremental approach. Finally, our results show that those who had used emergency care during the previous year declared lower WTP values in the incremental questionnaire. This may be linked to dissatisfaction with the care provided. All questionnaires investigated whether those who used emergency services during the previous year were very satisfied/ satisfied/ not satisfied with the care provided to them. Only satisfied/not satisfied users declared lower WTP than those who had not used any emergency service providers. This was true for both questionnaires but only significant in the incremental one.

The results of the tests reported in Table 7 (Tobit models) suggest that the hypotheses of normality and homoscedasticity cannot be rejected in either questionnaire.

5. Discussion and conclusion

In this paper, we assessed the ability of the incremental WTP approach to provide discriminating values. In essence, our approach, which builds on the reference-dependence theory, asks individuals to explicitly rank the available alternatives and then, using the respondent's least preferred alternative as a reference point, asks them to value more preferred options. We compared the incremental and standard WTP approaches, using explicit rankings as a common comparator and using health care service providers as the good under examination. Our empirical findings are in line with our theoretical framework which shows that, in the standard approach,

WTP values for each provider (which predominantly reflect improvements over the status quo), fails to discriminate between alternative providers. The incremental approach, which defines the reference point from which WTP responses are elicited, provides a more discriminating value for the β index. The incremental approach advocated improves consistency with explicit rankings and provides evaluation results (i.e., ranking of providers) fully in line with those of explicit ranking.

We performed various robustness checks on our results.

First, Table 8 shows the characteristics of individuals excluded from statistical and econometric analyses (i.e. with zero WTP for all of the six options). No significant differences were found between these individuals and other respondents' characteristics in terms of age, gender, education, marital status, family structure, health status, and use of emergency services in the previous year. However, those excluded had significantly higher incomes. Furthermore, they were significantly more likely to be covered by supplementary health insurance. Given that people with higher incomes may decide to self-insure and that those with supplementary coverage are expected to express higher WTP values (moral hazard), these results suggest that excluded individuals were most probably not expressing valid preferences, perhaps because they may have expressed protest answers or may have misunderstood the exercise.

Second, we checked for possible bias by the highest income group by computing mean WTP values for each provider in three income groups (Table 9). In the incremental questionnaire, the highest WTP values were found for the intermediate income group, suggesting that the highest income groups were not necessarily of key importance in shaping the results. Note that the pattern of explicit ordering of options did not differ across the income groups (Table 10).

Finally, we tested for sensitivity of our results to the identification choice of the WTP value. Based on the preference elicitation procedure described above, we identified the maximum WTP value using the following system: going up (and down, respectively) the scale, we took the maximum WTP to be the last (first) value which respondents replied "yes" to. In order to check for robustness, we took into account the possibility that, going up the scale, the maximum WTP

was an unobserved number somewhere between the last value which respondents said "yes" to and the subsequent value which they said "no" to. Accordingly, we estimated an interval data regression model in the incremental and standard questionnaires as an alternative specification to the Tobit model based on equation (2). The results were not qualitatively different from those shown in columns 2 and 4 in Table 7.

Our study has limitations. First, there is no equal ranking in the explicit ranking question. Indeed, one could argue that we prevented the respondents from classifying both options on equal terms. We must remember however, that individuals make such strong choices in the real world when they must prioritize between expenditures. It of course is true that some people may have no preference between two options and the WTP questions allowed for this. However, we found that for any given provider, only approximately 20% of answers indicated equal ranking with another provider, which suggests that most people indeed make strong rankings. This is also confirmed by the fact that the ranking of options provided by the explicit and implicit ranking questions is the same in the incremental questionnaire.

Second, one may argue that the incremental approach forces consistency between explicit and implicit rankings. However, the key contribution of this study was to give WTP the 'best chance' to work in that, if the incremental approach had not greatly improved consistency, it could have been regarded as invalid, thereby representing a serious blow to the validity of WTP methods. This was not the case here.

