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# **Conducting Stated Preference Surveys in Developing Countries: The Choice of an Appropriate Payment Vehicle**

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## **Abstract**

The use of stated preference surveys in developing countries has been subject to contention and debate over the last decades. An issue that has been largely ignored until now is the role and validity of the payment vehicle in the weak institutional framework of developing countries. This paper argues that no first-best solution exists in such circumstances and that some of the requirements of a good payment vehicle might have to be sacrificed in order to assure more vital ones. Through a review of theoretical and empirical studies, this paper elaborates on the four fundamental characteristics for a valid and reliable payment vehicle proposed by Johnston et al. (2017): bindingness, familiarity, credibility and realism. A critical analysis of previous studies shows that the poor institutional framework forces researchers to choose a second-best alternative with regard to the payment vehicle. We demonstrate that researchers face trade-offs among the four fundamental characteristics when making their choice. Finally, we propose guiding principles for survey designers to follow when choosing a payment vehicle in developing countries.

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## Introduction

Stated preference methods are not universally accepted by economists. They present, as do all valuation techniques, important limitations that spark debate over their validity. Contingent valuation (CV) seems to lead to particularly fierce discussions, giving rise to opinions such as that expressed by Hausman (2012), who argues that using contingent valuation is worse than simply presenting no number at all for the value of non-marketed goods.

There is, on the other hand, a significant group of researchers within the field of contingent valuation who defend its utility. Their central argument is that the alternative of placing zero value on non-marketed goods is very likely to be incorrect and may lead to bad policy design. Perhaps the most notable representative of this group is Richard Carson, who urges economists to abandon the debate over whether contingent valuation techniques should be applied at all and instead focus on improving the quality of CV studies (Carson, 2012).

While many contributions have been made to the improvement of stated preference surveys, a more general term for CV, as Carson (2012) himself acknowledges, they more often than not focus on the theoretical flaws of stated preferences (SP), taking the underlying institutional framework for granted. This is at least partly rooted in the history of how the technique evolved.

Stated preference methods were conceived for use in developed nations and were, initially, almost exclusively applied in that context. In the past two decades, however, they have increased in popularity in developing countries (Whittington, 1998). If even the staunchest defenders of stated preference methods admit that there is room for improvement when they are applied to developed nations, their use in the developing world demands extra care.

Durand-Morat, Wailes, and Nayga (2016) found evidence that suggests there is a significant difference in using CV methods in developing countries when compared to their application in developed nations. Their conclusion was based not only on their own experiences, but also on those of 42 other agricultural and applied economists with experience in both settings who were surveyed by the authors.

This same study by Durand-Morat et al. (2016) points to many practical issues in developing countries that hinder the realisation of stated preference studies. The paper

highlights the illiteracy rate, which can be quite high depending on where the survey is being conducted, the difficulty of subjects in grasping abstract concepts, the lack of communications infrastructure (telephone and internet access) and safety concerns, among others. Finding and training local personnel in order to bridge any cultural or linguistic gaps is also presented as a main concern, as is carrying out thorough pre-testing (Durand-Morat et al., 2016).

Whittington (1998) also reviews the difficulties associated with conducting SP studies in developing nations. He emphasises five main challenges: ensuring that subjects understand the meaning and objective of the study; interpreting the responses in light of cultural differences; setting referendum prices that elicit sufficient information while not compromising the credibility of the survey; constructing clear and realistic scenarios involving public-private cooperation; and guaranteeing minimal ethical standards, especially when utilising split-sample experiments.

While it seems clear that there are many aspects of SP survey design that are more challenging in poorer institutional frameworks, not all of them have been sufficiently addressed. One notable absence in the literature is a thorough discussion of how to choose an appropriate payment vehicle in this context. In stated preference surveys, the payment vehicle constitutes the manner in which the respondents would hypothetically pay for the proposed goods, services or improvements. Thus, it represents the trade-off between consumption of the good the survey seeks to evaluate and all other consumption. A deeper understanding of the specific role the payment vehicle plays in SP surveys will be provided in the following chapters.

Despite being seldom discussed directly, the fact that this particular choice can have substantial impact on the results of stated preference studies appears to be consensual among authors in the field (Gyrd-Hansen, 2013; Ivehammar, 2009; Johnston et al., 2017; Koetse, 2016). One study goes as far as to say that “(...) at the core of stated preferences lies an appropriate choice of payment vehicle” (Gyrd-Hansen, 2013, p. 860).

One possible impact of this choice on the results of the study is observed in the proportion of respondents that declare a willingness-to-pay (WTP) of zero. Ivehammar (2009) found that changing the payment vehicle from unspecified donations to a rise in taxes decreased zero bids from 46% to 12% in one study. She also found that the switch significantly increased positive bids (Ivehammar, 2009).

Another interesting finding regarding the effects of the payment vehicle on the results of a study concerns the discrepancies between willingness-to-pay and willingness-to-accept (WTA). Koetse (2016) argues that payment vehicle non-attendance, the ignoring of the

proposed improvement's cost, was higher when asking WTA questions due to the fact that price decreases and benefit increases were seen as less credible than their negative counterparts. This inflates the difference between WTP and WTA measures, which is underscored by Hausman (2012) as one of the principal shortcomings of CV.

Fortunately, some general guidelines are available to orientate the choice of a payment vehicle that minimises bias on the value estimates. They state that a payment vehicle should be “(...) realistic, credible, familiar and binding for all respondents to as great an extent as possible, and to ensure that payments are viewed as fixed and non-malleable” (Johnston et al., 2017, p. 45). An ideal payment vehicle that fulfils all these criteria is unachievable even in the most favourable of circumstances, but merely choosing an adequate one in the context of developing countries can be challenging. This means that there needs to be a clear understanding of the trade-offs that exist among those four core attributes in order to make an informed and consequential choice of payment vehicle in developing countries.

We hypothesise that no first-best solution exists in such circumstances and that some of the requirements of a good payment vehicle might have to be sacrificed in order to assure more vital ones. The aim of this paper is, therefore, to discuss how poor institutional frameworks restrict the researcher's choice of payment vehicle and how to guarantee that their ultimate choice is appropriate. For this, we propose three chapters.

The first chapter will briefly set the theoretical framework of this paper, presenting SP methods and the role of the payment vehicle therein. The second and third chapters will, in turn, address the most relevant theoretical and empirical aspects involved in this discussion.

