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## 3 A Practitioner's primer on the contingent valuation method

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### 3.1 Introduction

Consider the following hypothetical situation. You develop an intellectual interest in some good or service not typically traded in markets. It could be almost anything, such as adverse health effects from a hazardous waste disposal facility, a new sports arena, or preservation of a historic shipwreck. Its value could be important for efficiency reasons (e.g., a benefit–cost analysis of a management plan), for academic reasons (e.g., tests of economic theory), or for more important reasons (e.g., completion of a graduate thesis). Unfortunately, even though you may know the calculus of the consumer surplus triangle, you have no idea how to actually estimate the consumer surplus of anything in real life. Bummer.

You are industrious and dive right into the literature. You learn that there are several ‘implicit market’ methods that can be used to estimate economic value for non-market goods. You learn that the hedonic pricing method can be used to value location-related amenities, the travel cost method can be used to value recreational amenities, and the averting behavior method can be used to value health care and other services. But, these methodologies are not really what you are after. After all, your case study has pure public good attributes. It involves behavior beyond the range of historical experience. It may generate both use value and non-use (gasp!) value.

One lucky day you stumble across the contingent valuation method (CVM). You collect a bunch of journal articles from the *Journal of Environmental Economics and Management*, *Land Economics*, and *American Journal of Agricultural Economics* (to name a few), some books (e.g., Cummings, Brookshire, and Schultze, 1986; Mitchell and Carson, 1989; Bjornstad and Kahn, 1996), and begin to read. The good news is the literature is not difficult to understand (none of the articles are from the *Journal of Economic Theory*). The bad news is you find out that the contingent valuation method is a survey approach to valuation; you must collect your own primary data. Yikes! This topic wasn't covered in graduate school . . . not in Micro I or even Micro II. What are you going to do?

If you find yourself in this situation, don't lose sleep. The solution is almost pain free. You must simply figure out how to design and conduct

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a survey. People write books about this and you can read them. Three classic places to start are Sudman (1976), Dillman (1978), and Sudman and Bradburn (1982). Sudman tells you how to draw a sample, Dillman tells you how to conduct mail and telephone surveys, and Sudman and Bradburn tell you how to ask questions. More recent additions to this literature are Czaja and Blair (1996) with a focus on conducting telephone surveys, Maisel and Persell (1996) on sampling, and Mangione (1995) with a focus on mail surveys. If you read one or two of these books, then you should be in good shape.

What's that? You'd rather not ruin your spring break by reading one or two books? This chapter is an introduction to the collection of contingent valuation survey data. I go step-by-step through the survey design process with the assumptions that you have never conducted a survey before and your research budget is not especially large. After reading this chapter you won't be a survey expert, or look like one, but you will be able to design and conduct your own survey. You may even be able to fake it at professional meetings.

In the next section of this paper I briefly review the benefits and costs of the various data collection approaches available. You can employ mail, telephone, in-person, and other methods of survey administration. Next I'll explore each step in the survey design process. This begins with questionnaire design and covers the nuts and bolts of collecting data. Then I'll cover what should be done with the data once you get it. I'll conclude with some flippant remarks and ideas for your second survey.

### **3.2 Mail, telephone, and in-person surveys**

The issues to consider when choosing survey mode (mail, telephone, and in-person) are cost, time, and the amount of assistance available to you. Mail surveys are by far the least-expensive survey mode for the beginner. You can conduct a mail survey for anywhere from \$5 to \$10 per individual in the sample. So, a mail survey with a mail-out sample of 500 will cost about \$2500 minimum (all values are in 2003 dollars). Mail surveys are labor intensive and, therefore, even cheaper if you don't include the opportunity costs of your own time. You could probably conduct a mail survey of a sample of 500 for \$1500 if you do all the work. Note that the cost per completed interview will fall with increases in the response rate.

In contrast, you probably must hire professionals for telephone or in-person surveys. Cost-effective telephone surveys use computer-assisted telephone interview (CATI) software. The cost of telephone surveys greatly depends on the survey length due to long-distance phone charges. These costs might run from \$15 to \$40 for each 15 minute completed interview. In-person surveys will require mostly the travel and time costs of

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interviewers. Depending on who does the interviews, in-person surveys might cost \$25–\$50 per interview. Of course, all of these estimates rise with the quality of the survey research firm you might wish to employ.

Mail surveys require several months to conduct properly. Once the initial questionnaires are mailed, follow-up mailings should be conducted after about four and eight weeks. Responses will continue to trickle in even after you've developed preliminary willingness to pay estimates. Telephone and in-person surveys can possibly be conducted within a month or so of questionnaire design. If you are in a hurry and have plenty of interviewer help, you could try to conduct a telephone or in-person survey yourself. But, don't expect this to be a pleasant experience. Without the proper training, the interview process can be a painful process. Even worse, the data may end up more flawed than usual. If you wish to sample a large number of households (e.g., 500) in a short period of time (e.g., a few months) with a limited amount of assistance (e.g., one part-time research assistant) and you have other things to do, avoid conducting telephone and in-person interviews. Just think about talking to 500 strangers in addition to your normal professional activities, plus sleeping, eating, and having a little fun.

Other benefits of mail surveys are that you can provide visual aids (e.g., maps, bar charts, photos) and they allow some respondent privacy. Visual aids, which assist respondents with their answers, are impossible to include in a telephone survey. A willingness to pay question is considered by some to be a delicate subject. Mail surveys allow respondents some privacy and plenty of time when considering the amount of money they would give up that would leave them indifferent between having a government project or not. You may also get more honest income responses with mail surveys.

One of the costs of mail surveys is that they are self-administered. In any survey mode you can ask a single willingness to pay question without a serious problem. But, if you have a follow up willingness to pay question that depends on the answer to the first willingness to pay question, you can't trust your respondents to not peek ahead. This will limit your options. Another problem is that it is a bit easier for a potential respondent to throw a mail survey away than to rudely hang up on a persistent telephone interviewer. Low response rates have been reported in journal articles and you can imagine with horror the studies with very low response rates that never made it to a journal. Hopefully, with enough care and effort, this won't happen to you.

### **3.3 Questionnaire design**

The first step in designing your mail questionnaire is to begin thinking about the questions you want to include. Start with the literature review.

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Find contingent valuation studies of topics closely related to yours. If you can't find closely related studies, then find topics that are loosely related. The questionnaire design principles applied to these surveys will be similar to the principles you'll apply to your own survey. Once you find three or four survey instruments that you would like to read, beg the authors for a peek at their instruments. Write a letter, send an e-mail, or even call them on the phone. Most of these folks will pretend to be happy to forward you a copy of their instrument. Borrow the ideas that you like and revise them to your own situation. Make sure you cite the works that you borrowed questions from, at least once.