Third, as already mentioned in the results section, mean WTP values were higher in the incremental questionnaires. This is in line with our theoretical framework and with previous studies using the incremental approach (Shackley and Donaldson, 2002). If there were a baseline value for the least-preferred option, we would then expect that a more-discriminating β index would lead to higher values for remaining options. This does, however, raise the question of which WTP values to use in a cost-benefit analysis, i.e. whether to use WTP values based on the incremental or standard approach. Based on the theory and results outlined here, we would lean towards the incremental approach. As well as the theory predicting a more-discriminating β index, the empirical results on consistency would appear to suggest that the incremental approach

is more capable of pinpointing a structured set of preferences. Nevertheless, both approaches should be followed in future work to gather more data on the extent to which predicted differences matter.

Fourth, we are not clear about the extent of choice scenarios to which the incremental approach can be applied. It could be argued that, we applied it here to decide between close substitutes. However, there is no reason why it could not be applied to choices between more-disparate policy options, as Shackley and Donaldson (2002) attempted to do. The key consideration is whether there are alternative uses of resources when considering any given option.

Finally, it is true that our comparison between explicit and implicit ranking is based on the assumption that WTP rankings and explicit preference rankings should correspond. This in turn is based on the premise that the underlying structure of preferences is stable when respondents are asked to explicitly rank providers and to provide WTP values. Knowing that WTP questions involve monetary sacrifice while the explicit ranking question does not, this premise assumes that the ranking derived from WTP values is not influenced by the respondent having to pay money. It also would implicitly suggest that when respondents are asked to consider both (in our case by providing WTP values after answering an explicit ranking question), their opinion does not change. However, our context does not make it possible to investigate this. However, our context does not make it possible to investigate this.

We have displayed, both theoretically and empirically, the potential to overcome the major problem of embedding in contingent valuation studies.

Acknowledgments

We would like to acknowledge our colleagues who attended the Joint Meeting of UK and French Health Economists, Aix en Provence, 11-13th January 2012, and, in particular, Stephen Birch of McMaster University. Although the term 'marginal approach to contingent valuation' was coined in earlier work by Donaldson and colleagues in the context of encouraging patients involved in preference elicitation exercises to focus on differences between close substitutes (i.e. different ways of treating the same problem), Birch pointed out that the use of this term is problematic, in that it does not reflect the strict interpretation of the term 'marginal' in economic theory. Accordingly, we use the term 'incremental' to emphasise the continued focus of this method on the more general issue of differences between options. We also acknowledge valuable comments from Alain Trannoy and Ken McKenzie and financial support from the Social Sciences and Humanities Research Council of Canada.

Conflicts of interest

There are no potential conflicts of interest

Ethics

The research was approved by ethic committee at ESSEC Business School

Appendix 1: Wording of the WTP questions and hypothetical payment amounts suggested by the interviewer

WTP question

"What maximum monthly premium are you willing to pay to benefit from emergency care and out-of-hours services of *provider x* for you and your household *?"*

The original question in French was : « Quelle prime mensuelle maximale seriez-vous prêt(e) à payer pour que vous et les membres de votre foyer bénéficient des soins de < ACTEUR > dans le cadre de la permanence des soins et de l'aide médicale d'urgence? »

Hypothetical payment amounts suggested by the interviewer

5 euros	100 euros
10 euros	110 euros
20 euros	120 euros
30 euros	130 euros
40 euros	140 euros
50 euros	150 euros
60 euros	160 euros
70 euros	170 euros
80 euros	180 euros
90 euros	More than 180 euros