The second chapter, dedicated to theory, will more precisely define each one of the four criteria that characterise a suitable payment vehicle - realism, credibility, familiarity and bindingness; discuss how value estimates are likely to be affected by flaws in each criterion and how that can be addressed.

The third chapter will analyse how researchers have dealt with the choice of payment vehicle in developing countries, through a critical review of various case studies and our own experience conducting a choice experiment in Moldova.

A concluding section will firstly strive to identify the most salient patterns observed in the empirical literature. Then, guided by the theoretical standards presented in the first chapter, it will propose tentative guidelines for the choice of payment vehicle in SP surveys conducted in developing countries.

## Chapter 1: Theoretical background

In order to understand the matter discussed in this paper and its relevance, some background knowledge of economic valuation of environmental goods is required. The following section will provide a short introduction to the importance of economic valuation and the Choice Experiment (CE) approach.

### Economic valuation of environmental goods

Within the field of economics, the value of a good is normally represented by the price of this good on a market. Through the interaction of supply and demand in this market, a price is determined for a good. This price reflects its value to both consumers and producers. Based on this value, policy makers and society at large can make decisions that represent trade-offs between certain goods and services.

However, sometimes a good cannot be valued through the price mechanism. This is frequently the case for environmental goods, as these are often considered public goods (Freeman, 2014). These goods or services do not have a clear existing market on which they are valued through the supply and demand mechanism. Valuing these environmental goods through conventional tools is therefore not feasible (Freeman, 2014). Excluding these goods from policy decisions is also not appropriate, as society and consumers do obtain significant welfare from their provision.

In order to illustrate this valuation problem, consider the case of a forest that is free to access for all individuals. A policy decision has to be made on whether it is preferable to preserve the forest or to develop the area for other purposes.

In order to make an informed decision, the total value of the forest must be known to the policy makers. The forest provides several goods that are marketed, such as timber and game hunting, whose revenue could be summed and taken to represent the total value of the forest.

This total revenue would, however, not include the value of certain other non-provisioning services obtained from the forest. Services such as recreational possibilities, water purification functions or climate control through carbon storage would not be included, for example. These attributes do, nonetheless, contribute to the total welfare of society and should therefore be considered when making policy decisions (Pearce et al., 2006).

There is, thus, a need for a different method to estimate the total value of the forest. Different methods for this purpose have developed over time and can generally be divided into two different approaches. These are referred to as the “revealed preferences” and the “stated preferences” approaches (Freeman, 2014).

The revealed preferences approach makes use of an effect that an environmental good might have on other related marketed goods. For example, the value of a green space is inferred from its effect on housing prices, as houses near a park or other green areas are generally more expensive; this implicit price of green areas can be isolated through statistical techniques (Pearce et al., 2006). Although this approach is often very useful, it has been criticised for not estimating non-use values. Non-use values are benefits that are not related to the use of the good in any given time period, but stem solely from its existence. This could, for example, be a value derived from the continued existence of endangered animal species. These values often constitute a significant proportion of the total economic value of environmental goods (Pearce et al, 2006).

These non-use values are captured when the stated preferences approach is used. The stated preferences approach uses questionnaires and other formats to elicit values for changes in a service or good provision to a respondent (Pearce et al., 2006). By stating their respective willingness-to-pay for or willingness-to-accept a change, respondents provide an insight into their preferences. This is thought to include any non-use values they might attribute to a good (Freeman, 2014). There are different methods used to elicit these values from respondents, each presenting their own advantages and disadvantages.

### **The Choice Experiment approach**

A commonly used method is the Choice Experiment (CE) approach. Choice Experiments have become an increasingly frequent elicitation method in developing countries (Bennet & Birol, 2010). In the CE context, the payment vehicle is of particular importance. The calculation of the marginal WTP or WTA for all other attributes of a good is made possible because of an appropriate payment vehicle (Bateman, 2002).

In the Choice Experiment approach, a representative sample of the targeted population is selected. These respondents are given multiple sets of hypothetical scenarios, each showing different levels of attributes and the baseline scenario, which reflects the status quo. Although the levels of the attributes differ, the attributes themselves are the same throughout the survey. At least one of these attributes represents some form of monetary value that characterizes the

cost of the change (Pearce et al., 2006). This monetary attribute is often referred to as the payment vehicle (Bateman, 2002).

The respondents are asked to choose their preferred option in each set of hypothetical scenarios. Comparing this approach to other stated preference methods, a Choice Experiment task is relatively straightforward to answer and is closer to a real-world decision for respondents (Mangham, Hanson & McPake, 2009).

By analyzing the trade-offs made by the respondents in their choice of attribute, their underlying preferences can be observed. This will provide information on the relative importance of the different attributes to the respondents.

This trade-off analysis is based on the random utility theory, derived from Luce (1959) and McFadden (1973), and the attribute theory of Lancaster (1966). Lancaster's attribute theory states that goods can be decomposed into their characteristics, whose levels determine the utility they provide to the consumers. The sum of all these attributes then represents the full utility derived from the good by consumers (Pearce et al., 2006). For example, a house can be described in terms of the number of bedrooms, the total size, the neighborhood, the year it was built and other characteristics. The total sum of these attributes is what determines the value of the house (Bateman, 2002).

However, breaking down a good completely by its characteristics will in practice prove to be very difficult. Many unobservable factors will affect the value of a good (Bateman, 2002). This is where the connection in CE techniques with the random utility theory is important.

Random utility theory is an extension of the standard utility theory that takes unobserved factors into account. It is a standard assumption that the preferences of an individual can be characterized by their utility function, which is described below

$$U = U(X_1, \dots, X_n)$$

where the utility depends on the level of consumption of goods and services  $X_1, \dots, X_n$ . Having said that, it is very likely that some of these components are unobservable (Bateman, 2002). This can be captured by breaking down the utility function into two parts: an observed one,  $V$ , and a random one,  $e$ . We can therefore rewrite the previous equation as

$$U = U(X_1, \dots, X_n) = V(\mathbf{X}) + e(\mathbf{X})$$

in which the bold letters represent vectors. This simple representation is the core of what random utility theory entails. There are parts of an individual's preferences that can be observed and other factors that will be unobservable (Bateman, 2002). Although this representation is closer to reality than the standard utility representation, it does create a problem for the researcher with regard to the random, or error, term. As the researchers cannot observe the error, assumptions have to be made as to its statistical distribution (Bateman, 2002).

