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Monetary Valuation of Environmental Goods: Alternatives to Contingent Valuation

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Chapter 1

Introduction

"Pecunia non olet."

This was the typical answer of the Roman emperor Titus Flavius Vespasianus (30-81 AD) when residents complained about stench nuisance from the vegetables, fish and cattle markets. According to Titus it is all very simple: when money is earned, the side effects do not matter. Money doesn't smell.

Today's world is much more complex. Now it does matter what the side effects are. Economists even invented a name for them: externalities. They also came up with the solution. By pricing side effects like stench nuisance, these side effects are no longer side effects but are internalised in the market. This thesis is about pricing side effects. The side effects considered here are typically environmental externalities, and the methods for pricing these externalities are called monetary valuation methods.

1.1 A Précis of the Plot

The most well-known monetary valuation method is the contingent valuation method, or CVM for short. This method uses a questionnaire to elicit people's preferences for environmental goods by finding out what they are willing to pay for specified improvements of these goods. A standard CVM question in the case of the Roman vegetables, fish and cattle markets would be (roughly speaking):

Imagine that the markets could be relocated. Such a relocation entails costs, e.g., for rebuilding the new market place. How much are you willing to pay for such a relocation if the stench nuisance would be halved?

The CVM is very popular among valuation researchers. Most textbooks about environmental economics deal with the CVM, journals publish piles of articles about CVM studies, and most valuation papers presented at conferences are based on the CVM. Leading economists, like Nobel Prize winners Arrow and Solow, argue that the CVM represents the most promising approach yet developed for determining prices for the environment (Arrow et al., 1994). Also, a large amount of money is spent at improving the CVM, and many scientists earn their living by doing research in the field of the CVM.

"Its uses –and fees for carrying them out– continue to grow at rates seldom seen among adaptations of academic scribblings." (Knetsch, 1994, p.14)

Apart from this large group of proponents, there are also those researchers who do not agree with the monopoly position of the CVM in the field of monetary valuation. Some of the latter group even severely criticise the method (e.g., Hausman, 1993). The debate between opponents and advocates is rather fierce.

One of the aims of this thesis is to examine this debate regarding the pros and cons of the CVM. The main objective, however, is to introduce alternative valuation methods to the CVM. The underlying idea is that the monopoly position of the CVM does not seem completely justified. The popularity of the CVM is not caused solely by its scientific superiority. Put in the words of Plott (1993, p. 468):

"As a measurement technology, does the CVM do a good job? The answer to the question is no. [...] Does it measure what the underlying philosophy of welfare economics and preference theory requires it to measure? Again the answer is no."

The popularity of the CVM is also caused by the strong and effective pr-offensive of the proponents. This has even resulted in the fact that the use of this method has been given a legal status. Like any monopoly, the position of the CVM is rather immune to criticism.

"There has been little accommodation, or even recognition, of the evidence pointing to a need to change current contingent valuation practices. Most practitioners of resource valuations, and eager consumers of their findings, remain in a state of denial. [...] Rather than a continuation of current practice, perhaps socially desired interests and

objectives might be better served by a more even-handed regard for empirical findings.” (Knetsch, 1994, p. 25)

Therefore, it seems reasonable to introduce other methods that do not necessarily replace the CVM but complement it. The alternatives discussed in this thesis include the conjoint measurement method, the welfare evaluation method, and the well-being evaluation method. All of these methods use questionnaires, as does the CVM. The three alternatives are very briefly described here; the reader is referred to chapter 4 for an elaborate description of the methods.

Conjoint measurement method

In a conjoint measurement questionnaire, respondents are asked to order a set of vignettes (cards with several qualitative and quantitative characteristics of the environmental good under valuation). Sometimes, respondents are also asked to mark the vignettes and to indicate which of the vignettes are acceptable to them, i.e., would they really pay for the situation portrayed in the vignettes. Provided that one of the vignette's characteristics is a monetary value, it is theoretically possible to deduce prices from the answers to the vignettes questions as stated by the respondents. Applications of conjoint measurement will be described in chapters 5 and 6.

Welfare evaluation method

The welfare evaluation method is based on the income evaluation question (Van Praag, 1971): “Which monthly after-tax household income would you, in your circumstances, consider to be very bad? Bad? Insufficient? Sufficient? Good? Very good?”. By translating those six verbal levels into numerical evaluations ($1/12, 3/12$ until $11/12$), and by relating these numerical evaluations to personal and environmental circumstances, it is theoretically possible to determine the influence of a particular environmental effect on the evaluation of income. The corresponding income change necessary to compensate for a change in the environmental effect can then be calculated.