Once you have an idea of how survey questions look, consider the sections, or type of questions, in your questionnaire. A typical introductory section includes attitudinal questions. This asks for respondent knowledge and opinions about the survey topic. There is not much in economic theory to suggest these questions are important but they are for at least two reasons. First, these questions should be relatively easy, but interesting, to answer. You can also think of these as 'warm up' questions. This gets the respondent ready to answer some tougher and more thought-provoking questions. The second reason is that you might actually find a reason to use these variables when trying to explain your results (e.g., willingness to pay may not be a function of theoretically important variables until you control for respondents who do not have much knowledge about the matter).

The next section of the questionnaire could ask people about their behavior. How many days during the past year did you go outside and were exposed to air pollution? How many trips did you take to the beach during the past year? How often do you read newspapers about endangered species? These questions require more thought than the attitude questions. Trying to remember what you did last week can be a problem. Trying to remember what you did during the past 12 months can be a big problem. While you are thinking about behavioral questions, don't forget economic theory. Each behavior was engaged in because the benefits exceeded the costs. Find out something about the cost of the behavior. Do you have a respiratory condition? How far do you live from the beach? How much free time do you have to read the newspaper? With these questions you can estimate a behavioral model that might in some way be related to the hypothetical valuation questions. This relationship is crucial when trying to convince a narrow-minded skeptic (e.g., a labor economist) that your willingness to pay estimate is a valid measure of Hicksian compensating variation.

The valuation section should contain the primary valuation questions, additional valuation questions, and some debriefing questions. Unfortunately, in a contingent valuation survey you have about one chance to

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elicit an unbiased willingness to pay value. You have one chance because the answer to any other valuation question will be related in some way to the answer to the first question. So, think long and hard about the primary (i.e., first) valuation question and then consider follow-up valuation questions that could be useful. The follow-up questions could be designed to reduce the variance of willingness to pay or they could be designed to elicit willingness to pay values for variations in the scenario. Ask two or more questions, but don't ask twenty; your respondents will tire of these quickly. Once you have all of your valuation questions sketched out, add some debriefing questions. Why are you willing to pay? Why aren't you willing to pay? Why don't you know whether you would be willing to pay or not? You'll also need a demographic section. Discover your respondents' race, age, marital status, education, number of children, and income. These are standard questions that can be borrowed from most surveys.

### **3.4 Writing questions: in general**

You've decided that your questionnaire will have an attitudinal section, a behavioral section, a valuation section, and a demographic section. The next step is to begin writing your own questions. This can be a painful process. No one will understand what you are trying to ask when you first jot down a series of questions. The questions that you thought were only one question will actually be two questions combined into one. Your response categories will not cover the entire range of responses. The range of responses you provide will be ambiguous. It takes some time and effort to craft an effective questionnaire. Be patient.

The two types of questions are open-ended and closed-ended questions. Open-ended questions do not constrain respondents' answers because no response category is given: How many times during the past week did you walk your dog? Closed-ended questions constrain answers by specifying response categories: During the past week, did you walk your dog less than five times, between six and ten times, or more than ten times? The benefit of open-ended questions is that you end up with a point estimate of the response. If this is your dependent variable, you could use ordinary least squares to analyze it. If this is your independent variable, you could include the variable, as answered, on the right hand side of your model. A closed-ended question might give you a yes/no response, an interval response (between \$5 and \$25), an ordinal scale response ('probably yes'), or some other monster that is more difficult to empirically analyze. If the closed-ended question is an independent variable, you usually must recode it into dummy variables. Open-ended questions are also easier to write. You only have to worry about writing the question; you don't have to worry about writing the response categories.

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Although there are significant benefits to open-ended questions, most of your questions should be closed-ended for one simple reason. Closed-ended questions are much easier for respondents to answer. Closed-ended questions will be answered without as much worry about what the answer is supposed to look like (e.g., 'If I answer 93 will Dr Jones, Project Director, think I'm a silly fool?') or about unnecessary detail (e.g., 'Did I spend \$152.36 last year on cheeseburgers or \$152.46?'). With closed-ended questions respondents are able to focus on the question, answer it, and get to the next question. Using a simple rational choice model of answering questions with time constraints, the more difficult the question is, the less well developed the answer. The more time it takes to answer a single question, the fewer questions will be answered. You should plan on asking closed-ended questions in mail surveys unless it is difficult to do so. Some simple rules to follow when you write your questions are: (1) keep the questions (as) short (as possible), (2) make the questions clear, (3) each question should be only one question, and (4) response categories should be mutually exclusive and exhaustive. These rules might seem obvious but they are very easy to break. Try spending a long first day writing a draft of your questions. Go home, get something to eat, sleep eight hours, and go back to work. Then, read your questions carefully again and see how many rules you broke. Ouch!

Survey respondents usually have something else they would rather be doing than answering your questionnaire. Once they decide to tackle your questionnaire, they may only devote a certain amount of time to it. The more text you ask the respondent to read, the more text they will skip and the less accurate their answers will be. Try not to be too ambitious with each question. When writing questions, scratch out any unnecessary words or phrases, don't repeat things, and don't use big words. Unnecessary words and phrases are . . . unnecessary. You don't need them. When you repeat yourself in a question, the respondent gets irritated and may put the survey down. Big words are bad because they take longer to read and not everyone knows what they mean. If your respondent doesn't know what a word in the question means, then their answer to the question may not be what you intended it to be.

The survey question must be clear. Define your terms. If you need a precise measure of household income, don't simply ask: How much income did you make last year? The respondent will wonder what you really mean by income: Is it wages, dividends, and/or profits? If a term in the question might be ambiguous, then define it. Don't use jargon. It is especially tempting to use jargon in the valuation section of the questionnaire. If you want to estimate the benefits of reducing total suspended particulates by 25 per cent, you can't use the words 'total suspended particulates'.

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One trap you may step into is to ask two questions at once. In the contingent valuation literature, the most common example of this problem is the open-ended willingness to pay question: 'What is the most money that you would be willing to pay for improved drinking water from the tap?' This single question is actually two questions. The first implicitly asks the respondent if they would be willing to pay anything at all. The second asks how much? These questions cause easily avoidable confusion among respondents. Split the single question into two questions: 'Are you willing to pay anything?' 'If yes, how much are you willing to pay?'

Response categories should be mutually exclusive and exhaustive. If you ask people how often they brush their teeth, give them more response categories than 'always' and 'never'. Make the categories exclusive. Don't provide '(a) never', '(b) once or twice a day', '(c) two to four times per day' as the three response categories. Some respondents overly deliberate about whether answer (b) or (c) is correct. Some respondents will want to answer 'more than four times per day'. Include this additional category and change the category (c) to 'three to four times per day'.