In a choice experiment, respondents are asked to make a choice between goods that are differentiated on their attribute levels. By selecting one alternative, we assume that the respondent has chosen the scenario that maximises their utility (Bateman, 2002). An error term is present in this individual's utility function, since they might choose an option based on information not given in the choice set and unobservable to the researcher (Bateman, 2002).

Since this error term is present in the utility function, we cannot make predictions about the individual's preferences with certainty. The analysis of these preferences therefore becomes probabilistic in nature. The probability that an individual chooses option  $i$  over any alternative option  $j$  in the choice set, can be assumed to be the same as the probability that the utility associated with the choice of option  $i$  exceeds the utility of choosing option  $j$ . As Bateman (2002) proposes, we have the following inequality:

$$P[(V_{in} + e_{in}) > (V_{jn} + e_{jn})] = P[(V_{in} - V_{jn}) > (e_{jn} - e_{in})]$$

As can be seen in the formula above, the probability of choosing alternative  $i$  over  $j$  is dependent on the relative differences between the observable and unobservable characteristics of the alternatives. However, it does not depend on the characteristics of the respondents themselves. This makes aggregation over respondents possible (Bateman, 2002).

The design of choice experiments makes it possible for researchers to gain information about the respondent's preferences for certain attribute levels. This approach is therefore particularly useful when one is interested in the *ceteris paribus* values of the different attributes, for example in situations where changes in the provision of the good represent trade-offs between the different attributes (Pearce et al., 2006). It also provides very detailed

information on the preferences of individuals, often more so than do other stated preferences methods.

However, because of the hypothetical nature of the scenarios presented and the stated responses, value estimates extracted from choice experiment studies are strongly susceptible to changes in survey design (Pearce et al., 2006). Precise and appropriate survey design is therefore crucial to the validity of the study, an issue that proves challenging in many different contexts.

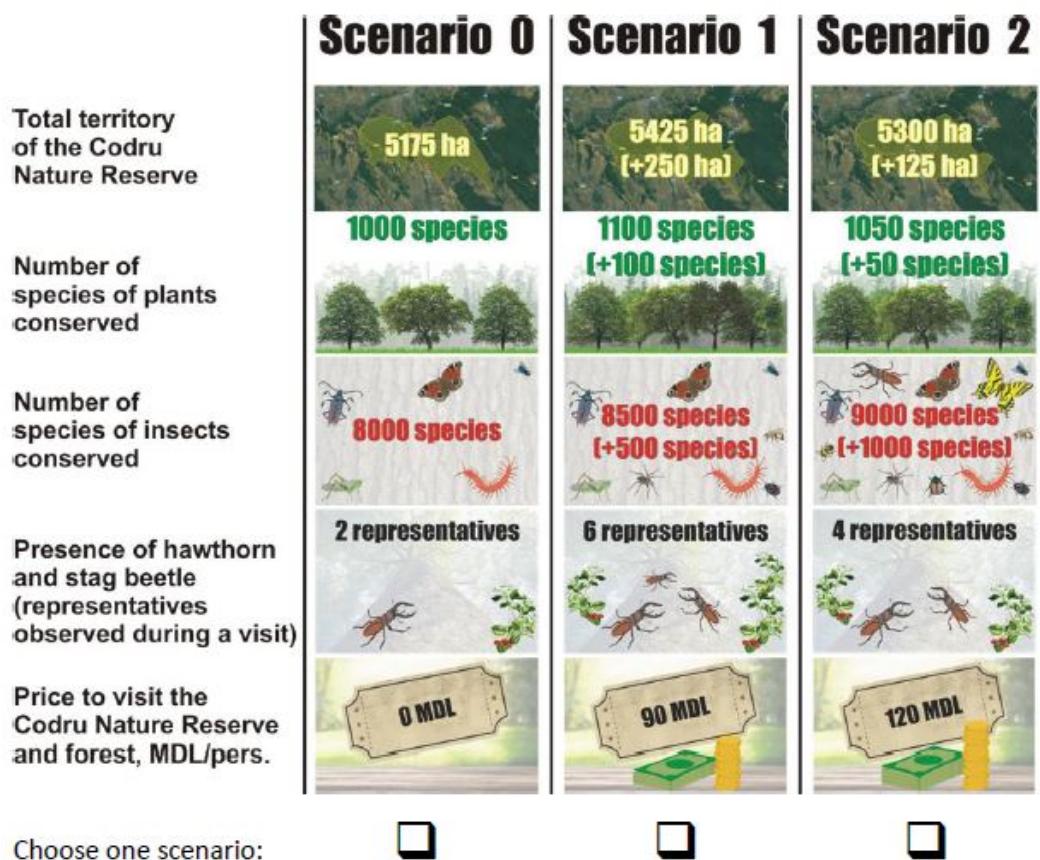


Figure 1: Example of a choiceset, presented to the respondents of the Codru Natural Reserve Study (Iscenco et al., 2017)

### Payment vehicle

As stated earlier, the monetary attribute that represents the cost of provisioning the good is called a payment vehicle (Pearce et al., 2006). By characterising the cost of provisioning a scenario in monetary forms, it represents a trade-off between the presented scenario and all other consumption possibilities for respondents. In other words, the resulting coefficient on the cost attribute represents the marginal utility of income for the respondents (Bateman, 2002).

The inclusion of a payment vehicle enables the estimation of so-called willingness-to-pay or willingness-to-accept values for the different attributes in choice experiment studies (Pearce et al., 2006). These are estimated in monetary terms that represent the value of certain attribute levels to respondents. The most straightforward manner in which these estimates are calculated is by dividing the estimated coefficient of the attribute of interest by the estimated coefficient of the payment vehicle as such:

$$WTP = \frac{-\beta_i}{\beta_y}$$

where  $\beta_i$  and  $\beta_y$  are, respectively, the coefficients of the attribute of interest and the payment vehicle (Bateman, 2002).

As these estimates are in monetary terms and are relatively straightforward to interpret, they usually form the core of the final reporting in a choice experiment study. Choosing an appropriate payment vehicle is therefore vital to the presentation of valid and accurate results.

