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Measuring the effect of procrastination and environmental awareness on households' energy-saving behaviours: An empirical approach

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HIGHLIGHTS

- Norwegian online survey on factors affecting households' heating energy saving activities.
- Identify the effect of procrastination and environmental awareness in energy saving decision making.
- People with a higher tendency to procrastinate are less likely to engage in energy saving activities.
- Procrastination can limit the positive effect of environmental awareness on energy saving.
- Innovative behavioural measures are suggested to bring people's "energy saving plans or decisions" to action.

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ABSTRACT

A common finding in behavioural economics is that people often procrastinate, i.e., keep postponing planned tasks or decisions that require effort to execute. The effect of procrastination on inter-temporal energy choice behaviours could be even more serious because energy is an abstract, invisible and intangible commodity. This paper uses a web survey to investigate how people's procrastination propensity and environmental awareness affect their heating-energy-saving behaviours. The results indicate that people who state that they have a higher tendency to procrastinate are significantly less likely to have engaged in most of the heating energy-saving activities, especially regarding larger purchases or investments in equipment and the insulation of doors and windows. I also found a positive relationship between environmental awareness and engaging in everyday energy-saving activities such as reducing the indoor temperature. The findings suggest that measures aimed at reducing procrastination are needed to realise energy-saving potential. It is important to find ways to either bring future benefits closer to the present or to magnify the costs of delayed action. For example, one can employ certain feedback systems and commitment devices to make current gains and future costs more visible or tangible.

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1. Introduction

The energy used in family homes accounts for one-third of the total energy use in Europe (EEA, 2008). Reducing households' energy use is a target for energy and environmental policies (Gardner and Stern, 2002). The European Energy Efficiency Action Plan estimates that there is a large saving potential in the household sector and that households could save up to 27% of their current energy use by 2020 by making more energy efficient choices (European Commission, 2006). In a household study encompassing 12 European countries, de Almeida et al. (2011) estimate that an annual savings of 1300 kW h per household can be achieved by a combination of more energy efficient technologies and behavioural changes. Furthermore, in countries with a temperate climate, such as Norway, over half of the household energy is used for heating (IEA, 2004). The total energy saving potential for the private building sector is estimated to be approximately 12 TW h in Norway (Wachenfeldt, 2009). Energy-saving practices for space heating can therefore significantly reduce the energy use in households (Darby, 2000; Guerra Santin, 2011).

Household energy use depends on factors such as climate, energy price, and residence and household characteristics but also on the householders' energy-saving behaviours (Barr et al., 2005; Branco et al., 2004; Fabi et al., 2012; Lindén et al., 2006). Changing the households' behaviour is the focus of many of the proposed policies and measures to achieve energy-saving potential (European Commission, 2006). Households' energy-saving

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behaviours cover energy behaviours directed at both curtailment and efficiency. The former refers to daily engagement in energy-saving, such as turning off the light when leaving a room, and the latter refers to investment behaviours, such as buying new equipment or insulating the house (Oikonomou et al., 2009). Most studies on energy-saving behaviour focus on either cost issues or normative concerns (Allcott, 2011; Steg, 2008). However, several studies have found household energy-saving behaviour to be influenced both by cost factors and by other behavioural factors such as the available information on energy saving, the effort needed, everyday routines, demographic factors and the preference for thermal comfort (Steg, 2008). In particular, certain drivers or barriers behind energy investment behaviours could be due to sociocultural and psychological reasons (Brohmann et al., 2009; Lillemo et al., 2013; Wilhite and Lutzenhiser, 1999; Wilk and Wilhite, 1985; Wilhite et al.,1996).

Furthermore, people do not always behave consistently with their intentions and plans, especially in the case of pro-environmental behaviours (Kollmuss and Agyeman, 2002). Therefore, we need to pay more attention to behavioural factors to improve the policy effectiveness of the interventions aiming to encourage energy-saving behaviours (Abrahamse et al., 2005). Identifying the barriers to energy-saving behaviours could help to bring about the intended behaviour change. Some behavioural studies have mentioned potential psychological drivers and barriers including procrastination (postponing planned tasks or decisions that need the input of effort) (Baddeley, 2011; Grubb et al., 2009; McNamara and Grubb, 2011). As Rabinovich and Webley (2007) note, in general, moving from saving intentions to actual saving is not straightforward and may require careful planning and efforts in self-control. More empirical studies aiming to incorporate such behavioural economics principles are needed to sharpen energy policy (Wilson and Dowlatabadi, 2007).