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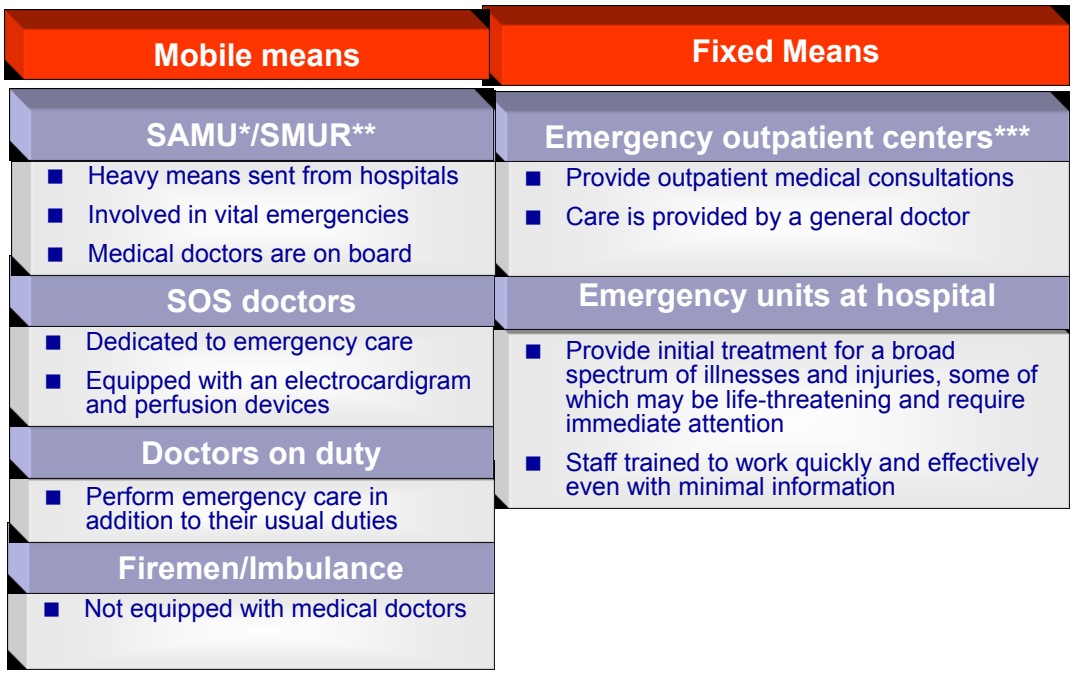
Table 1: Description of emergency providers in France



** Service d'Aide Médicale d'Urgence*
*** Services Mobiles d'Urgence et de Réanimation attachés aux hôpitaux*
**** «Maisons Médicales de Garde»*

Table 2: Descriptive statistics concerning the study population

	All n = 280	Standard questionnaire n = 140	Incremental questionnaire n = 140	p*
Age (mean)	50.1	50.9	49.4	0.46
Male (%)	45.7	39.3	52.1	0.03
Education level				0.60
Secondary school or short professional track (%)	31.4	32.1	30.7	
High school diploma (Baccalaureat)	21.4	24.3	18.6	
Short university studies (2 yrs) or long professional track (%)	15.7	14.3	17.1	
University degree higher than bachelor's (%)	31.4	29.2	33.5	
Individual is married or living in a couple (%)	57.1	57.9	56.4	0.81
Number of children under 15 living in the household (mean)	0.4	0.4	0.4	0.95
Monthly household net Income (1-10)** (mean)	5.7	5.8	5.6	0.64
Health status				0.83
Excellent self assessed health (%)	30.0	30.0	30.0	
Good self assessed health (%)	47.9	49.3	46.4	
Poor self-assessed health (%)	22.1	20.7	23.6	
Individual has supplementary health insurance coverage (%)	90.7	90.7	90.7	1.00
Used at least one of the 6 emergency services in the previous year	33.3	29.3	37.9	0.13

All statistics are weighted

* Test of difference between the standard and incremental versions
(student t-test for continuous variables, chi2 for categorical variables)