## Chapter 2: Theoretical considerations on the choice of payment vehicle

As stated in the introduction, the objectives of this chapter are threefold: to more precisely define what constitutes an adequate payment vehicle, to predict how failure to fulfil the proposed criteria is likely to affect value estimates and to discuss how this effect can be addressed.

We have defined an appropriate payment vehicle as presenting four fundamental characteristics, in accordance with Johnston et al. (2017): bindingness, familiarity, credibility and realism. Although we have found no objection to these criteria in the literature, we were equally unable to find a precise definition of them all. This may be due to the perception that these concepts are self-explanatory and easy to grasp. In any case, as the payment vehicle is the focal point of this paper, we deem it necessary to clearly define each of them.

Let us start with bindingness, which is perhaps the best-defined criterion in the literature. In order for a payment vehicle to be considered binding, it has to constrain individuals to pay and not offer a chance of easy avoidance.

The most common examples of binding payment vehicles are rises in income or local taxes. Johnston et al. (2017) also mention a general rise in the cost of living, which would be the most binding option theoretically available. It is interesting to note that an increase in sales tax is not binding, since consumers can shift their habits to avoid paying tax. Entrance fees and voluntary donations are also classified as non-binding.

Multiple authors argue that bindingness is essential to ensure that respondents maximise their own utility by divulging their true WTP (Ivehammar, 2009; Johnston et al., 2017). This is known as incentive compatibility.

As long as a survey is not incentive-compatible, respondents have reason to misreport their WTP. If a payment vehicle is not binding and respondents know they cannot be forced to pay, there is a tendency to overstate WTP if any value whatsoever is placed on the good in question (Ivehammar, 2009). If the proposed change is ever implemented, free-riding is highly likely to occur, since the payment vehicle does not constrain the beneficiaries to pay.

In the context of developing nations, it can be more challenging to find a binding payment vehicle. There is typically significant public distrust of government officials in what concerns the handling of public money (Whittington, 1998), which complicates the choice of traditional binding payment vehicles, i.e. tax rises. If a researcher is only interested in

appraising the economic value that is placed on a certain good, involving state agents in the hypothetical scenario may confound the estimates (Whittington, 1998).

Compromising on bindingness, however, also entails some obstacles. Whittington (1998) indicates that, in the context of developing countries, CV studies are often used to inform real policy change. This creates a few additional problems when a binding payment vehicle cannot be chosen.

Firstly, if respondents overstated their WTP through a non-binding payment vehicle such as voluntary donations, authorities are likely to not collect sufficient funds to proceed with the proposed improvements. The same can be said of the case of sales-tax increases, even if respondents do not inflate their answers. Ivehammar (2009) argues that an increase in the price of certain goods would shift consumption away from them, reducing tax revenue. This effect would be magnified by more elastic demand curves, driven by the abundant availability of substitutes (Ivehammar, 2009).

A general increase in the cost of living could prevent the aforementioned problems, as Johnston et al. (2017) state that it can help respondents to shift focus from the payment vehicle. That being said, it can be difficult to establish a clear connection between a generic increase in the cost of living and the financing of any proposed improvements. This would arguably be aggravated in the context of developing countries.

As Whittington (1998) points out, making sure that respondents understand the survey and its objectives is one of the key issues of conducting SP studies in this setting. An unclear connection between payment and provision can further compromise comprehension.

This point is also central to the discussion of the second characteristic of an adequate payment vehicle: familiarity. Durand-Morat et al. (2016) highlight that respondents must be familiar with the good being valued to be able to answer the survey. We would extend this notion to include the payment vehicle.

If participants do not understand the manner in which they are supposed to pay for a proposed change, they might not consider the price of the good or, even more damaging to the study, refuse to participate in a survey they fail to understand completely. If respondents do not take the price of the good or service being evaluated into account, their answers will reveal very little information about their preferences. This would result in an insignificant effect of the price attribute in choice experiments and an overestimation of WTP in the case of CV studies.

If a significant fraction of participants fail to understand the payment vehicle and abandon the survey, it may compromise the study by excessively reducing the sample size.

This is particularly important in developing countries, where finding a representative probabilistic sample is already identified by Durand-Morat et al. (2016) as a challenge.

To ensure that lack of familiarity with the payment vehicle does not damage the quality of the study, it is important to bear in mind the idiosyncrasies of the country or countries where the data is being collected. Both Whittington (1998) and Durand-Morat et al. (2016) mention the value of engaging local personnel to gain insight into the culture and knowledge of the target population. This can be a valuable asset in selecting a familiar payment vehicle, as can the use of focus groups.

Johnston et al. (2017) also underline the importance of giving an explanation of the payment vehicle at the appropriate level of detail. An overly detailed account of the payment scheme might increase protest bidding and erode the perception of bindingness, but a poorly characterised payment vehicle may result in a loss of credibility (Johnston et al., 2017).

This brings us to the third characteristic of a suitable payment vehicle: credibility itself. In addition to being familiar with the selected payment vehicle, it is crucial that respondents find it credible. Koetse (2016), perhaps unintentionally, divides credibility implicitly into two points: trust that the payment vehicle can and will be implemented by the capable authorities and trust that the collected funds will be channelled into the realisation of the hypothetical scenario presented to respondents.

In the context of developed countries, there is evidence that selecting a tax rise as a payment vehicle can increase WTP estimates in relation to other alternatives (Ivehammar, 2009). That can be attributed to the trust that governments inspire in the developed world, which could sufficiently address the second requirement for credibility. The issue that remains in this case is whether participants believe that the proposed payment vehicle would actually be adopted.

Koetse (2016) argues that willingness-to-accept questions - associated with tax cuts, subsidies, grants and the lowering of prices - result in higher payment vehicle non-attendance. This is due to the fact that respondents do not find such payment vehicles believable, given that they occur less often than their WTP-associated counterparts (Koetse, 2016).

In developing countries, finding a credible payment vehicle is seemingly more difficult, as there appears to be no straightforward solution to either point proposed above. There often is significant distrust of government (Durand-Morat et al., 2016), which means that involving public authorities might erode credibility rather than boosting it. This also seems to be the case when international institutions such as the World Bank are involved,

since they would also have to work in partnership with local governments, as Whittington (1998) aptly cautions.