Well-being evaluation method

The well-being evaluation method resembles the welfare evaluation method, except for the fact that it measures a broader concept than welfare, namely well-being. The method is based on the Cantril (1965) question: “Here is a picture of a ladder, representing the ladder of life. The bottom of this ladder, step 0, represents the worst possible life, while the top of this ladder, step 10, represents the best possible life. Where on the ladder do you feel you personally stand at the present time?”. These self-reported well-being positions (0 to 10) are then related to various personal and

environmental circumstances. From this relation it is possible to determine the influence of a particular environmental effect on the evaluation of well-being. Compensations can now be calculated, based on the idea that well-being should not be affected by a change in an environmental effect. An application of the well-being evaluation method is given in chapter 6.

1.2 A Critique of Monetising the Environment

Not everybody agrees with the economic solution to environmental problems, in fact not even all economists do. Therefore, some relativising remarks are in order. The objections to monetising the environment can be divided into two categories, practical objections and moral objections.

Practical issues concerning monetising the environment

The first category of criticisms includes practical issues like the neglect of preferences of future generations, the uncertainties of ecological effects and the impossibility to measure ecocentric values.

The first major problem in monetising the environment is the fact that preferences of future generations are not taken into account. Individuals have a positive time preference, that is, they prefer benefits now rather than later. Both consumers, via this positive rate of time preference, and producers, via the social opportunity costs of capital, treat the future as less important than the present (Spash, 1993). However, environmental damages incurred at present are often irreversible, i.e., a degradation that cannot be repaired afterwards, like the permanent loss of tropical forests, wetlands, or certain species. In the presence of such irreversibilities, valuation by currently living individuals is risky. This is certainly true if the resource in question is unique and no substitute is available. Until now there is no universally acceptable method to take the interest of future generations into account. One way of dealing with intergeneration environmental problems (such as the depletion of the ozone layer), is by the institution of safe minimum standards.¹

The second issue regarding monetising the environment implies that, due to the ecological uncertainties, environmental goods cannot reliably be translated into economic values. For example, the effect of greenhouse gases is a long-term and uncertain effect. Some climate scientists argue that we are faced with an increasing greenhouse effect, while others are sceptical about the importance and urgency of the greenhouse problem (Böttcher, 1992, pp. 6-7). Moreover, most environmental effects

are multidimensional effects, i.e., some of the greenhouse gases (chlorofluorocarbons) also effect the ozone layer. It may therefore be impossible to map all the effects of a good into a single dimension, namely a monetary value (Vatn and Bromley, 1995).

The third difficulty concerns the fact that valuation methods do not capture all values, but economic values only. After all, monetary valuation methods are based on part of the neoclassical economic theory which only takes into consideration anthropocentric values. E.g., a service has economic value only if it enters at least one individual's utility function or one firm's production function. As it is practically impossible to measure the utility of animals or plants, ecocentric or non-human values do not exist in economic theory. Intrinsic (that is, not related to use) value exists only in humans and not in animals, plants and other natural resources (Hanley and Spash, 1993). To some people this is arrogant and unacceptable. They argue that, because of the disregard of ecocentric values, the environment cannot be monetised properly. However, to many other people anthropocentrism is acceptable. For example, the Rio Declaration on Environment and Development contains the following First Principle:

"Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature." (UNCED, 1992, p. 1)

Moral issues concerning monetising the environment

The second category is a generally moral one. Many people are convinced that the environment should not be priced, because it as abhorrent as putting a price on family, friendship or freedom (Beder, 1993). For instance, slavery is immoral, not because slave traders place too low a price on human beings, but because human beings should not be priced at all. In the same line of reasoning, individual members of species, like a black bear, can have a market price, but it is very difficult or perhaps immoral to quote a market price for the species of black bear. Another example is given by Sagoff (1988, pp.68-69).

"The Church once auctioned off indulgences. It sold future shares in heaven at the margin with a very favorable discount rate. Was it a good idea to establish a market in salvation? Of course it was. How else can you determine how much an infinity of bliss, discounted by the probability that God does not exist, is worth? The Church membership, however, grew a little disillusioned when it saw that the favors of the Lord were auctioned for silver and gold. This disillusionment was one cause of the Reformation."²

According to these criticisms, decisions about the environment should not be made via calculus, but through ethical or intuitive considerations. Monetising the environment means that moral and ethical considerations are taken over by capitalism.