** (euros per month) 1 . < 800, 2. [800 - 1000[, 3. [1000 - 1200[, 4. [1200 - 1500[, 5. [1500 - 1800[, 6. [1800 - 2300[, 7. [2300 - 3000[, 8. [3000 - 3800[, 9. [3800 - 5300[, 10. ≥ 5300 euros

Table 3: Mean and median WTP by provider in the standard and incremental questionnaires

		SMUR/ SAMU	SOS doctors	Doctors on duty	Ambulance/ Firemen	Hospital emergency units	Outpatient emergency centres
Standard version (n = 123)	mean	47,0	41,9	43,0	39,8	36,9	29,8
	std	46,9	41,1	42,8	41,3	38,5	35,2
	median	30,0	30,0	30,0	30,0	30,0	20,0
	% of zero answers	9,8	6,5	9,8	10,6	14,6	24,4
Incremental version (n = 123)	mean	117,6	75,4	67,9	111,6	78,9	47,8
	std	133,1	92,2	86,3	129,9	77,6	47,8
	median	70,0	40,0	45,0	60,0	50,0	20,0
	% of zero answers	1,6	8,9	9,8	1,6	1,6	20.33

Table 4: Test of comparison in WTP for each possible pair of providers

	Mean comparison test (1)		Median comparison test (2)	
	Standard questionnaire (n = 123)	Incremental questionnaire (n = 123)	Standard questionnaire (n = 123)	Incremental questionnaire (n = 123)
SMUR/SAMU versus SOS doctors	0,18	<0,01	0,90	0,01
SMUR/SAMU versus doctors on duty	0,33	<0,01	0,80	0,01
SMUR/SAMU versus ambulance/firemen	0,07	0,22	0,52	0,37
SMUR/SAMU versus hospital emergency units	<0,01	<0,01	0,30	0,04
SMUR/SAMU versus outpatient emergency centres	<0,01	<0,01	0,04	<0,01
SOS doctors versus doctors on duty	0,77	0,15	0,90	0,90
SOS doctors versus ambulance/firemen	0,52	<0,01	0,61	0,06
SOS doctors versus hospital emergency units	0,22	0,52	0,37	0,44
SOS doctors versus outpatient emergency centres	<0,01	<0,01	0,02	0,02
doctors on duty versus ambulance/firemen	0,32	<0,01	0,70	0,03
doctors on duty versus hospital emergency units	0,05	0,06	0,44	0,30
doctors on duty versus outpatient emergency centres	<0,01	<0,01	0,03	0,04
imbulance/firemen versus hospital emergency units	0,41	<0,01	0,70	0,25
imbulance/firemen versus outpatient emergency centres	<0,01	<0,01	0,07	<0,01
hospital emergency units versus outpatient emergency centres	0,03	<0,01	0,16	<0,01

(1) paired Student t-test

(2) Pearson chi-squared test of the equality of the medians

Table 5: Mean and median WTP by provider in the standard and incremental questionnaires, depending on the explicit ranking

	WTP in the standard version (n = 123)		WTP in the incremental version (n = 123)		p**
	Mean	n	Mean	n	
SMUR/SAMU ranked 5-6*	39,5	11	30,0	9	0,65
SMUR/SAMU ranked ≤ 4th*	47,8	112	124,5	114	
SOS doctors ranked 5-6*	46,3	26	37,6	36	0,47
SOS doctors ranked ≤ 4th*	40,7	97	91,1	87	
Doctors on duty ranked 5-6*	40,9	61	37,5	53	0,66
Doctors on duty ranked ≤ 4th*	45,1	62	90,9	70	
Ambulance/ Firemen ranked 5-6*	39,8	10	32,9	18	0,76
Ambulance/ Firemen ranked ≤ 4th*	39,8	113	125,1	105	
Hospital emergency units ranked 5-6*	43,8	35	85,8	29	0,01
Hospital emergency units ranked ≤ 4th*	34,2	88	76,8	94	
Outpatient emergency centres ranked 5-6*	28,1	103	30,5	101	0,62
Outpatient emergency centres ranked ≤ 4th*	38,8	20	127,0	22	