Credibility appears to be a particularly persistent problem when it comes to selecting a payment vehicle in developing countries. *Ad hoc* solutions will be discussed in the following chapter, but the theoretical literature on the topic does not offer ample advice on how to address it. What is often emphasised, however, is that the selected payment vehicle must be realistic (Gyrd-Hansen, 2013; Ivehammar, 2009; Johnston et al., 2017).

Realism implies that the chosen payment vehicle is the means through which the proposed provision of goods or services would actually be financed. Gyrd-Hansen (2013) strongly advocates for the importance of realism in the selection of a payment vehicle. She argues that if researchers are evaluating a change in policy that is connected to a specific payment vehicle, attitudes towards this scheme should be taken into account (Gyrd-Hansen, 2013). This includes failures with regards to credibility.

This argument is strengthened by the realisation that it is disproportionately common for CV studies carried out in developing countries to result in actual policy change (Whittington, 1998). However, it is important that respondents be able to correctly identify the actors responsible for the provision of the goods or services being evaluated. Gyrd-Hansen (2013) cites the example of public goods being provided by private institutions, which would create noise around the perception of the payment vehicle if respondents instinctively associate the provision of public goods with the State.

Although choosing the most realistic payment vehicle may appear to be an adequate and fairly general solution, it may not be so if researchers aim to evaluate a good *per se*, rather than as part of a policy change package. One of the advantages of stated preference methods, to which we have alluded in the first chapter, is that they are able to estimate non-use values. This is, notwithstanding, dependent on the choice of payment vehicle.

Gyrd-Hansen (2013) maintains that certain types of payment vehicle will fail to elicit non-use values, citing out-of-pocket cash payments at the point of consumption as an example. In this payment scheme, beneficiaries would only pay when directly using the good or service being evaluated, meaning that existence or other non-use values would likely not factor into their answers.

As can be observed from the discussion above, there is no straightforward answer when it comes to choosing a payment vehicle in developing countries. Throughout this chapter we have exposed the theoretical challenges of making that choice, as well as the importance of making an adequate one. However, as Ivehammar (2009) notes, there often is a

discrepancy between how a flawed payment vehicle is predicted to affect value estimates and how it does in practice.

For this reason, the following chapter will analyse stated preference studies conducted in the developing world to discuss the practical aspects associated with choosing a payment vehicle in that context. It will also more strongly emphasise the trade-offs between the four characteristics of a good payment vehicle described in this section, the understanding of which is crucial for making an informed choice.

## Chapter 3: A review of the empirical literature on the choice of payment vehicle

### Previous studies

As defined in chapter 2 of this paper, an appropriate payment vehicle is characterized by having four fundamental attributes: bindingness, familiarity, credibility and realism. In order to overcome the issues faced when selecting an appropriate payment vehicle in a challenging institutional framework, different approaches have been taken. In the absence of well-established and detailed guidelines on the choice of payment vehicles in developing countries, researchers have had to make decisions on a case-by-case basis. The approaches described in the following section affect the fundamental characteristics in different ways. Although the listed *ad hoc* solutions are far from a comprehensive overview of all possible approaches, analysing them will provide insight into the trade-offs faced when choosing a payment vehicle in a challenging institutional framework.

In many of the studies mentioned in this report, the major issue faced by researchers is a lack of credibility of the country's institutional framework. Respondents are sceptical of the authorities' ability to supply the good as presented or believe the collected funds will not go towards the proposed goal. As a result, protest bids might be higher than acceptable or estimates might not be consistent with real-world preferences (Koetse, 2016). Most of the solutions presented here are therefore designed by researchers to address this issue. However, in doing so they made certain trade-offs with regard to the other three characteristics.

This section will outline some of the problems faced by previous researchers and their proposed solutions. It should be noted that many of these researchers do not perceive their solution as readily applicable to other contexts. Furthermore, they stress the importance of more in-depth research into the appropriate payment vehicle when an income tax is not an available option (Nam Do & Bennet, 2010).

### Outside authority

In many settings, the problems faced by researchers do not stem from the collection of funds, but from respondents' concerns regarding their management. This was also the major issue with the payment vehicle in the valuation study we have conducted in the Codru Reserve, in central Moldova, where many respondents expressed concerns with regard to

corruption. Strong criticism of the use of an income tax as a payment vehicle in focus groups due to a lack of trust in governmental institutions forced the researchers to choose a different payment vehicle (Iscenco et al., 2017).

Several researchers have tried to overcome this issue by designing a scenario in which the management of collected funds is overseen by an independent and international NGO (Delhavi et al., 2010; Beharry-Borg & Scarpa, 2010). This independent authority would have to provide credibility in the eyes of the respondents.

For example, in their study of the non-use values of ecosystems dependent on the Indus River in Pakistan, Delhavi et al. (2010) used a donation fee to WWF-Pakistan, collected door-to-door for twelve months, as their payment vehicle. The local population has very low confidence in institutional bodies such as public utilities and the local government. In order to present a credible scenario to the respondents, researchers took advantage of the good reputation of the WWF and the familiarity of the local population with door-to-door payments (Delhavi et al., 2010) Although this choice of payment vehicle presents issues with regard to bindingness and strategic responses, the researchers were successful in presenting a payment vehicle that the respondents saw as familiar and credible (Delhavi et al., 2010).

Another example where this approach has been taken can be found in the study of Beharry-Borg & Scarpa (2010). This study investigated the WTP for different coastal water quality scenarios in Tobago. After consulting with focus groups, the researchers decided to use a contribution fee towards a hypothetical non-governmental organization as their payment vehicle (Beharry-Borg & Scarpa, 2010).

The outside authority approach can be seen as a prime example of a method to attribute more credibility to the payment vehicle. Because of the reference to an authority outside of the poor institutional framework, respondents could be more likely to accept the scenario.

This approach can, however, negatively affect the other fundamental characteristics. Respondents have to be familiar with the outside agent and have trust in this organisation for this approach to have merit. For example, in the study by Dehlavi et al. (2010), only 44% of the respondents were aware of the NGO in the study. Including an outside authority that does not clearly meet these requirements will at the very least increase the cognitive burden of the study and lower the familiarity of the respondents with the payment vehicle.

By including an outside agent that does not have the same legal enforcement possibilities as national authorities, the bindingness of the payment vehicle might also be compromised. In many instances, only voluntary donations can be made credible to

respondents due to the lack of enforcement possibilities. Respondents are, however, unlikely to divulge their true WTP under voluntary donations, as these do not ensure incentive-compatibility (Ivehammar, 2009).