### **3.5 Writing the valuation scenario**

The contingent valuation scenario must be (as) short (as possible), realistic, and simple. The components of a contingent valuation scenario include a description of the resource or policy context, a description of the policy or proposed change in resource allocation that will be valued, a payment vehicle, and a policy implementation rule. The description of the resource or policy context must be done in a paragraph or two, while explicitly describing exactly what is being discussed.

The description of the proposed policy should make explicit exactly what is being valued. Instead of phrases such as 'will improve drinking water' use phrases such as 'will improve tap water so that it tastes as good as bottled water and you will never get sick from it'. A concrete scenario allows each respondent to understand what, exactly, they are paying for. It also allows you to add different versions to your scenario. Each version can become an independent variable in your model of willingness to pay. Another version in the drinking water example could be constructed from the phrase 'will improve tap water so that it tastes as good as bottled water and you will not get sick more than one day a year from it'. Now you have a SICK variable equal to zero and one, depending on which survey version the respondent received.<sup>1</sup>

Respondents must have a way of paying for the change in resource allocation. In contingent valuation jargon this is the 'payment vehicle'. Typical payment vehicles include increases in water and/or utility bills, increases in state and/or federal taxes, increases in prices of related goods, fishing and

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hunting licenses, and contributions or donations to special funds. You must concern yourself with whether the payment vehicle is realistic, believable, and neutral. A local drinking water issue will not likely be financed with an increase in federal taxes or voluntary contributions. You should first consider whether an increase in the local water bill is realistic. In another example, a policy to limit the number of trawlers scraping the bottom of the local sound will not likely increase the market price of fish. Try using an increase in state taxes to fund enforcement. Some payment vehicles are natural. If you are analyzing the benefits and costs of a red drum fishery management plan, a special red drum stamp that allows the catch of one (two, etc.) drum per trip might work. An example of a payment vehicle that may not be neutral is higher personal income taxes during a taxpayer revolt.

A closely related issue is the policy implementation or payment rule. The policy implementation rule can be explicit or implicit, but it must be enforceable. Otherwise, the contingent valuation question will not be incentive compatible. In the case of a special hunting license, a private good sold by government, the payment rule is implicitly understood by potential hunters. Pay for the stamp or don't go hunting. But, if the hunting regulation in the valuation scenario is not enforceable, many respondents might be happy to say that they would pay \$10 for a duck stamp if it were easy to shoot a duck and not get caught doing it.

Respondents will believe that the state and federal government can raise taxes and enforce their payment. People will believe that a local government can raise utility bills and enforce their payment. The policy implementation rule in these cases is: if enough people are willing to pay enough money, then the government will implement the policy. Respondents have at least a weak incentive to tell the truth.

Voluntary contributions to special funds are more troublesome. The policy implementation rule is the same, but payment is not enforceable. If enough people say they will pay enough money, government may implement the policy. When government tries to collect money for the special fund, they would discover that people free ride. This may cause people who want the policy to overstate their willingness to pay. Voluntary contributions should only be used in valuation scenarios if other payment rules are exceptionally awkward (or if you are studying the economics of voluntary contributions). If the text of your valuation scenario is becoming long and you have no idea how it can be shortened and still maintain the integrity of the study, insert some questions in between the paragraphs. Ask people if they care about the policy: 'How concerned are you about the problem?' Ask people whether they believe what you are telling them: 'How effective do you think the management plan will be?' You might use these questions in your statistical analysis and you might not; but, they will break up the



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text so that respondents remain fresh and continue thinking about what you are telling them. They will also be less likely to skip big chunks of text to get to the next question because they'll be answering questions during the reading of the text.

### **3.6 Writing the valuation questions**

The contingent valuation question is the most important question in the contingent valuation survey instrument. Since you are presenting a hypothetical situation to respondents, it is the most difficult question to write and the most difficult for respondents to answer. It is difficult to write because you must conjure up an imaginary scenario that is realistic, relatively short, and meets the objectives of the study. The question is difficult to answer because even the best contingent valuation scenarios are not realistic, they are long, and they tend to make people think about something they've never thought about before.

#### *3.6.1 Willingness to pay v. behavioral intentions*

A helpful suggestion might be to think of a contingent valuation question as a behavioral intention question, not as a willingness to pay question. A behavioral intention question asks people about behavior under hypothetical conditions: 'Would you donate \$15 if that is how much it cost to protect sea turtle nesting habitat?' or 'How would you vote on the sewer bond if paying off the bonds cost you \$125 per year?' or 'How many shellfish meals would you eat if they were safe and cost \$12?' Many people can imagine how much money they would donate, how they would vote, and how much they would eat under different circumstances. Behavioral intentions are also easier to compare to actual behavior.

Willingness to pay questions ask people to speculate on how much they would be willing to pay for something, not what they would do in a certain situation: 'Would you be willing to pay \$55 for an increase in water quality to the fishable level?' Most people aren't used to being asked about the size of their consumer surplus triangle. Also, hypothetical willingness to pay is not easy to compare with actual behavior. Even so, sometimes the willingness to pay question is unavoidable because a realistic scenario can't be constructed around a behavioral intention question. If this is the case, try to remember the difficulties that respondents have with hypothetical situations.

#### *3.6.2 Open ended v. closed ended*

Just like the typical survey question, there are two types of valuation questions: open ended and closed ended. Closed-ended questions include dichotomous choice (i.e., single-bound), and payment card questions. When follow-up questions are included, single-bound questions can

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become double or even multiple bounded. Even after a zillion journal articles comparing one version of the valuation question against another, many CVM researchers still don't agree about the appropriate form of the valuation question. If your survey budget allows it, try testing one of these against the others.

Many early CVM applications asked the open-ended question: 'What is the maximum amount of money that you would be willing to pay for the increase in ozone attainment days?' This question has several disadvantages. Being an open-ended question, it is relatively difficult to answer. You would really have to think hard about the size of your consumer surplus triangle. Instead, respondents may not think hard and simply say '\$5' or '\$25', the same amount they might write a check for when the neighbor kid asks for a school donation. Respondents will even skip the unfamiliar question entirely and go to the next question (they don't understand that this is the most important question to the CVM researcher!). Being not-so-incentive-compatible (do you tell the car salesperson your maximum willingness to pay?), the open-ended question is relatively easy to free ride on. Respondents might answer 'zero' or '\$1', even if their other answers indicate they might have a much higher value for ozone attainment days.