* based on the explicit ranking question (see Table 6)

**student t-test (comparing mean WTP for options ranked 5-6 between the standard and incremental versions)

Table 6: Distribution of provider ranking

		1st	2nd	3rd	4th	5th	6th	p*
All questionnaires	SMUR/SAMU	34,6	32,5	17,1	7,7	5,3	2,9	
(n = 246)	SOS doctors	13,0	16,3	22,0	23,6	17,9	7,3	
	Doctors on duty	7,3	6,9	15,9	23,6	35,0	11,4	
	Ambulance/ Firemen	29,7	26,8	21,1	11,0	6,9	4,5	
	Hospital emergency units	12,2	15,0	20,7	26,0	19,5	6,5	
	Outpatient emergency centres	3,3	2,4	3,3	8,1	15,5	67,5	
Standard questionnaire	SMUR/SAMU	32,5	32,5	18,7	7,3	6,5	2,4	0,91
(n = 123)	SOS doctors	17,1	16,3	22,8	22,8	16,3	4,9	0,34
	Doctors on duty	8,1	8,9	11,4	22,0	40,7	8,9	0,12
	Ambulance/ Firemen	30,9	27,6	20,3	13,0	3,3	4,9	0,30
	Hospital emergency units	10,6	12,2	22,8	26,0	21,1	7,3	0,71
	Outpatient emergency centres	0,8	2,4	4,1	8,9	12,2	71,5	0,19
Incremental questionnaire	SMUR/SAMU	36,6	32,5	15,5	8,1	4,1	3,3	
(n = 123)	SOS doctors	8,9	16,3	21,1	24,4	19,5	9,8	
	Doctors on duty	6,5	4,9	20,3	25,2	29,3	13,8	
	Ambulance/ Firemen	28,5	26,0	22,0	8,9	10,6	4,1	
	Hospital emergency units	13,8	17,9	18,7	26,0	17,9	5,7	
	Outpatient emergency centres	5,7	2,4	2,4	7,3	18,7	63,4	

*chi2 test of differences in the distribution of respondents' answers to the ranking question between the standard and incremental questionnaires

Table 7: Estimation of an ordered probit model based on the explicit ranking of providers (1) and a Tobit model based on WTP values (2)

	Standard questionnaire		**Incremental questionnaire**	
	Ranking (1)	WTP (2)	Ranking (1)	WTP (2)
SAMU/SMUR	-0,693***	4,575	-1,035***	49,141***
SOS doctors	*ref*	*ref*	*ref*	*ref*
Doctors on duty	0,442***	0,418	0,259***	-9,658*
Ambulance/ Firemen	-0,615***	-5,193	-0,805***	42,026***
Hospital emergency units	0,21	-9.243	-0,277	4,094
Outpatient emergency centres	1.838***	-18.606***	1,337***	-50,077***
Male	0,009	-2,837	-0,001	30,991
Age 18 - 30	-0,020	21,686	-0,005	95,272*
Age 31 - 50	-0,015	29,581	-0,010	45,806
Age 51 - 65	0,003	-2,619	-0,002	43,215
Age > 65	*ref*	*ref*	*ref*	*ref*
Excellent health status	0,001	-3,980	-0,006	47.327***
Good health status	*ref*	*ref*	*ref*	*ref*
Poor health status	0,014	-1,790	-0,022**	95.457***
Income	-0,038	3,133	0,001	9.856***
Number of children under 15 living in the household	0,006	-12,541	-0,004	-3,853
Individual has supplementary health insurance coverage	0,039	-9,299	-0,025	79.519***
Used at least one emergency service in the previous year	-0,010	-10,967*	-0,005	-44.660***
n	738	738	738	738
Test of normality of residuals (null hypothesis: normal errors)		0,74		0,83
Test of homescedasticity		0,66		0,70