Finally, realism too can be affected by this approach. An outside authority has to actually be involved in the possible implementation of the proposed policy change for the payment vehicle to be realistic. Furthermore, when a hypothetical outside agent is used such as in Beharry-Borg & Scarpa (2010), it has to be made realistic that such a construction will actually be designed for the implementation of the plan. A lack of realism in this regard could severely hinder the trust respondents have in the credibility of the study.

### **Internalising concerns**

Some researchers have also considered the problems posed by the challenging institutional framework in developing countries as an important part of their study. Within the observed framework, these issues were found to be integral to the choices made by the respondents (Mekonnen et al., 2010). This has led to their inclusion within the choice sets and the proposed scenarios.

A good example of this approach is the study by Grosjean et al. (2010), which analyses the sustainability of the Sloping Land Conversion Program in China. In this study, WTA for converting cropland into forest was estimated. The payment vehicle chosen in this study was the level of subsidy received by farmers for converting a plot of cropland into forest.

Payment issues in previous, similar compensation schemes have, however, severely eroded the trust of the farmers in these types of programmes and the ability of the government to deliver payment (Grosjean et al., 2010). The researchers therefore included an attribute within the choice sets called “Assurance that subsidies will be delivered”. This attribute was highly significant in all models and had a strong effect on the choice of scenario (Grosjean et al., 2010). This approach could be a possible solution if the institutional framework only causes a singular issue when income taxes or subsidies are used as the payment vehicle. In order for this approach to be feasible, researchers must make it clear the additional attribute would resolve the concerns.

Mekonnen et al.’s research (2010) is another example of a study in which the inclusion of an attribute associated with both the payment vehicle and the institutional framework is a

central feature of the study design. This study analyses the willingness of Ethiopian farmers to pay for agricultural input packages.

In Ethiopia, farmers can currently purchase agricultural inputs on credit through a governmental programme. These loans have to be repaid after harvest. However, this debt can cause major problems for farmers, even up to imprisonment, if the harvest fails or is smaller than expected (Mekonnen et al., 2010). This prompted the researchers to include an insurance attribute in their choice sets, which would cover the debt of the farmer in the event of a failed harvest.

After administering the survey, the researchers concluded that the participants were not sensitive to the amount to be paid back after the harvest, but had a very strong preference for the insurance attribute (Mekonnen et al., 2010). This result can be explained by the farmers' high level of risk aversion and by the vulnerability of their budget constraint. For the farmers, the chosen payment vehicle was only accepted in combination with the risk reduction attribute (Mekonnen et al., 2010). This study again shows the importance of understanding the effect of the challenging institutional framework on the chosen payment vehicle and the resulting WTP estimates.

These methods of internalising concerns with regard to the poor institutional framework in the scenario design can be regarded as another way of increasing the credibility of the payment vehicle. By acknowledging the issues posed by the institutional framework, the researchers make it more credible to respondents that these will be appropriately dealt with in the implementation of the plan. Participants can now express their sentiments that could lead to protest votes through their response to this additional attribute. By expressing this in their choices, the respondents also provide an implicit price of the poor institutional framework to policy makers.

Great care should be taken, however, when including another attribute that is closely connected to the payment vehicle. As stated in our chapter, the payment vehicle is included in SP studies to represent the marginal utility of income. By adding another attribute that essentially influences the relative worth of this attribute, like in the study of Grosjean et al. (2010), this representation becomes more complicated. Furthermore, the use of the standard method to calculate the WTP of respondents can be then questioned. How exactly this issue influences the results of a study is beyond the scope of this paper and should be analysed in further research.

## **Scoring by respondents**

Yet a third approach was adopted by Nam Do and Bennet (2010) in their study of wetland values in Vietnam. In order to choose a payment vehicle, three criteria were used. These were coverage, acceptability and feasibility (Nam Do & Bennet, 2010). Respondents then sorted different payment vehicles on these criteria on a scale from 1-10. This resulted in the choice of the electricity bill as the payment vehicle (Nam Do & Bennet, 2010). This scoring mechanism provides researchers with detailed information on the respondents' perception of the institutional framework.

This approach also provides an interesting way to visualize and map the credibility of a payment vehicle. By scoring on the different attributes of credibility and familiarity, in this case coverage, acceptability and feasibility, respondents give insight into their views on a proposed payment vehicle.

Researchers can then use this knowledge when comparing the payment vehicles on all of the other fundamental characteristics. It is essential, at any rate, that the final choice of the payment vehicle is not solely based on the scorecards but also on the judgement of the researchers. Payment vehicles based on solely on the preferences of the respondents could lead to biased estimates. Respondents might prefer a non-binding payment vehicle, for example, which would enable them to avoid payment; but this would cause major issues in the study due to a lack of bindingness (Johnston et al., 2017).

## **Participation fee**

Another possible approach that has often been taken in previous studies is a user fee as a payment vehicle. For example, in the previously mentioned study of Beharry-Borg & Scarpa (2010), the contribution to a hypothetical NGO was constructed as payment upon accessing the beach. A different example of this method can be found in the study of Iscenco et al. (2017), where an entrance fee to a natural reserve was used as the payment vehicle. Although this vehicle is considered to be realistic, it does provide problems with regard to bindingness in the sample population and it compromises the estimation of non-use values (Gyrd-Hansen, 2013).

This solution is, nevertheless, still a widely used approach when an income tax is not available. The approach is perceived by respondents as credible and familiar. Having to pay in order to gain access to or use a good is something that respondents are very familiar with. Paying money directly to the agent responsible for the provision of the good or service is more likely to be perceived as credible than payment to governmental institutions. Additionally, it provides reliable payment enforcement capabilities when the responsible

agent is not directly part of the institutional framework, such as when referring to an external NGO.

This approach presents, however, severe problems with regard to the bindingness characteristic. As respondents are not forced to visit the area or use the good, the payment vehicle can potentially be non-binding. Respondents that have a very low use of the good but do attribute large non-use values to its existence might have an incentive to overstate their WTP and free-ride. Conversely, frequent users might adapt their consumption pattern when a new policy is introduced or not take non-use values into account (Gyrd-Hansen, 2013). These respondents might prefer to visit less frequently after the policy change is installed. This plays into another major issue with using participation fees as a payment vehicle. As respondents might use the good with different regularity, the aggregation and interpretation of the WTP estimates will have to take this into account. A user that states the same WTP for every use but visits three times more often than another user has a different total WTP, for example.