The effect of procrastination has often been studied as it relates to health and financial savings topics (Thaler and Benartzi, 2004; Laibson, 2005; Akerlof, 1991; Kooreman and Prast, 2010). However, to the best of my knowledge, there are still no empirical studies about how procrastination affects people's energy-saving behaviours. The effect of procrastination on energy inter-temporal choice (choice over time) could be even more serious because energy is an abstract, invisible and intangible commodity. Based on survey data from Norway, I sought to explore the relationship between people's energy-saving behaviours and their level of environmental awareness and how this relationship is moderated by their tendency to procrastinate. The objective of this study is to provide empirical evidence of procrastination affecting households' energy-saving behaviours. This evidence will provide insights into why households fail to achieve their energy-saving potential and will help policy-makers to broaden their approaches to encourage energy saving.

2. Procrastination as a self-control problem

Economists usually incorporate exponential discount rates to represent peoples' impatience when they evaluate choice outcomes over time. The same exponential discount rate applied to all future moments implies that people have time-consistent time preferences. However, behavioural economists have found that more often people have inconsistent time preferences. And applying hyperbolic discounting or quasi-hyperbolic discounting may be more appropriate and consistent with the empirical findings than is using exponential discount rates (Laibson, 1997; O'Donoghue and Rabin, 2001; Phelps and Pollak, 1968). The reason is that when a decision-maker considers trade-offs between two future moments, he or she usually gives a stronger relative weight to the earlier moment as it gets closer; i.e., one is more impatient for the near future than for the distant future. In this case, the preferences are inconsistent along the time change. A consequence of this inconsistency is that people have a tendency to delay costs and desire rewards sooner.

Procrastination is defined as the tendency to keep postponing tasks or decisions that have been planned and that require effort for execution (Steel, 2007; Ainslie, 1975; Loewenstein, 1996). For example, one plans to do a task (such as changing heating equipment, dieting, exercising, stopping smoking, or saving) tomorrow (or next week, etc.), but in the next period, further postponement appears likely to occur. People have the inclination to procrastinate because they are impatient and usually put too much weight on the “here and now” when evaluating the costs and benefits of action (Laibson, 1997; Loewenstein and Prelec, 1992). Notably, not all procrastination leads to bad outcomes. Some economists would argue that there is an “inconsistency” or negative procrastination only if the procrastination actually leads to subsequent regret. I only focus on negative procrastination in this paper. For unwanted postponed behaviour, if people are not (fully) aware of the influences from their present biased preferences, the consequences could be serious. In this case, people usually refer to procrastination as a self-control problem.

Some researchers try to explain the procrastination phenomenon using a dual-self theory (Benabou and Pycia, 2002; Thaler and Shefrin, 1981). Thaler and Shefrin (1981) have stated that in an inter-temporal decision making process, people are guided by a “Doer self,” who only cares about the present moment, and a “Planner self,” who also cares about the future. The intrapersonal conflicts between the Doer and the Planner make people unwilling to take action if the costs are immediate and the payoff more distant. There are two ways to help people toward consistency: promote patience (Planner) or restrain impatience (Doer). In practice, one can either bring future benefits closer to the present or magnify the costs of delayed action. O'Donoghue and Rabin (2001) have indicated that the way to manage self-control problems such as procrastination depends on how aware the decision maker is of their problem. Sophisticated persons are partly aware of their self-control problem but naïve persons are not. The former would be able to use some commitment devices to enforce the Doer's planned actions, such as depositing some amount of money or goal setting, to ensure implementation of the plan.

Furthermore, when planning ahead, people usually underestimate the influence of procrastination, although it may have a large effect on their inter-temporal choice behaviour (O'Donoghue and Rabin, 2001). Decision-making is affected by procrastination in several ways such as wandering attention and peripheral factors that subconsciously influence decisions and perceptions (Allcott and Mullainathan, 2010). Procrastination is particularly a problem for our planned environmental activities because the future gain from environmental activities often looks small or unclear in the present (Steel, 2010). In the case of engaging in energy-saving behaviours, the short-term benefits in the form of economic and environmental gains may appear to be small even when the long-term effects are substantial. Therefore, procrastination can easily result in a gap between planned and actual environmental behaviour. Even when long-term gains are substantial, people do not want to sacrifice their current comfort and convenience in exchange for future gains. In many cases, the total welfare gain from energy-saving actions would have been much larger if the actions were performed earlier (Costanzo et al., 1986). Based on survey data and an econometric approach, this empirical study provides evidence for how procrastination plays a role in householders' energy-saving behaviours.

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