An alternative to the open-ended question is the payment card question. The payment card question asks an open-ended question but provides dollar interval response categories to respondents. Respondents could be given the following response categories: 'Between \$1 and \$5', 'Between \$5 and \$10', 'Between \$10 and \$15', and 'More than \$15'. Respondents would then indicate the response that most accurately reflects their maximum willingness to pay. You are left with a dependent variable that is almost continuous; for your preliminary models you can code the data at the mid-point of the intervals and model the responses with ordinary least squares regression. A problem is that payment card questions are prone to 'range bias'. In the example above, the average willingness to pay will likely be between \$1 and \$15. If another response category is included, say 'Between \$15 and \$20', the average willingness to pay may rise. The reason is that many survey respondents are very open to suggestion when answering unfamiliar questions. But, if your survey budget constrains you to use small samples, a payment card valuation question is an improvement over the open-ended valuation question.

The earliest version of the closed-ended question was the iterative bidding question. Everyone in the sample was asked: 'Would you be willing to pay \$5 for the oil spill prevention program?' The \$5 was the starting point. If the respondent answered 'yes', they would be asked the question again with a higher dollar amount (say \$10). These questions would continue until the respondent answered 'no'. If the respondent answered 'no', they

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would be asked the question again with a lower dollar amount until the respondent answered 'yes'. You could keep iterating up and down until the respondent's willingness to pay was narrowed down to the dollar. The result was a continuous measure of willingness to pay obtained from relatively easy-to-answer questions that were more difficult to free ride on. Unfortunately, iterative bidding is prone to starting point bias. If your starting point is \$5, the average willingness to pay amount ends up lower than if the starting point is \$25.

The dichotomous choice question has been the dominant form of CV question since Bishop and Heberlein (1979). The dichotomous choice question is similar to the initial iterative bidding question with two differences: (1) the starting point is varied across survey respondents and (2) the starting point is the ending point (i.e., there is no follow-up willingness to pay). The advantage of the dichotomous choice question is that each respondent is asked a single valuation question that is relatively easy to answer. The major disadvantage is that you, the CVM researcher, only learn whether each respondent's willingness to pay is above or below the dollar amount threshold. More sophisticated econometric methods are necessary to develop an average willingness to pay amount. Even then, the variance on average willingness to pay tends to be large. Another disadvantage is that larger samples are necessary to implement the dichotomous choice approach. For each dollar amount version you include in your experimental design, you need a large sample (about a minimum of 30 or so) for statistical purposes. Hence, dichotomous choice contingent valuation costs more money to implement in the field.

The double-bound approach adds one follow-up question to the single-bound question. If the respondent answers 'yes' to the first question, then the dollar amount is increased, typically doubled, and the question is asked again. If the respondent answers 'no', then we are able to bound willingness to pay between the dollar amounts. If the respondent initially answers 'no', then the dollar amount might be halved and the question is asked again. Respondents end up in four groups: 'yes, yes', 'yes, no', 'no, yes', and 'no, no'. The benefit of the follow-up question is that analysis of these data substantially reduces the variance of the average willingness to pay estimate. A disadvantage of the double bound approach is that the responses to the follow-up questions might lead to willingness to pay estimates that differ from the willingness to pay estimates from the first valuation question. In other words, double-bound questions may also be prone to a form of starting point bias.

An extension of the double-bounded question is the multiple-bounded question. 'Yes, yes' and 'no, no' respondents are asked more follow-up questions until their willingness to pay value actually has upper and lower

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bounds. In effect, the multiple-bounded question approach is the same as the iterative bidding approach with a random starting point. The benefit of the multiple bounds is that you can even further reduce the variance of the willingness to pay estimate. The disadvantage is, again, the potential for starting point bias.

Contingent valuation researchers have also experimented with including more response categories to the closed-ended valuation question. The most practical category to include is 'don't know' in addition to the standard yes/no options – a trichotomous choice. After all, this is the most truthful response for many respondents. Polychotomous choice questions might include variations of the yes/no answer to indicate respondent uncertainty by adding categories such as 'definitely yes', 'probably yes', 'probably no', and 'definitely no'. These questions supply useful information about respondent preferences, but the appropriate use of these data in benefit estimation is still to be determined.

Dichotomous choice and payment card valuation questions are the easiest questions to implement in a mail survey. It is more difficult to ask double- and multiple-bounded valuation questions in a mail questionnaire but easy to do in a telephone survey. You must use complicated skip patterns that can be read by respondents before they answer the first question. In a telephone survey, payment card questions are difficult to implement and double- and multiple-bounded questions are easy to implement. Any of these questions are easy to implement in an in-person survey. Experimenting with the valuation question can be one of the more enjoyable components of doing contingent valuation research so don't let this quick review limit your range of choices. Develop your own incentive-compatible valuation questions, split your sample, and compare willingness to pay estimates from the alternative forms.

#### **3.7 Get some feedback**

Now you have a draft of contingent valuation survey questions. The next step in the process is to get some feedback. You'll need to talk with experts and real people about the questionnaire. Ideally, you'll have a research budget line for 'consultants'. If so, finding experts is not difficult. If your budget is smaller you need to be more creative. Ask advice from your graduate school cohort, your colleagues across the hall, and your friends and family members. Tell them that they will be contributing to science. Once they have stopped laughing, offer to buy them a cup of coffee. Eventually, and with the right incentive structure, you'll find plenty of experts and real people to help with your study. Once you have revised the questionnaire you should pre-test it in the field.

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### 3.7.1 *Experts*

Potential experts include scientists from other disciplines who are familiar with the policy (e.g., biologists, toxicologists), those who are familiar with survey research (e.g., sociologists), and those who are familiar with economic values (e.g., economists). Talk with as many of these people as you can. Show them the survey. Ask them to read it and comment. At this point you should be concerned with whether your two paragraph policy scenario covers the facts of the situation and is truthful, whether the questions violate some survey norm that you don't know about, whether the valuation question is incentive compatible and whether it elicits the appropriate Hicksian valuation measure.

Don't be offended by the comments. Most of the experts are trying to help you. Carefully consider what the experts told you and revise the questionnaire accordingly. Only ignore a comment in extreme circumstances (e.g., too much coffee).

### 3.7.2 *Real people*

At this point your questionnaire is utility theoretic and scientifically sound. In fact, you are quite proud of it. You wish there was a *Journal of Questionnaires* that you could submit it to for publication. But, can your grandparents, neighbors, and students understand it? These are the real people who must understand what you are saying and asking. Otherwise, your survey project will be a failure. Making this determination is critical.

If your survey budget is big enough, you have enough money to hire a professional to conduct focus groups. Focus groups are tools used by marketers, politicians, and survey designers to understand how real people react to unfamiliar products, policy speeches, or survey questions. You've probably heard of these from television. You may even have participated in a focus group conducted by a textbook company at a professional conference.