### **Marketed goods**

Finally, after reviewing previous studies, we can conclude that the choice of payment vehicle in a poor institutional framework is less affected by the previously mentioned issues when a marketed good is the topic of the study. The repeated market interactions and the social and cultural structures surrounding these transactions ensure credibility and familiarity of the payment vehicle to the respondents (Kikulwe et al. , 2010; Roy et al., 2010; Yorobe et al. 2010). We believe that this might also be the reason why Durand-Morat (2016) and his co-authors do not address the payment vehicle issue in their paper, as they primarily analyse studies that make use of a marketed good.

## Discussion and concluding remarks

At the start of this paper, we set out to discuss how a poor institutional framework, typical of developing countries, complicates the choice of an adequate payment vehicle in stated preference surveys. We have presented the economic theory that underlies SP studies in our first chapter and discussed the insights the theoretical literature provides into the importance and pitfalls of this choice in our second chapter. Finally, in our third chapter, we have reviewed the available empirical literature to identify how researchers have dealt with this problem and the inevitable flaws of their proposed solutions.

Having completed this exercise, we believe our initial hypothesis of there being no first-best solution to the problem of selecting a payment vehicle in a poor institutional framework has been substantiated by our findings. In both the theoretical and empirical components of our analysis, we have sought to emphasise the inherent trade-offs that exist among the four characteristics we have put forward as fundamental to an appropriate payment vehicle. This places our efforts comfortably within the frame of searching for second-best alternatives.

Since, as of yet, there is no general solution available in developing countries that is able to simultaneously fulfil bindingness, familiarity, credibility and realism; it is important to clearly define priorities with regards to the attributes of the chosen payment vehicle. Knowing this, it is our strong suggestion that researchers be very clear about these priorities in their final study and how the compromises made could have affected the results. It might be advisable, although it is not essential, to reference the four core attributes and how the chosen payment vehicle fulfils or falls short of each of them.

In our review of the choices of payment vehicle made in past SP studies in developing countries, we have indicated that the main concern is often to ensure credibility. This, however, comes at a cost. Involving third parties such as international organisations, for example, might compromise realism if they would not ultimately participate in the provision of goods or services. It may also mean forgoing bindingness if these organisations do not have legal authority to enforce payment. It could even damage familiarity if the target population is not entirely familiar with the entities mentioned in the study. All other choices presented to guarantee credibility suffer from similar limitations, as we have pointed out in our empirical chapter. Yet, it is not possible to determine *ex-ante* which of these concerns are relevant for a specific study.

For this reason, our second general recommendation is that researchers have thorough knowledge of the target country and population and are candid about the potential problems that apply to the specific context of their study. Honesty about its limitations is the only policy to ensure that the study itself is regarded as credible and properly conducted.

As there is no reason to believe credibility will lose its place as researchers' major concern, the way to ensure the choice of payment vehicle is appropriate is to guarantee that it provides a minimum level of the three other attributes. If a potential payment vehicle ensures credibility but completely compromises familiarity (such as in the case of an extremely complex scheme), the study may not be viable as respondents will be unable to complete the survey. If, instead, bindingness is not ensured, there will be no incentive-compatibility and bids will likely be inflated. Compromising realism, in turn, leads to questions of a different nature.

Employing a more credible payment vehicle in expense of realism, when researchers know that a less credible scheme is likely to be adopted in reality, raises important ethical concerns. As Whittington (1998) hypothesises, it may be in the researcher's or the commissioner of the study's interest to omit information about the true payment vehicle in order to minimise questioning as to its credibility. This, however, pushes the ethical boundary on how much participants should know about the purpose of the study. If a real policy change is being evaluated, as we have mentioned in our first chapter, the payment vehicle is an important component of the proposed change and integral to the evaluation of the good itself (Gyrd-Hansen, 2013). It is for this reason that we recommend prioritising realism when dealing with actual changes rather than a mere valuation of a good or service that is already provided.

In a more general case, there is no one-size-fits-all solution to the choice of payment vehicle in developing countries. Although this paper is in no way exhaustive and further research is still required, it is our hope that researchers are able to rely on our findings to guide them through the choice of payment vehicle, providing a framework with which to evaluate candidates and accentuate their strengths and shortcomings. In addition to that, we would like to see this choice be more openly and thoroughly discussed in SP studies to ensure that any effect it might have on the results is properly addressed. This would be a small but important improvement for stated preference studies conducted in developing countries, ensuring that policy decisions are based on ever-sounder scientific evidence.

