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Willingness to Pay for Gold Standard Carbon Credits

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Abstract It is increasingly clear that carbon credits generated by clean development mechanism (CDM) projects do not all deliver the same sustainable development (SD) benefits, as intended by the Kyoto Protocol. Independent certification of has now been developed to meet the needs of buyers searching for carbon credits with high levels of SD benefit. This paper use the contingent valuation method (CVM) to investigate buyers’ willingness to pay (WTP) a price premium for Gold Standard (GS) carbon credit in recognition of SD benefits. This study finds that 56.4% of the buyers are willing to pay a price premium for GS carbon credits. Charity groups and governments have more likely to place a price premium on certified credit than private sector buyers. On average, buyers are willing to pay a price premium of €1.12 per tonne of CO2e for GS carbon credit in recognition of SD benefits.

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Keywords  carbon credit, clean development mechanism, contingent valuation, sustainable
development, willingness to pay

Introduction
The third Conference of the Parties (COP-3) to the UN Framework Convention on Climate
Change (UNFCC) gave birth to the Kyoto Protocol which aims to stabilization atmospheric
concentrations of greenhouse gases at a level that would prevent dangerous climate change.
The Kyoto Protocol incorporates three flexibility mechanisms underpinned by the principle
that GHG emission reductions anywhere in the world have the same environmental
benefits. The Clean Development Mechanism (CDM) is one of these three mechanisms
which allows Annex I countries to invest in emission reduction projects in developing
countries and claim emission credits called “Certified Emission Reductions (CERs)”.
CERs can be used by Annex I countries to meet their own Kyoto targets or be sold in the
emission trading market. CDM projects themselves have twin objectives: (1) to assist Non-
Annex I countries achieve Sustainable Development (SD); and (2) to assist Annex I
countries achieve their emission reduction targets in a cost effective way.

The SD benefits of CDM projects are supposed to be assessed by a Designated National
Authority (DNA) in the host country. However Burian (2006) and Erion (2007) found that
host country DNAs could not guarantee the SD benefits of CDM projects. Moreover,
Kolshus et al. (2001) found that industrial gas projects (including hydrofluorocarbons
(HFCs), perfluorocarbons (PFCs), and nitrous oxide (N2O) projects) produce fewest SD
benefits compared to other types of CDM project. These results indicate that the quality of
carbon credits (in terms of their SD benefits) is not consistent between projects. This is
contrary to the original concept of the UNFCCC. Sutter (2003), argued in favour of independent sustainability labeling and various international CDM sustainability labels have now been developed in an attempt to recognize CDM projects delivering high levels of SD benefit. CDM sustainability labels provide an international standard to assess the sustainability of CDM projects. Projects with CDM sustainability labels must therefore pass both the sustainability tests set by the host country DNAs and the tests set by CDM sustainability labels. Non-labeled projects need only pass sustainability test set by the host country. There are now several CDM sustainability labels including the Gold Standard, the Climate, Community, and Biodiversity Alliance Standard (CCB Standards), the Community Development Carbon Fund (CDCF), and the MDG Carbon Facility (Nussbaumer, 2009).

Sutter (2003) argues that if CDM sustainability labels can attract a price premium, it will encourage projects with high SD benefits. This implies that a price premium for CERs is the key motivation for project developers to invest in CDM projects with a sustainability label. However, the willingness to pay a price premium for CERs with CDM sustainability label is unclear. This paper applies the contingent valuation method (CVM) to investigate buyers’ willingness to pay (WTP) a price premium for CERs with a CDM sustainability label. This issue is investigated using a case study of the Gold Standard (GS) labeled projects either (1) renewable energy; and/or (2) end use energy efficiency improvement.

Survey Design

Since the SD benefits of CDM projects are not given a monetary value, Contingent valuation (CV) is chosen as the valuation method in this research. CV is a survey-based
hypothetical and direct method to estimate the monetary value of non-market resources. This approach asks respondents to directly report their WTP, or less often willingness to accept (WTA) compensation, for a change in the provision of a non-market good. In this study CV was used to ask CER buyers to report their WTP a price premium for CERs with the GS label. A survey was designed to collect information from CER buyers active in the carbon market. The list of CER buyers was taken from the UNEP Risoe CDM/JI Pipeline Analysis and Database. However, this database provides only the name of companies, not the name of responsible persons and their E-mail address. The names of responsible individuals were taken from the Project Design Documents (PDDs) of CDM projects. Eliminating many incorrect E-mail and postal address in the PDDs, resulted in a usable list of 295 buyers, as of May 2009. The unit of measurement in this research is the organization, not the individual, so one respondent represents one organization in the carbon market. We asked that participants answer the questions from the perspective of their organization.