Recruit people the same way you recruited experts. Offer them a token incentive, something besides their contribution to science. Make a donation to a church's special community fund. Make a donation to the local animal shelter. Try to talk to different age groups and don't rely totally on your students. Remember, students aren't always real people and they might be intimidated by the size of your cranium. If you use students, offer them a reward besides extra credit (e.g., a donation to the Kayak Club) and don't conduct the focus group during class time unless it is relevant to the course. You'll have students there who really don't want to participate and don't like what you are making them do. There are also opportunity costs – you really should cover international trade in micro principles.

The focus group can be as formal or informal as you'd like. It can include one real person or several. A typical focus group might involve you and

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several people where you ask them questions from the survey. If they make an ugly face, you know the question needs work. Find out which word(s) are causing the problem(s). Or, the focus group might involve one to three real people reading one page of your questionnaire at a time. Have them talk aloud when they have trouble understanding the contingent valuation scenario or a particular question. Make sure all your visual aids convey the information they are supposed to convey. The focus group shouldn't last much more than an hour. If you haven't covered everything that you want in an hour, let the nice people go home and arrange another focus group. If you are able and the real people are willing, videotape the session or have a research assistant take notes. You won't be able to remember everything that happens.

Don't be offended by the comments. The participants are trying to help you. Carefully consider what they told you and revise the questionnaire accordingly. Only ignore a comment in extreme circumstances (e.g., too much coffee).

#### *3.7.3 Pre-test*

Once you have gone through the second round of questionnaire revision it is time to pre-test the survey in the field. The pre-test is a small-scale survey where you follow most of the steps that you would follow in the big survey. The pre-test is your opportunity to make sure everything works the way it is intended, get an idea about your potential response rate, and identify any potential disasters. The pre-test should be as large as your survey budget and as time allows. If you have the resources, you can even conduct multiple pre-tests and even a large-scale pre-test: the pilot study.

Many researchers can only afford a single pre-test. If this is you, try to find a sample of between 30 and 100 real people. Conduct a mail survey pre-test following the same procedures that are outlined in the next section. Draw a random sample from a phone book (this won't cost anything), mail out your questionnaires, and hold your breath. If you have the time, conduct the follow-ups to the mail survey. The response rate obtained from the pre-test is an estimate of the response rate that you will obtain with the full survey. If the pre-test response rate is low, say between 20 per cent and 40 per cent, then this is an indication that something is wrong with the questionnaire. One of the main reasons that mail surveys are not returned is their length. If this is the case, chop some questions and increase your font size. The benefits of making the questionnaire shorter, e.g., a higher response rate, outweigh the costs of losing the variables from these questions. At some point, a low response rate makes your data worthless.

If 90 per cent of the respondents in the pre-test sample are female, or members of environmental organizations, or some other special population,

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then you have a biased sample. This may have occurred because your survey offended or disinterested members of the groups not adequately represented. The pre-test may also reveal problems with individual questions. If everyone in the pre-test skipped question number 4, then you know that question number 4 is a bad question. Rewrite it or drop it. If any of these problems occur and you don't know why, you'll need to go back to the focus group stage and find out what the problem is.

One of the most important questions you are pre-testing, of course, is the valuation question. If your survey contains a dichotomous choice valuation question, you'll need to pre-test the dollar amounts that are randomly assigned to respondents. You may have an idea of which values to insert after conducting the literature review. For example, if the economic literature indicates that all willingness to pay values for threatened and endangered species are between \$1 and \$75, then this is a reasonable range for your starting points. Still, you need to test these values. Suppose your dollar amounts are \$1, \$25, \$50, and \$100. If everyone answers 'no' to the \$100 willingness to pay question, you aren't learning much from this dollar amount. Consider lowering the \$100 amount to \$75. If more than 40 per cent or 50 per cent of the sample says that they will pay \$100, then add a higher dollar amount. A similar procedure could be used to pre-test payment card response categories. If no one says that they would pay more than \$100 but 55 per cent say they would pay between \$50 and \$100, then you will learn more about willingness to pay by changing the response categories to 'between \$50 and \$75' and 'more than \$75'. If you have no idea what a reasonable range is for your dichotomous choice dollar amounts or payment card response categories, try asking an open-ended valuation question in the pre-test. The range of willingness to pay values obtained give you an idea of the range of dollar amounts to use in the dichotomous choice question. In this case, a second pre-test may be necessary.

If, for some reason, you are not able to conduct a mail survey pre-test, consider a pre-test with convenience samples. Convenience samples include those obtained from intercept surveys. Go to a place where people hang out – the mall, the grocery store, or the boat ramp – and place the survey booklet with a postage paid return envelope on the car windshield. You'll get a lower response rate than if you mailed the survey to people at their home address, but you will distribute a large number of questionnaires quickly and cheaply. If you are bolder, you could 'intercept' people as they are leaving the mall, the grocery store, or getting their boat out of the water and ask them to take the questionnaire home, fill it out, and mail it back to you. You'll probably get a better response if you talk to them.

### **3.8 Survey design**

Once you have completed your revisions and are satisfied with the questionnaire it is time to draw a sample, print a large number of your survey instruments, and conduct the mail survey. Different groups on-campus (e.g., the print shop, the survey lab) or firms in the private sector are available to help you with these tasks. The rest of this section is a 'how to', if your research budget forces you to do these tasks yourself. Another consideration at this point is cost. Questionnaire design didn't really cost you anything, except time and any donations you felt compelled to make for focus groups participants. Constructing the survey and getting it in the mail will cost significant sums of money, even if you are on a shoestring budget.

#### *3.8.1 The sample*

A sample is a set of units from a population. In your case the population is the target group of people that you would like to reach. For example, if all individuals in Kansas is the population, a sample of individuals might be 200 individuals selected from all people in Kansas. There are several types of samples, convenience, quota, and probability samples are a few. You'll want to use a probability sample. A probability sample is one in which every member of the population has a known and non-zero chance of being selected. Units are selected randomly from the population. Probability sampling leads to the most representative samples of the population.

The first step in drawing a probability sample is to construct the sampling frame. A frame is a list of people in the population with contact information. One such list is a telephone book. Other frames include voter registration lists, drivers' license lists, fishing license holder lists, etc. Choose the sampling frame that best matches the population that you wish to survey. With mail surveys of special populations, this can be very difficult. Do the best you can. Even if your sampling frame is a close match to the population, your sample is already potentially biased. Your sample frame will not contain everyone in the population. For example, not everyone has a telephone and not everyone lists their telephone number in the phone book. People move. You have already missed your chance at questioning these people. The potential for bias increases as the size of the missing group grows.

Once you have your sampling frame, you must randomly choose units for your sample. Ideally, assign numbers to each unit in the sampling frame and then draw random numbers to select the individuals to be surveyed. If the sampling frame is large, this will be impractical. For example, assigning numbers to each individual in the phone book would be a long and tedious job. Another way to randomize the selection process is to develop simple rules. For example, if there are 250 pages in the local telephone book and you need 500 names and addresses, choose two names from each page.