## Bibliography

- Bateman, I. J., Carson, R.T., Day, B., Hanemann, M., Hanley, N., Hett, T., ..... Swanson, J. (2002). *Economic valuation with stated preference techniques: A manual*. Cheltenham, United Kingdom: Edward Elgar.
- Beharry-Borg & N., Scapra, R. (2010). Assessing the sustainability of the Sloping Land Conversion Programme: A choice experiment approach. In *Choice experiments in developing countries* (89-106). J. Bennett & E. Birol (Eds.). Cheltenham, United Kingdom: Edward Elgar
- Bennett, J. & Birol, E. (2010). *Choice experiments in developing countries*. J. Bennett & E. Birol (Eds.). Cheltenham, United Kingdom: Edward Elgar
- Carson, R. T. (2012). Contingent Valuation: A Practical Alternative when Prices Aren't Available. *Journal of Economic Perspectives*, 26(4), 27-42. doi:10.1257/jep.26.4.27
- Delhavi, Al, Groom, B., Khan, B. N. & Shabab, A. (2010) Non-use values of ecosystems dependent on the Indus River, Pakistan: A spatially explicit, multi-ecosystem choice experiment. In *Choice experiments in developing countries* (129-150). J. Bennett & E. Birol (Eds.). Cheltenham, United Kingdom: Edward Elgar
- Durand-Morat, A., Wailes, E. J., & Nayga, R. M. (2016). Challenges of Conducting Contingent Valuation Studies in Developing Countries. *American Journal of Agricultural Economics*, 98(2), 597-609. doi:10.1093/ajae/aav068
- Freeman III, A. M., Herriges, J. A., & Kling, C. L. (2014). *The measurement of environmental and resource values: theory and methods*. Routledge.
- Grosjean, P., Kontoleon, A. & Zhang, S. (2010). Assessing the sustainability of the Sloping Land Conversion Programme: A choice experiment approach. In *Choice experiments in developing countries* (107 - 129). J. Bennett & E. Birol (Eds.). Cheltenham, United Kingdom: Edward Elgar
- Gyrd-Hansen, D. (2013). Using the Stated Preference Technique for Eliciting Valuations: The Role of the Payment Vehicle. *PharmacoEconomics*, 31(10), 853-861. doi:10.1007/s40273-013-0086-x
- Hausman, J. (2012). Contingent Valuation: From Dubious to Hopeless. *Journal of Economic Perspectives*, 26(4), 43-56. doi:10.1257/jep.26.4.43
- Iscenco, A., Ungureanu, (2017). The Codru quest: Phase 1 results. Retrieved from: [https://issuu.com/megageneration/docs/mega\\_-\\_the\\_codru\\_quest\\_-\\_phase\\_i\\_re\\_7d8864fd8d80bd](https://issuu.com/megageneration/docs/mega_-_the_codru_quest_-_phase_i_re_7d8864fd8d80bd)
- Ivehammar, P. (2009). Payment vehicle used in CV studies of environmental goods does matter. *Journal of agricultural and resource economics*, 34(3), 450-463.
- Johnston, R. J., Boyle, K. J., Adamowicz, W., Bennett, J., Brouwer, R., Cameron, T. A., ... Vossler, C. A. (2017). Contemporary Guidance for Stated Preference Studies. *Journal of the Association of Environmental and Resource Economists*, 4(2), 319-405. doi:10.1086/691697
- Kikulwe, E., Birol, E., Falck-Zepeda, J. & Wesseler, J. (2010). Rural consumers' preferences for banana attributes in Uganda: Is there a market for GM staples? In *Choice experiments in developing countries* (278-296). J. Bennett & E. Birol (Eds.). Cheltenham, United Kingdom: Edward Elgar
- Koetse, M. J. (2016). Effects of payment vehicle non-attendance in choice experiments on value estimates and the WTA-WTP disparity. *Journal of Environmental Economics and Policy*, 1-21. doi:10.1080/21606544.2016.1268979

- Lancaster, K. J. (1966). A new approach to consumer theory. *Journal of political economy*, 74(2), 132-157. In Pearce, D., Atkinson, G. and Mourato S. (2006). Cost-benefit analysis and the environment: Recent developments, OECD
- Luce, R. D. (1959). *Conditional logit analysis of qualitative choice behavior*. New York: John Wiley & Sons.
- Mangham, L. J., Hanson, K., & McPake, B. (2009). How to do (or not to do)... Designing a discrete choice experiment for application in a low-income country. *Health policy and planning*, 24(2), 151-158.
- Mekonnen, A., Yesuf, M., Carlsson, F. & Köhlin, G. (2010). Farmers' choice between public goods and agricultural extension packages in Ethiopia: A stated preference analysis. In *Choice experiments in developing countries* (189-204). J. Bennett & E. Birol (Eds.). Cheltenham, United Kingdom: Edward Elgar
- McFadden, D. (1973). Conditional logit analysis of qualitative choice behavior. In Pearce, D., Atkinson, G. and Mourato S. (2006). Cost-benefit analysis and the environment: Recent developments, OECD
- Nam Do, T. & Bennet, J. (2010). Using choice experiments to estimate wetland values in Viet Nam: Implementation and practical issues. In *Choice experiments in developing countries* (33-49). J. Bennett & E. Birol (Eds.). Cheltenham, United Kingdom: Edward Elgar
- Pearce, D., Atkinson, G. and Mourato S. (2006). Cost-benefit analysis and the environment: Recent developments, OECD
- Roy, D., Birol, E., Deffner, K. & Karandikar, B. (2010). Developing country consumers'demand for food safety and quality: Is Mumbai ready for certified and organic fruits? In *Choice experiments in developing countries* (261-279). J. Bennett & E. Birol (Eds.). Cheltenham, United Kingdom: Edward Elgar
- Whittington, D. (1998). Administering contingent valuation surveys in developing countries. *World development*, 26(1), 21-30. doi:10.1016/S0305-750X(97)00125-3
- Yorobe Jr., J., Birol, E. & Smale, M. (2010). Farmer preferences for Bt maize, seed information and credit in the Philippines. In *Choice experiments in developing countries* (225-243). J. Bennett & E. Birol (Eds.). Cheltenham, United Kingdom: Edward Elgar

## **Reflection on the writing process**

The writing process of such a large paper will always pose some issues. This section will outline some of the problems we encountered while writing this paper and how we addressed them.

First of all, although we started this project off with a relatively clear idea of the topic we wanted to write about, we were not completely sure of what precisely we set out to achieve with the paper. Structuring our paper was therefore somewhat of a challenge in the initial stages. In time, more literature research and discussions resolved this issue, leading to the current form of the paper. Even though this is a common process to go through when writing a project like this, discussing it more thoroughly at the start could have been beneficial to the writing process.

Secondly, the programme chosen when collaborating online in this project was Dropbox instead of Google Docs or some other, user-friendlier programme. This resulted in some issues with regard to real-time tracking of changes in text. The choice of another tool would have definitely aided our writing progress.

Thirdly, a disproportionately large amount of time was spent while writing this paper on details and rewriting. This can be attributed to the high standards with regard to language use and content. This has caused significant stress because of conflicting deadlines. A more accepting attitude towards the final product would have significantly reduced stress.

However, many things also went very well while writing this paper. The writing progress was steady and on track. The fear of not completing the paper before the deadline was not ever present. The atmosphere while writing was good and the research process was interesting.

During writing process, we might have benefitted from more detailed and frequent feedback from our supervisor. However, as we felt that this was not our supervisor's main field of interest, we did reach out as much as we perhaps should have. Communicating more clearly with our supervisor in earlier stages of the writing process and vocalizing our concerns could have resolved this.

Finally, as this was a large project over a longer period of time, writing a detailed roadmap for our paper would have definitely helped in providing structure and scheduling earlier in the process.