Online questionnaires were sent to these buyers between September and November 2009\(^1\). With a response rate of 40% the survey generated 117 valid questionnaires. The numbers of the usable questionnaires is higher than those found in related research. Exploring the price premium for CDM credits, Asuka and Okimura (2005) conducted a survey CER buyers in the carbon market with 82 usable questionnaires. Asuka and Okimura found that quality of CERs is determined by three aspects: (1) risks; (2) technologies; and (3) project’s contribution to SD. This study revealed that the willingness

\(^1\) http://www.kwiksurveys.com/online-survey.php?surveyID=OKJHK_f437b2ba
to pay (WTP) a price premium for CERs in recognition of SD benefits and country risk was low. However, in SD benefits only included improvement of the local environment in the host countries. The study showed a WTP a price premium for an improvement of the local environment was €0.254 per tonne of CO2e. More recently, Sterk et al. (2009) conducted a survey of the demand for GS CERs and buyer’s willingness to pay a price premium for GS CERs. Sterk et al. sent questionnaire to 55 carbon credit buyers in the compliance market receiving only 17 usable questionnaires. This study found that 6 out of 17 buyers had purchased GS-labelled CERs or would be interested in doing so. These 6 buyers were then asked to report their WTP – “What level of premium on the normal CER price has been paid or would the buyer be willing to pay in relative and absolute terms?”. These buyers reported WTP values ranging from €1 to €7 per tonne of CO2e. Finally, Sterk et al. concluded that a premium of 5% – 25% for GS CERs is possible and the tendency to pay a price premium for GS CERs exists. However, a price premium for GS CERs varies widely.

WTP Questions

The precise questions in a CVM study play a significant role in the accuracy of WTP values. Kotchen and Reiling (2000) suggested that valid CV questions of WTP should include three components: (1) a detailed description of the resource to be valued, including the initial and alternative conditions of the hypothetical scenario; (2) the form and frequency of payment; and (3) how respondent are asked their WTP (the formats of WTP question).

A draft questionnaire was developed based on Kotchen and Reiling’s criteria. This draft questionnaire was refined following a pretest and review by 3 carbon credit traders at EU
companies. The final questionnaire comprised two parts. The first part is designed to investigate the respondents’ demographic information and perceptions of the sustainability of CDM projects. The second part is designed to investigate the monetary value of SD benefits of CDM projects through WTP. In the second part the WTP questionnaire uses a two-step approach. Respondents are first asked whether they are willing to pay a price premium:—“There are many reasons to buy Gold Standard CERs such as high sustainable development benefits, low Post-Kyoto risk, low methodology risk, etc. However, this question will consider only the sustainable development benefits. Would your organization be willing to pay a price premium per tonne of CO2e for CERs from the Gold Standard label in recognition of its contribution to sustainable development? (This price premium given will stand for only the sustainable development benefits, not including other benefits such as low Post-Kyoto risk, low methodology risk, etc.)”

Those who refuse to pay a price premium are asked to give the reason for that choice. Those who agree to pay a price premium are then asked: “If you answered YES to question 1, what is the maximum amount you would be willing to pay as a price premium per tonne of CO2e for CERs with the Gold Standard Label in recognition of the contribution to sustainable development? Assume the current CER price, without any premium, is €10.00 per tonne of CO2e.” These buyers will select an answer from the following values: €0.10, €0.20, €0.30, €0.40, €0.50, €0.75, €1.00, €1.50, €2.00, and Other (Please specify)”. Additionally they were asked to give the reason for WTP. Finally, we provided the space for participants to give the qualitative comments. Respondents required approximately 15 minutes to complete this questionnaire.
WTP for the GS Carbon Credits

The majority of buyer’s organisations surveyed were European (55.56%), followed by Japanese (11.97%), US and Canadian (11.11%), Multinational (11.11%), and Australian and New Zealand (7.69%). Regarding organization type, the majority were private organization (86.33%), followed by government (7.69%), and charities (5.98%). When these participants were asked, “Would you be willing to pay a price premium per tonne of CO2e for CERs from the Gold Standard label in recognition of its contribution to sustainable development?”, 56.4% of the buyers are willing to pay a price premium and the remaining 43.6% are not willing to pay (Table 1).

Considering the organization type against responses to the WTP question, it is clear that the highest number of buyers that are willing to pay is found in the charity group (85.71%), followed by the government group (77.78%). As expected, the charity group and the government group have a greater percentage of the “yes” WTP responses than the private group (Table 1). In other words charity and the government buyers are more willing to pay than the private sector buyers.