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Using your random number generator, pick a random number for the column on the page, and a random number for the names to skip before you find your selection. Or, pick a random number on your ruler and measure that far down the page to select the individual for the sample. If you need to sample a larger region or state, you can gather phone books from each city and town in the region and draw names from each phone book; or randomly select cities and towns to sample. Be careful here and use common sense. You may randomly select five rural areas and miss the largest city in the state. Your resulting sample will be biased. If you are sampling Georgia households, make sure a large number of individuals are from Atlanta. If you really don't care if the probability sample is representative of a larger region (e.g., you will be testing microtheory), you can select a couple of areas to sample from (e.g., a large city and a small town).

You can also purposely choose a biased sampling frame and weight the sample to reflect the true population. For example, suppose there are four urban areas in a region, each urban area has about 150 000 residents, and the region has 1 000 000 residents. The region is 40 per cent rural and 60 per cent urban. If you draw a sample of 500 with 100 names and addresses from each urban area and 100 names and addresses from a few randomly drawn rural towns, your sample will be biased. The sample will be 80 per cent urban and 20 per cent rural. If you weight the resulting data with weights equal to the proportion in the population divided by the proportion in the sample, the weighted sample will be representative of the population. In this case, rural households are under-represented and urban households are over-represented. The rural weight will be  $40/20 = 2$  and the urban weight will be  $60/80 = 0.75$ . Make sure the sum of the weights equals the sample size.

Drawing the sample yourself will not cost you much. Telephone books are available in libraries. If you do have some money, survey sampling firms exist that will provide you specialized samples on demand. These samples will be better than the ones you draw yourself, but they cost money. A fairly recent price quote for a professionally drawn sample is \$75 plus \$.21 for each record (individual) in a computerized file of names and addresses.<sup>2</sup> For a sample of 1000 this will cost \$285.

### 3.8.2 *Gather materials*

Now you have the questions to be included in the questionnaire and a list of names and addresses. You are also going to need a ball point pen or two, several reams of paper, some letterhead, some envelopes, some postage paid return envelopes, an extra long stapler, and some postcard stock. The amount of paper and envelopes you'll need depends on the number of contacts with respondents that you plan to make. The more contacts the

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greater the response rate and the greater the cost. A typical mail survey, with a good chance of obtaining response rates between 40 per cent and 70 per cent, as long as the survey topic is reasonably salient to respondents, might include three potential contacts: the original questionnaire booklet mailing, a post card follow up one week later, and a second questionnaire mailing two to three weeks later.<sup>3</sup> A conservative rule would be to get enough material for two complete mailings; that is, assume that the response to the first mailing is 0 per cent. You will definitely not run out of materials and you'll have plenty left over to supply eager journal referees, conference participants, job interviewers, students, and novice survey researchers who write to you asking for the finished product.

Let's assume you have a sample of 500 individuals. You will potentially send 1000 letters so go ahead and get 1000 sheets of letterhead. If you have letterhead left over, your college, school, division, or department may buy it back from you. Always use letterhead, it will increase the response rate. A blank sheet of paper doesn't look professional. If you can, get 1000 big envelopes with a return address pre-printed or stamped on it. A No. 10 regular white envelope may be too easy for respondents to misplace and it might be difficult to get all your survey materials stuffed into it. Get 1000 pre-printed metered return envelopes. Get 250 sheets of card stock. At the last minute you can get 500 second class postage stamps. You'll then need to get some more postage for the second mailing.

One more design element to consider at this stage is the cover page of the survey. Give your survey a title (e.g., 'Beach Use at the Jersey Shore') and a sub-title (e.g., 'A Survey of Public Opinion'). See other surveys for some ideas. Also find a graphic to put on the cover. If it is a drinking water survey, you might use an image of some grown up with a kid drinking a tall, cold glass of water. Make the cover eye-catching. You are hoping to turn innocent people into survey respondents with it. The logo of your funding agency or university might also be appropriate or required for the cover page. The cover page should also include a paragraph about the purpose of the survey and that all information supplied is confidential. The back page of the survey should thank respondents for completing the survey and give them a chance to tell you anything else that they would like. This text is standard so feel free to borrow it from others.

Construct the questionnaire booklet. Make sure the questions fit nicely on six or ten 7 inch (height) by 8.5 inch (width) pages with one inch margins or, if your research budget is not the minimum, make them fit on the standard 8.5 inch by 11 inch pages. Make sure you are using a font size (e.g., 12 point) and type (e.g., Arial) that is readable by people who aren't wearing their glasses. Real printing shops will make them on 8.5 inch by 11 inch paper with a nice cover.

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If you are constructing the booklet yourself, get 2000 (3000) sheets of 8.5 inch by 11 (or 14) inch white paper for a six (ten) page survey. Take 2 (3) sheets of paper and hold them in 'landscape' mode. Fold them in half and you have a survey booklet. Open the booklet to what would be page 1. Now number the pages in the order that they would be read. Take the pages apart. You'll see that the questions need to be reordered in your word processor so that pages 1 and 6, 5 and 2, and 3 and 4 face each other. If you have different versions of the questionnaire (e.g., dichotomous choice), don't forget to make the different questionnaires different. Once the questions are on the page, fold in the middle and attach two staples with a regular stapler. Oops, the stapler isn't long enough. Now go back to the store and get an extra long stapler. Staple the pages and your survey booklet is ready to go.

The cover letter goes on letterhead. Address the letter to the individual: Dear John Smith, not Dear South Dakota Citizen. This is easy to do with the mail merge function on your word processor. Tell people the purpose of the survey ('the topic is very important to policy makers'), why you sent it to them ('one of only a few chosen'), why it is important that they send it back ('so that the results will represent accurately the opinions of South Dakota citizens'). Tell them it doesn't cost anything to mail it back and tell them to call you during the day or evening with any questions (at this point your potential respondents own your time). Now go get your ball point pen and sign all the letters yourself. If you are sending 1000 letters and questionnaires, sign them all. Sign the first 100. You'll get bored so take a break. Sign 200 more. Your hand will begin to hurt. Go home and sign the rest the next day. It is very important to individually sign all the letters.

Now you need to make the reminder postcards with the cardstock paper. Four postcards will fit on each 8.5 inch by 11 inch sheet. The postcards should remind people how important it is to send their questionnaires back and sincerely thank those who have already sent theirs back. You don't really need to sign these but go ahead and do it if you wish. Buy 500 postcard stamps.