“The notion of nature and the market as separate moral realms became established in Victorian society when both nature and the family came to be seen as retreats –havens from Victorian capitalism. [...] The family and nature were seen to offer temporary escape from the drudgery and grind of the working place. Somehow or other, the human spirit could find release from the cash nexus in these settings.” (Lowe et al., 1993, p. 105)

The fear of monetising the environment is related to the fact that economists tend to know the price of everything but the value of nothing³: although environmental goods often do not have a (correct) price, that does not mean they do not have a value. This is the difference between a financial analysis, which is concerned only with goods and services in the market, and an economic analysis, which is concerned with society's well-being or welfare.

A personal note about monetising the environment

At the outset of this thesis, I will give my own point of view regarding the feasibility of monetising the environment. I agree with those who state that one cannot measure *the* value of environmental goods, but I contend that one can elicit *preferences* for environmental goods and so produce measures directly comparable with the values of marketed goods. Thus, the primary purpose of economic benefit valuation is not to consider what should be the market price for an environmental good, but to estimate subjective valuations for the good in question. Moreover, monetary estimates of environmental effects do facilitate, but do not imply, a cost-benefit analysis, and leave room for other methods of decision making. Finally, the exercise of monetary valuation does not preclude or supersede other approaches to environmental problems, like for instance an institutional or ecological approach.

On the other side, I think we should indeed be careful with monetising the environment, since the monetary value is not the only important characteristic of the environment. So, cost-benefit analysis may be too narrow. Other decision criteria than monetary costs and benefits, like the income distribution, the vicinity of other polluters and potential victims, the toxicity of the contamination, efficiency and sustainability, are equally important. Therefore, the price or value resulting from the monetary valuation

techniques discussed in this thesis, should be incorporated in something like a multi-criteria analysis, and the price should not be treated as the omnipotent factor.

Although, I do not agree with all of the criticisms reviewed above, I am well aware of the fact that mere price corrections cannot be sufficient to solve environmental problems. Moreover, besides the contributions of economics, the contributions of other disciplines, like psychology, law, chemistry and ecology, are very important. As one of my PhD supervisors once wrote: "*the economist must not take the place of the decision maker: Quod licet Jovi non licet bovi.*" (Lambooy and Opschoor, 1974b, p. 372). Of course, as an economist I can make an effort to interpret to the best of my ability the possibilities offered by economic theory, and to translate these into methods that can be applied in everyday practice.

1.3 An Overview

This book consists of two parts. The first part is devoted to the theoretical framework of monetary valuation, and the second part to the empirical results of two valuation studies conducted as part of this thesis.

Part I contains chapters 2, 3 and 4. Chapter 2 discusses monetary valuation from three different theoretical viewpoints. The first viewpoint is that of the well-known neoclassical economics. The others are those of the institutional economics and the relatively unknown ecological economics. Chapter 3 describes and discusses the contingent valuation method, since, after all, it is one of the aims of this thesis to analyse the debate between advocates and proponents of the CVM. The main objective, however, is to introduce alternative valuation methods to the CVM. In chapter 4 three alternatives are introduced in the field of the monetary valuation of environmental goods, namely the conjoint measurement method, the welfare evaluation method, and the well-being evaluation method.

Part II includes chapters 5 and 6. In chapter 5 the results from the IJburg study are discussed. In this study the contingent valuation method as well as the conjoint measurement method were used, and the results are compared here. In chapter 6 the Schiphol study is reviewed. In the latter study, the three alternative methods to the CVM were put into practice, but only two of them are discussed in the main text of chapter 6, namely the well-being evaluation method and conjoint measurement.

Finally, chapter 7 contains the conclusions and the summary.

Endnotes

- ¹ The safe minimum standard approach states that we should avoid irreversible environmental damages unless the social costs of doing so is unacceptably large. See section 2.2.1 in chapter 2.
- ² In a small study conducted by *USA Today* among rich people ("What would you pay for these unmarketed goods?"), they gave the following answers (translated in Dutch guilders): f1,292,800 for a place in heaven, f983,740 for true love, and f822,140 for enormous intelligence (in: *Panorama*, April 21-28 1999).
- ³ The original quote "A cynic is someone who knows the price of everything but the value of nothing" was taken from Oscar Wilde, *Lady Windermere's fan* (1893). An anonymous and probably cynic economist substituted 'economist' for 'cynic'.