(1) Ordererd probit models clustering for individuals (1 = most preferred option … 6 = least preferred option)
(2) Tobit models clustering for individuals
* significant at 0.10 level, ** significant at 0.05 level, ***significant at 0.001 level
All models include geographical areas (department) dummies
*Individuals with zero WTP answers for all six options are excluded

Table 8: Characteristics of individuals providing zero WTP values for all 6 providers

	Individual with zero WTP values for all six options n = 34	Others n = 246	p*
Age (mean)	50,10	50,10	1
Male (%)	47,06	45,53	0,87
Secondary school or short professional track (%)	26,47	32,11	0,72
High school diploma (Baccalaureat)	26,47	20,73	
Short university studies (2 yrs) or long professional track (%)	11,76	16,26	
University degree higher than Bachelor's degree (%)	35,29	30,89	
Individual is married or living in a couple (%)	70,59	55,28	0,09
Number of children under 15 living in the household (mean)	0,21	0,45	0,14
Income (1-10) (mean)	7,54	5,51	<0.01
Excellent self assessed health (%)	17,65	31,71	0,23
Good self assessed health (%)	58,82	46,34	
Poor self-assessed health (%)	23,53	21,95	
Individual has supplementary health insurance coverage (%)	100,00	89,43	0,05
Used at least one of the 6 emergency services in the previous year	26,47	34,55	0,35

* Test of difference between individuals with zero WTP for all six options and other individuals (student t-test for continuous variables, chi2 for categorical variables)

Table 9: Mean WTP by income level

		SMUR/ SAMU	SOS doctors	Doctors on duty	Ambulance/ Firemen	Hospital emergency units	Outpatient emergency centres
Incremental questionnaire (n = 123)	net income < 1500 (n = 45)	71,8	46,3	42,4	73,1	50,8	31,5
	net income 1500 - 3000 (n = 46)	153,7	91,6	79,8	135,5	97,2	54,0
	net income > 3000 (n = 32)	130,2	92,9	86,8	133,4	93,4	62,4
Standard questionnaire (n = 123)	net income < 1500 (n = 44)	40,5	41,0	44,8	35,9	36,9	28,7
	net income 1500 - 3000 (n = 47)	44,4	42,6	46,9	42,1	32,3	30,4
	net income > 3000 (n = 32)	64,4	45,9	37,7	44,4	45,3	32,7