### *3.8.3 In the field*

Gather your research assistant or office mate or any other goofball willing to stuff envelopes in exchange for free pizza. Make sure that you have unobtrusively numbered each questionnaire so that you know who returns the survey and who doesn't. This is crucial. If you overlook this step, then you must hope your initial response rate exceeds some minimum threshold for policy analysis and/or publication. If you use a regular sized envelope, fold the questionnaire so that it will fit inside the return envelope, put the metered return envelope inside the questionnaire fold, and fold the letter so that it will be the first thing your potential respondent sees upon opening

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the envelope. Place a stamp on the envelope, place the envelope in the mail, and cross your fingers.

During the next few days, while the questionnaires are out in the mail, expect some questionnaires to be returned. Some will have bad addresses. This is unavoidable and not your fault. If you are 'sampling with replacement', send another questionnaire to the next person on your list. Also expect a few phone calls. Some people will want to be taken off the mailing list. Do it. Some will be so excited they'll want to send a check. Don't take the check. Tell them where their donation might be useful. Some might even have some questions about the survey. Respond to these the same way you respond to an undergraduate taking an exam – don't give the answer away but try to be as helpful as possible.

The returned questionnaires will hopefully begin to pour in. As each questionnaire is returned, record who returned it, and take this individual off your second mailing list. Put the postcards in the mail about one week after you sent the initial questionnaires. Questionnaires will continue to pour in. When the response has become a trickle, probably in about three to four weeks, send the second mailing out, which includes a second cover letter, questionnaire, and return envelope. The cover letter should be similar to the first cover letter but written more aggressively. Begin it with something like: 'A few weeks ago we sent you a survey on manatees in Florida. At this point we have not received your completed questionnaire'. Once you have signed all the cover letters again personally have another envelope stuffing party and put the second mailing in the mail.<sup>4</sup>

When you sit down to enter the data into a computer spreadsheet you'll encounter a few surprises. Respondents don't always follow your carefully explained directions. If given a choice between 'yes' and 'no', they will write 'maybe' beside the answers. If you ask them how many trips they took to the beach last year, they might write 'between 10 and 15' instead of a point estimate. When coding these responses use your best judgment. You don't want to lose an observation but you also don't want to answer the question for the respondent. If you code the 'maybe' response as a 'no' and the 'between 10 and 15' trip response as 12, make a note of this with an additional variable in your data for each applicable problem (e.g., JUDGE = 1 if a coding judgment call, 0 otherwise). When conducting your empirical analyses, determine if these judgment calls make a difference to your results. Are these people outliers? What happens to willingness to pay when you exclude them from the analysis? If a significant number of respondents require a coding judgment call on a key variable, make sure you have a footnote explaining what you did. Also during the questionnaire mailing process a significant event might occur that you feel may bias your overall results (e.g., an oil spill).<sup>5</sup> Create a new variable in your spreadsheet that is

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equal to 0 for questionnaires that were returned before the event and equal to 1 afterwards. Then you can test the effect of the event on the results. It will be impossible to test the effect of the event on the response rate, although you can tell a story if you think the event did affect the response rate. Try not to make the story sound like an excuse for a low response rate.

### **3.9 Reporting the results**

Once the final responses stop trickling in you have your data. You'll be tempted to write out your likelihood function and begin testing your path-breaking models. Before you do, take a minute to conduct and write your research methods report. The methods report is that paragraph or two that you some people don't read in CVM papers that discuss the response rate and other things about data handling. Your initial methods report needs to be more detailed than this for several reasons. First, it is like eating oatmeal – it is the right thing to do. Second, at least one journal referee is going to want more detail about the sampling and survey procedures. Third, you'll learn much about the quality of your data if you explore it first before diving in with regression analysis. With this discovery you may be able to improve data quality. So, consider the following issues in the methods report.

#### *3.9.1 The response rate*

The survey response rate is calculated as the number of surveys returned divided by the number that reached their intended target. Some report the number of surveys returned divided by the number distributed. The former calculation will produce a higher response rate. It is also a more accurate measure of how well you developed your questionnaire. The latter response rate measures how well your questionnaire was developed and how well you sampled the population. If your sampling frame contains a number of bad addresses, then your response rate will be low. Professional sampling firms guarantee that only about 80 per cent of the names on their lists are still there. You should not be held to a higher standard so report the former response rate. If you mailed 1000 questionnaires and 200 of these were returned because of bad addresses, then 800 reached their intended target. If 400 of these were returned completed, then your response rate is 50 per cent. If you must, report both response rates.

#### *3.9.2 Non-response and selection bias*

You'll next need to see if your sample of 400 is representative of the population you sampled from. Look at the means of the demographic variables. Is the average income about the same as the population average income? Are there 52 per cent women and 48 per cent men as you expected? If not, you may have non-response bias. Non-response bias occurs when the

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respondents and non-respondents are different sorts of people for spurious reasons. Your non-respondents probably didn't look at the questionnaire before they threw it away. In other words, suppose you were able to collect contingent valuation data from non-respondents. When you estimate your willingness to pay model with a non-respondent dummy variable as a factor potentially affecting willingness to pay, the coefficient on this variable would not be significantly different from zero. You should treat a (non-response) biased sample the same way you treat a stratified sample. It doesn't matter whether you meant to collect a biased sample or not. Correct for non-response bias by constructing weights that make the weighted means of the data look like the population means.

A more serious problem is selection bias. Selection bias occurs when the respondents and non-respondents are different because of your survey topic. Suppose again that you were able to collect contingent valuation data from non-respondents. When you estimate your willingness to pay model, the coefficient on the non-respondent dummy variable would be significantly different from zero. Non-respondents might have a higher or lower willingness to pay for the policy problem your survey addresses. For example, individuals with relatively low incomes could not afford to pay higher taxes, so, instead of answering 'no' to your willingness to pay question, they did not return the questionnaire to you.

There is little to do about selection bias unless you know something about non-respondents. The best approach is to collect some information from non-respondents in a follow-up survey. Remember, non-respondents didn't reply in great numbers to your initial mail survey so they probably won't reply in great numbers to your follow-up survey, even if it is much shorter. You could, however, give them a call and obtain their gender, marital status, education, and etc. Once you have data on non-respondents, test for selection bias with the standard sample selection econometric models. Estimate a probit model with response as the dependent variable and, if your independent variables explain the response behavior well, adjust willingness to pay statistically.

In practice your non-respondents will be of both types. In the absence of reliable weights or a follow-up survey of non-respondents, you should make some adjustments to your average willingness to pay value when aggregating benefits across the population. For example, if respondent income is much higher than the income of the population and income is a positive and significant predictor of willingness to pay, then your willingness to pay estimate may be biased upwards due to selection effects. To get a more accurate predicted measure of sample willingness to pay, you could plug population income into the willingness to pay function and aggregate the adjusted average. A more heavy handed solution to this problem is to

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set non-respondent willingness to pay equal to zero and aggregate. This gives you a lower-bound estimate of aggregate benefits. The aggregated average willingness to pay is an upper bound. A problem with this approach is that the width of the upper and lower bounds will be quite large and less useful for policy analysis if you have a relatively low response rate.

