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Investigation of landowners' preferences for afforestation contracts in Denmark

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Abstract

This study investigates landowners' preferences for afforestation contracts in Denmark using a choice experiment. Four attributes are investigated: purpose of afforestation, option of denouncing the contract, control by authorities and subsidy levels. On average, landowners showed strong preferences for having the option to denounce the contracts whereas increasing control lead to increases in required compensation. Biodiversity was the most popular purpose.

Keywords: choice experiment, random parameter logit model, latent class model, regulation, participation, subsidy.

1. Short introduction to study and results

Voluntary agri-environmental schemes are used as a widespread means to provide incentives for nature management on private land in e.g. the European Union and the USA. The success of voluntary scheme is dependent on participation (Falconer, 2000; Franks, 2003) implying a need for understanding landowners' participation decision. The aim of this study is to investigate preference heterogeneity for afforestation contracts among landowners, with a regulation perspective in mind. Even though afforestation has previously been investigated in a Danish context (Madsen, 2002; Madsen, 2003; Præstholm et al., 2006), little knowledge has been gathered regarding landowners' afforestation subsidy scheme preferences. The Danish afforestation scheme is an example of a voluntary agri-environmental scheme which does not provide the demanded good at the desired level due to low participation rates. In Denmark, it is a national goal to increase the forest area from approximately 12 % in 1990 to 20-25% within the next 80-100 years. This requires an average yearly afforestation of 4-5,000 ha and from 1989-1998 the afforestation was less than 1,800 ha/year (The Danish Forest and Nature Agency, 2008).

We used a choice experiment to elicit landowners' stated preferences for afforestation contracts. The choice experiment was distributed with help from Danish Agriculture via e-mail to 3,609 landowners and of these 1,027 landowners answered the questionnaire which equals a response rate of

28.5 %. Four attributes are investigated: purpose of afforestation (biodiversity, recreation or groundwater), option of denouncing the contract (within the first five or ten years, or the contract is binding), control by authorities (1, 10 or 25 % are selected for control) and subsidy levels (one time payment between 27,000 and 42,000 DKK/ha). All attributes present a potential conflict between landowners' and authorities' interests which emphasise the importance of knowing how to handle these.

Data are analysed using a random parameter logit model (RPL) and a latent class model (LC)¹. In the latent class model class probability variables are included which potentially can be used to differentiate and target contracts to groups of landowners. On average, landowners show strong preferences for the option to denounce the contract which reduces the required subsidy. Control by authorities raises the required subsidy level. Furthermore, landowners are willing to accept a lower subsidy when the aim is to protect biodiversity and groundwater relative to recreation.

LC models reveal considerable discrete heterogeneity across landowners and support a division into four groups with divergent preferences. For example, a group of landowners who already have forest areas do not find the option of denouncing important whereas another group of landowners relying on the farm for income require the highest subsidy.

The results from this study indicate that introducing an option to denounce the contract within a limited period can improve landowners' willingness to accept contracts at a lower cost for society – especially landowners who do not have forest areas on their land. For landowners, it may create a feeling of leaving a backdoor open for themselves or future owners even though it may be costly to remove the forest. It will also let the landowner keep authority because he is the one to decide if the area should remain forest. This is in line with recommendation from theory about leaving decisions to the principal or agent depending on who is most concerned (Aghion & Tirole, 1997) and know most about the issue (Bogetoft & Olesen, 2002). Theory also states that it is likely that landowners will become happy about what they have (their forest) and will feel a loss from removing it due to the endowment effect (Kahneman et al., 1991 in Kahneman & Tversky, 2000). The importance of denouncing was tied to uncertainty among landowners who do not have experiences with forests. Schemes directed at landowners who already have forest on their property need therefore not offer an option to denounce, whereas schemes directed at other groups should.

Landowners do on average require increased compensation for increased control. Due to this it is important that authorities consider what

¹ The random parameter logit model and latent class model details are not presented in this extended abstract.

they want to achieve by control. When landowners get a contract offer, there are three options; either they participate and comply, participate without (fully) compliance or they do not participate (Hart & Latacz-Lohmann, 2005; Ozanne et al., 2001). Even though landowners experience disutility from control, it is recommended to reduce cost of moral hazard problems in contracts (Bogetoft & Olsen, 2002). It is worthwhile considering why control creates disutility, as, e.g. Hart & Latacz-Lohmann (2005) claim that the majority of landowners do not want to cheat, leaving bureaucracy and fear of non-compliance as more likely explanations. Fear of non-compliance may be reduced if authorities use transparent contracts (Bogetoft & Olesen, 2002) which make it obvious to the landowners what is required. If the level of control is too high landowners may experience distrust and even feel criminalized, as some state in the questionnaire. To avoid this, control visits may be framed as free advisory service to assure compliance. Then the visits should focus on dialogue about difficulties with the scheme. Some landowners already see control visits in this way and said that they considered authorities as a partner or expert who could give good advice. The degree of non-compliance is relevant. If landowners only 'non-comply' on the margin, then non-compliers will also contribute to the goal (Hart & Latacz-Lohmann, 2005).

Moreover, targeting with regard to the purpose of afforestation is relevant since recreational areas are more expensive to establish than areas which protect biodiversity or groundwater interests. In the Danish afforestation scheme there is extra subsidy for avoiding pesticides (The Danish Forest and Nature Agency, 2009), which may benefit both biodiversity and groundwater. Compared to landowners' preferences only, this is odd because recreation is what creates the largest disutility. Due to this, authorities may consider paying more to achieve the goal of increased recreational purposes, e.g. close to towns. Altogether, these findings show important potential for further development of afforestation contracts and agri-environmental schemes in general.

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