Table 10: Pattern of explicit orderings of options across the income groups

			1st	2nd	3rd	4th	5th	6th
All questionnaires	net income < 1500	SMUR/SAMU	35,63	32,18	16,09	6,90	5,75	3,45
(n = 246)		SOS doctors	11,49	13,79	27,59	24,14	21,84	1,15
		Doctors on duty	6,90	11,49	14,94	21,84	31,03	13,79
		Ambulance/ Firemen	33,33	26,44	20,69	12,64	4,60	2,30
		Hospital emergency units	11,49	16,09	20,69	26,44	19,54	5,75
		Outpatient emergency centres	1,15	0,00	0,00	8,05	17,24	73,56
	net income 1500 - 3000	SMUR/SAMU	35,16	30,77	21,98	7,69	3,30	1,10
		SOS doctors	12,09	16,48	18,68	24,18	20,88	7,69
		Doctors on duty	9,89	4,40	12,09	24,18	42,86	6,59
		Ambulance/ Firemen	26,37	32,97	19,78	9,89	6,59	4,40
		Hospital emergency units	12,09	13,19	23,08	24,18	19,78	7,69
		Outpatient emergency centres	4,40	2,20	4,40	9,89	6,59	72,53
	net income > 3000	SMUR/SAMU	31,15	36,07	9,84	9,84	8,20	4,92
		SOS doctors	16,39	19,67	18,03	19,67	9,84	16,39
		Doctors on duty	4,92	4,92	24,59	22,95	26,23	16,39
		Ambulance/ Firemen	29,51	16,39	26,23	11,48	11,48	4,92
		Hospital emergency units	13,11	16,39	14,75	29,51	21,31	4,92
		Outpatient emergency centres	4,92	6,56	6,56	6,56	22,95	52,46
Standard questionnaire	net income < 1500	SMUR/SAMU	34,88	32,56	18,60	6,98	4,65	2,33
(n = 123)		SOS doctors	11,63	18,60	23,26	23,26	20,93	2,33
		Doctors on duty	4,65	13,95	11,63	20,93	37,21	11,63
		Ambulance/ Firemen	34,88	25,58	23,26	13,95	2,33	0,00
		Hospital emergency units	13,95	9,30	23,26	23,26	27,91	2,33
		Outpatient emergency centres	0,00	0,00	0,00	11,63	6,98	81,40
	net income 1500 - 3000	SMUR/SAMU	32,61	26,09	23,91	8,70	6,52	2,17
		SOS doctors	19,57	10,87	26,09	21,74	17,39	4,35
		Doctors on duty	13,04	8,70	6,52	23,91	45,65	2,17
		Ambulance/ Firemen	28,26	39,13	15,22	8,70	4,35	4,35
		Hospital emergency units	4,35	13,04	21,74	32,61	17,39	10,87
		Outpatient emergency centres	2,17	2,17	6,52	4,35	8,70	76,09
	net income > 3000	SMUR/SAMU	30,00	40,00	10,00	6,67	10,00	3,33
		SOS doctors	23,33	20,00	20,00	16,67	10,00	10,00
		Doctors on duty	6,67	3,33	20,00	20,00	33,33	16,67
		Ambulance/ Firemen	26,67	13,33	26,67	20,00	3,33	10,00
		Hospital emergency units	13,33	16,67	16,67	23,33	20,00	10,00
		Outpatient emergency centres	0,00	6,67	6,67	13,33	23,33	50,00
Incremental questionnaire	net income < 1500	SMUR/SAMU	36,36	31,82	13,64	6,82	6,82	4,55
(n = 123)		SOS doctors	11,36	9,09	31,82	25,00	22,73	0,00
		Doctors on duty	9,09	9,09	18,18	22,73	25,00	15,91
		Ambulance/ Firemen	31,82	27,27	18,18	11,36	6,82	4,55
		Hospital emergency units	9,09	22,73	18,18	29,55	11,36	9,09
		Outpatient emergency centres	2,27	0,00	0,00	4,55	27,27	65,91
	net income 1500 - 3000	SMUR/SAMU	37,78	35,56	20,00	6,67	0,00	0,00
		SOS doctors	4,44	22,22	11,11	26,67	24,44	11,11
		Doctors on duty	6,67	0,00	17,78	24,44	40,00	11,11
		Ambulance/ Firemen	24,44	26,67	24,44	11,11	8,89	4,44
		Hospital emergency units	20,00	13,33	24,44	15,56	22,22	4,44
		Outpatient emergency centres	6,67	2,22	2,22	15,56	4,44	68,89
	net income > 3000	SMUR/SAMU	32,26	32,26	9,68	12,90	6,45	6,45
		SOS doctors	9,68	19,35	16,13	22,58	9,68	22,58
		Doctors on duty	3,23	6,45	29,03	25,81	19,35	16,13
		Ambulance/ Firemen	32,26	19,35	25,81	3,23	19,35	0,00
		Hospital emergency units	12,90	16,13	12,90	35,48	22,58	0,00
		Outpatient emergency centres	9,68	6,45	6,45	0,00	22,58	54,84

Figure 1: Reference dependent preferences in commodity space.