### *3.9.3 Item non-response bias and data imputation*

Now begin to look at your variable summaries more closely. Your data suffer from item non-response. The sample sizes on each of your variables will be different. People skip some questions for some seemingly obscure reasons. The sample size on income will be the lowest of the demographic variables. One-fourth or more of the sample may refuse to reveal their income. Item non-response can lead to bias in the same ways that non-response and sample selection led to bias.

If you begin to estimate regression models with these data, your sample sizes will be different every time you include a different combination of demographic variables. You are engaged in what is called incomplete case analysis. The problem with incomplete case analysis is that when comparing regression models you are comparing apples and oranges. Some respondents drop out of Model 1 when you estimate Model 2. Even more respondents drop out when you estimate Model 3. Models 1, 2, and 3 are not comparable. If you conduct complete case analysis by deleting all observations with missing values, your useable response rate may fall significantly. In the response rate example above you may lose 100 additional observations from your sample of 400. Your useable response rate has fallen to 37.5 per cent. Your useable sample may be quite different from the original sample. This is no good. You have just deleted a lot of information provided by your respondents.

To increase your useable sample, you should consider data imputation. Imputation involves making up numbers, scientifically of course, for your missing values. You can impute with a measure of the central tendency of the distribution. If 50 people didn't report their education level, assign them the mean, median, or mode education level from the sample that reported income. More complicated imputation schemes are often desirable. Run frequencies on your variables with missing values against other variables. If the average education of women and men is significantly different, don't plug in the overall average for missing education values. If the average education level for women is 14 years, plug in 14 years of education for all women who did not report their education. The case of income is even more complex. If 100 people didn't report their income, estimate a regression model with income as the dependent variable using the 300 complete cases in your data. Predicting income for the 100 respondents is called conditional mean

imputation. You are plugging in the average income conditional on other important variables such as education and work experience.

Make sure that you assess whether data imputation affects your willingness to pay results. There is a tradeoff. An increased sample size will lead to increased statistical efficiency. But, by imputing with the mean, median, or mode, the variability of the variable will fall. So, don't blindly impute values and estimate regression models. For each variable that has a significant number of imputed values, create a second variable (e.g., EDUC2). Run the regression models with both variables. If the results with the imputed data are no different than with the complete case data, then don't worry. Or, create a dummy variable (= 1 if the case contains imputed values) and include it in your willingness to pay model. If the coefficient on the dummy variable is insignificant, then imputation does not significantly affect your results.

### **3.10 Conclusions**

Once you have conducted your own survey, you'll never be the same economist again. You'll become aware that most economic data isn't generated by transactions in markets (cha-ching!), directly fed into a super computer, and electronically delivered to the economist. It is generated during surveys of the population, nicely cleaned and coded, and then electronically delivered to the economist. A contingent valuation survey is not much different from the surveys conducted by government agencies that economists use frequently.<sup>6</sup> The only difference is our obsession with valuation questions. Also, once you have conducted your own survey, your discussant comments and referee reports could become much more irritating to those who receive them as you incorporate your understanding of sampling, non-response bias, etc. Survey methodology is an important tool for economic research. Don't be ashamed of your new powers. Use them for the good of society. If your colleagues make fun of you in seminars or at lunch, just give them a smug smile. Not all super heroes with secret identities get a knowing pat on the back.

Once you have conducted your own contingent valuation survey, you'll probably want to conduct another. If you are fortunate enough to have an increased budget, consider other survey modes. If your research budget is a bit higher than that for a low budget mail survey but still relatively low, explore the possibility of 'piggybacking' on someone else's telephone survey. This involves writing a contingent valuation section and inserting it into another related survey. Some university survey research centers have institutionalized the piggyback survey with their annual, biannual, or quadrannual omnibus surveys. A typical survey research center might allow researchers to purchase space for a single question for \$300 to \$500 on an omnibus survey. A ten question contingent valuation scenario might cost between \$3000 and \$5000. By taking advantage of economies of scale, you'll



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get a large data set (e.g.,  $n = 1000$  or so) with your ten questions and standard demographics at relatively low cost.<sup>7</sup>

Your next big budget survey, conducted by the professionals, could employ state-of-the-art telephone–mail, telephone–mail–telephone, or in-person interviews. The telephone–mail survey employs an initial telephone survey to collect demographic data and recruit participants for the mail survey. You will obtain a high quality-sample and information about the non-respondents to your mail survey. The telephone–mail–telephone survey is similar, but, instead of trusting respondents to answer the questions and mail the survey booklet back to you, you call them and ask them the questions. Hopefully, respondents have studied the information that you sent them in the mail and are able to refer to the survey booklet while the interviewer asks them questions. Finally, if you have the research budget that is the envy of all other contingent valuation researchers, hire some gee-whiz professional survey firm to conduct thousands of in-person interviews. May the force be with you.

### Notes

- \* The author would like to thank Jammie Price and Paul Chambers for numerous constructive comments.
- 1. When adding scenario versions to your survey, be careful that the experimental design does not compromise the validity of your valuation scenario (see Leik, 1997).
- 2. This price quote was obtained from Survey Sampling, Inc. (<http://www.surveysampling.com>), September 1999.
- 3. A very thorough mail survey will contact respondents as little as three and as much as seven times. For respondents who send the survey back immediately, they'll get an introductory letter or postcard, the questionnaire itself, and a follow up postcard. Non-respondents (those who never answer your questions) will get the three contacts, a second and third survey instrument, an additional postcard and, finally, a telephone call.
- 4. If you can afford it, send a second postcard reminder/thank you about a week after the second mailing. You can also follow-up with telephone calls if necessary to get a decent response rate.
- 5. During the University of Kentucky basketball arena survey, Coach Rick Pitino resigned to take the head coaching job with the Boston Celtics (Johnson and Whitehead, 2000). In a surprise to the researchers (and probably Coach Pitino) willingness to pay for the new UK arena did not depend on Rick Pitino coaching the Wildcats.
- 6. If you would rather use data gathered by the government, as most of our labor economist colleagues do, but still want to do contingent valuation research, take a look at the 'National Survey of Fishing, Hunting, and Wildlife-Associated Recreation'. The 1980, 1985, 1991, 1996, and 2001 surveys contain contingent valuation sections. The data are available on CD-ROM from the US Fish and Wildlife Service, Division of Federal Aid (<http://fa.r9.fws.gov/surveys/surveys.html>).
- 7. Many of these centers have websites that will give you an idea of what is involved with a telephone survey.

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