Buyers who agreed to pay a price premium were asked to state the maximum premium they would be willing to pay as a price premium per tonne of CO2e for CERs with the GS Label in recognition of the contribution to SD. One respondent declared that they were unable to provide a WTP figure in the absence of specific details of SD benefits. Consequently the final WTP figures were derived from 65 respondents. The results indicated that the mean WTP is €1.12/tCO2e with a standard deviation of €0.65 and the median WTP is €1.0/tCO2e (at the time of the study we assumed that the current CER
price, without any premium, is €10.00 per tonne of CO2e. This, WTP value is materially different from those reported in previous studies. As noted, Asuka and Okimura (2005) found that the WTP a price premium for SD benefits was € 0.254 per tonne of CO2e, whereas Sterk et al. (2009) reported WTPs between € 1 to € 7 per tonne of CO2e. This may be because of the difference of WTP questions. The SD benefits defined by Asuka and Okimura only represented improvements to the local environment in the host countries, and did not cover all SD aspects. Moreover, Asuka and Okimura did not give a clear definition of CERs used in the WTP question. In their study CERs may come from labeled CDM projects or non-labeled CDM projects. Consequently, some buyers may report their WTP in recognition of labeled CERs, whereas some buyers may report their WTP in recognition of non-labeled CERs. In reality labeled CERs can attract a price premium more easily than non-labeled CERs. Considering the WTP question used by Sterk et al., it does not focus on only SD benefits, so the price premium reported may reflect more than just the value of SD benefits. For example some buyers may pay a price premium for GS CERs because of the low Post-Kyoto risk, not just SD benefits. The Sterk et al. results were also based on a relatively small sample of 17.

Considering the distribution of the WTP values, it can be seen from Figure 1 that the range of WTP values is wide. Most buyers (34.8%) report €1.0 WTP per tCO2e, followed by €2.0 WTP (24.24%), and €0.50 WTP (19.70%). Indeed results seem to clump around these values. Some 4.54% (3) of participants express a WTP value of €0.20, €1.50, > €2.0 respectively. Few of respondents (each 1.52% of participants) express a WTP value of €0.00, €0.30, and €0.75. We can clearly see that more than a half of respondents (68.17%) are willingness to pay greater than or equal to €1.0/tCO2e.
Surprisingly, there is no difference between European countries and Non-European countries in the amount of money that they are willing to pay. The mean WTP of these two groups is €1.12/tCO2e. Considering the aspect of organization type against responses to the WTP values, the charity show the highest mean WTP which is €1.50/tCO2e. Surprisingly, despite the increased preparedness of government buyers to pay a premium the mean WTP of government buyers (€0.93/tCO2e) is lower than that of the private sector buyers (€1.10/tCO2e).

Considering the reasons for the willingness to pay, 36.4% of participants view the payment of a premium as a reward given to the CDM sustainability labels and the project developers. Some 25.8% of participants believed that paying a price premium was worthwhile as the GS label is a tool for public relations and branding their organizations. This concurs with Meyrick (2007) and Sutter (2003) hypothesized that buyers may pay a price premium because they may use it for public relations activities. Therefore, our findings proved that their assumption of reason for willingness to pay is correct. Another motive for paying a price premium for the GS projects is the belief that it will help CDMs projects achieve their SD objectives (25.8%). Few of them (7.6%) stated that they were worried about the CDM’s inability to generate SD benefits, so they would like to pay a price premium for project with high SD benefits.

Finally, we found the three major reasons for the unwillingness to pay. These reasons are that: (1) they did not believed that paying a price premium can help CDM projects achieve SD objectives (29.4%); (2) they are not interested in SD benefits, but they would like to pay a price premium for Gold Standard CERs in recognition of its other benefits such as low methodology risk, low Post-Kyoto risk, etc (23.5%); and (3) paying a price...
premium will result in higher costs of acquiring carbon credits (13.8%). There were two participants who stated other reasons for the unwillingness to pay: (1) “I have very little confidence in the GS methodology for assessing the SD benefits of a project”; and (2) “This is about CO2, not social issues, the carbon money and on particular private money should not go to fixing social problems in countries where the governments are ignoring their social duties, it is bribe money”. So the second participant has a pessimistic view on paying a price premium.

However, one respondent suggested that a strict regulation for proving sustainability of CDM projects may make the company to change its decision on paying a price premium. This respondent said “During a current market situation, it is difficult for credit buyer to pay premium for GS but situation may change especially when there is a strict regulation for proving sustainability of CDM projects”. This implied that the WTP responses may change in the future.

Conclusions

This paper aims to investigate the value of SD benefits generated by CDM projects through the willingness of buyers to pay a price premium for CERs with the GS label. Finally, our research results clearly show that CDM sustainability labels can attract a price premium. We found that 56.4% of the buyers are willing to pay a price premium, whereas the remaining 43.6% are not willing to pay. Buyers are willing to pay a price premium of €1.12 per tonne of CO2e for GS carbon credit in recognition of SD benefits. However, we found that a price premium for GS CERs varies widely. These findings support Sutter’s recommendation to use CDM sustainability labels for giving the monetary value to the SD
objective. Moreover, these findings may induce the project developers to develop the projects with high SD benefits in order to get a price premium as Sutter suggested. Finally, our results clearly showed that CDM sustainability label can result in a synergy between the twin objectives of “ensuring cost-effectiveness of GHG emission reductions” and “promoting sustainable development”.

Acknowledgements

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References


Table 1

WTP responses

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Figure 1. The distribution of WTP values.