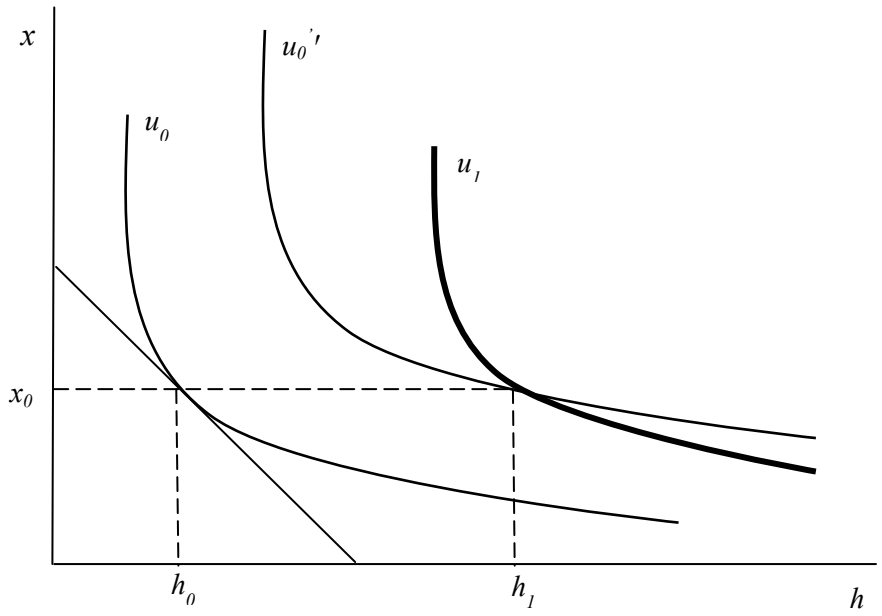


Figure 2: Standard WTP measure comparing h_1 and h_2.

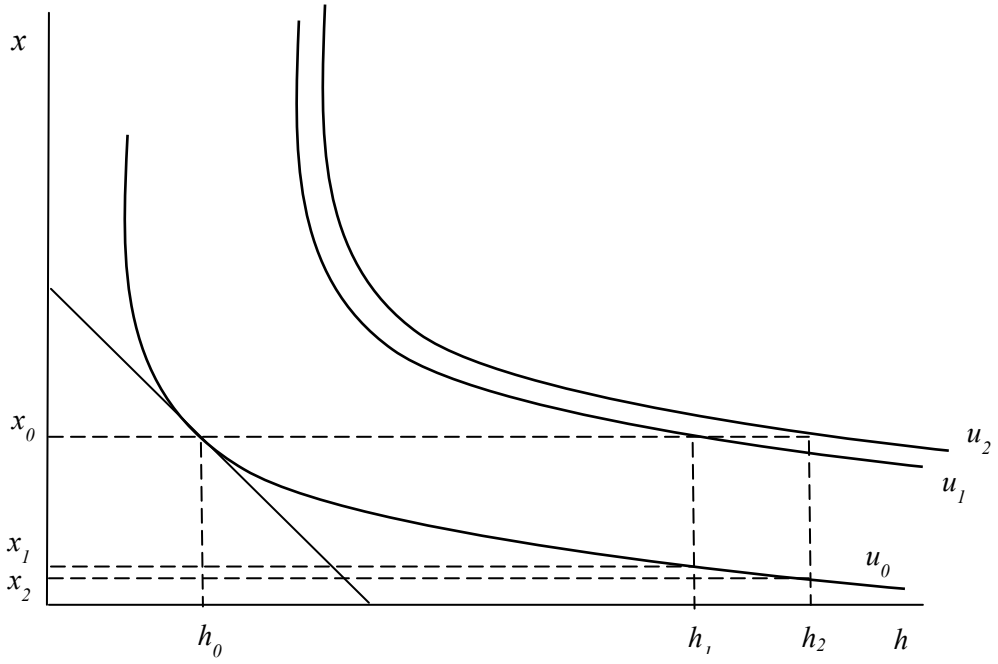


Figure 3: Incremental WTP with reference dependent preferences