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Updates on the OECD EPIC Household Survey Project

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At its September 2019 meeting, the Environmental Policy Committee (EPOC) issued a directive to the Secretariat to consider conducting household surveys. Scoping note ENV/EPOC/WPIEEP(2020)14 outlines the motivation, scope, and process of the proposed work on a new round of the OECD household survey on Environmental Policy and Individual Behaviour Change (EPIC). This note elaborates further on the theoretical background and methodology of the survey. It also provides details on administrative, financial and logistic aspects of the survey.

Contact:

Katherine FARROW
katherine.farrow@oecd.org

Walid OUESLATI
walid.oueslati@oecd.org

JT03472522

1 Objective of the OECD EPIC Household Survey

1. The objective of the EPIC Household Survey is twofold: 1) to collect information on individual preferences and attitudes in different environmental domains and country contexts, and 2) to assess the effectiveness of specific environmental policies in inducing changes in individual environmental behaviour. Building upon scoping note ENV/EPOC/WPIEEP(2020)14, this note provides further details on the theoretical framework that underpins the analysis, the content and methodology of the survey, as well as administrative aspects regarding its implementation.

2 Theoretical framework

2. Demand-side strategies to induce behaviour change have come to be seen as critical to addressing environmental issues (e.g. Mundaca et al., 2019) and will be a focus of the sixth assessment report of the Intergovernmental Panel on Climate Change to be published in 2022 (IPCC, 2017). The effectiveness of environmental policies that seek to change individual behaviour will depend on a number of factors including contextual conditions (e.g. structural policies and institutional robustness), individual-level factors (e.g. attitudes and sociodemographic characteristics), as well as policy-related factors that directly shape the incentives that individuals face regarding environmental behaviours.

3. The theoretical framework of the analysis is based on random utility theory, according to which behaviour is driven by a deterministic component and a stochastic or random component. Under random utility maximisation, individuals choose the option that affords them the greatest utility. The advantage of this modelling framework is that it allows for random variation in choice while permitting the development and systematic testing of theoretical microeconomic models). Although the functional form of the model may not accurately reflect the specific decision-making processes that individuals employ, the models' usefulness for policymaking arises from the extent to which it is able to approximate the outcomes, i.e. observed choices, issuing from these processes.[1] Moreover, and highly relevant for policy analysis, the random utility maximisation framework enables the calculation of choice probabilities and of welfare.

4. The scientific literature indicates that environmental behaviour can be influenced by a range of factors beyond the economic consequences of a given option. Evidence suggests that a variety of factors can influence environmental behaviours (Steg and Vlek, 2009), including but not limited to socio-economic characteristics, issue knowledge, environmental concern (e.g. OECD, 2014), trust in government (e.g.

[1] Although decision-making processes have been shown to deviate from the conventional axioms of rationality in many contexts (Kahneman and Tversky, 1979), many of the behavioural patterns they generate can be accommodated for in random utility models. Hess et al. (2018) review the implications of these anomalies for the use of random utility models in policy analysis. They find that random utility theory is generally consistent with behavioural phenomena such as anchoring effects, zero cost/price effects, status quo bias, mental accounting, elimination by aspects, and framing effects. Other deviations, such as lexicography (myopic decision-making), certain forms of reference-dependence, context effects, and heuristic use, can pose problems for forecasting hypothetical scenarios and the resulting welfare implications.

Taniguchi and Marshall, 2018), political orientation, perceived social norms (e.g. Nyborg et al., 2017; Farrow et al. 2017) and perceived behavioural control (Madden et al., 1992). A comprehensive review of all relevant determinants of behaviour identified in the scientific literature will be undertaken and these factors will be considered for inclusion in the survey in order to serve as control variables for the subsequent econometric analysis.

5. For instance, the survey will gather data on: individual socio-demographic characteristics, individual attitudes and beliefs, and key design elements of the environmental policy in question (e.g. the nature of the incentives offered). While some of these factors can be addressed via policy interventions (e.g. the economic costs associated with a particular behaviour), others are fixed (e.g. socio-demographic characteristics). To the extent that socio-demographic characteristics can influence responses to environmental policies, however, an understanding of heterogeneity in this regard can nevertheless inform the design and implementation of relevant policies (e.g. income-differentiated measures or targeting certain contingents of the population). Insofar as the data will be collected in contexts that differ in economic, institutional and broader cultural ways, the data will also allow for an exploration of how these contextual factors may influence not only environmental behaviour and attitudes, but how individuals may respond to environmental policies.

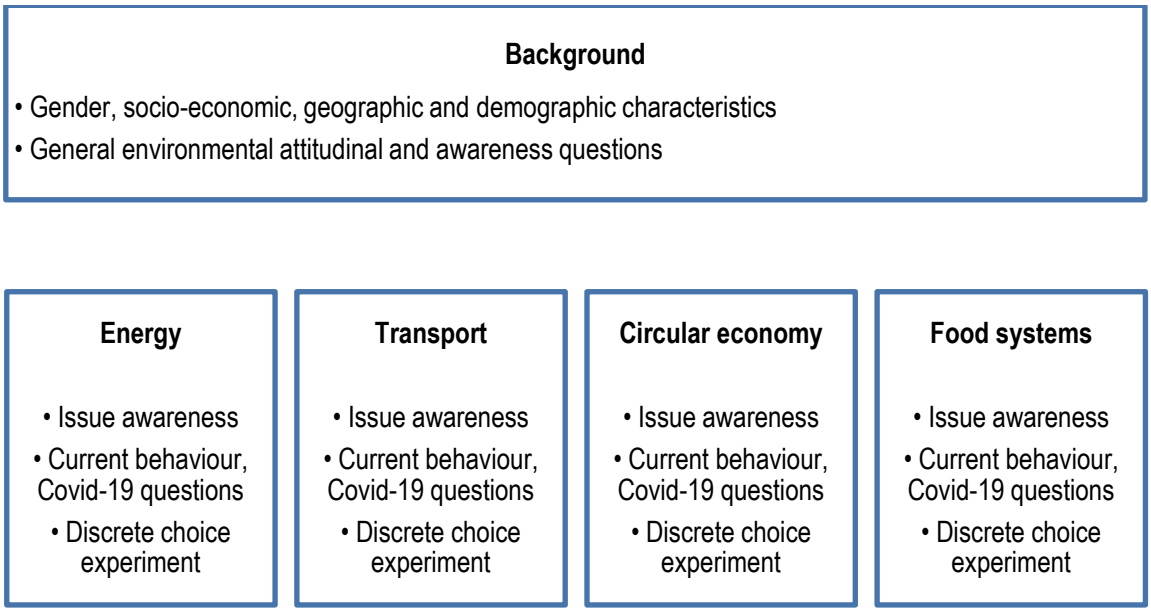
6. In light of this theoretical framework, the following section provides a preliminary indication of the envisaged content of the survey and reviews a selection of methodological issues that will be considered in its design and implementation.

3 Survey design

Content

7. The survey will be split into two main sections: background questions and domain-specific questions. The first section with gather standard sociodemographic information, e.g. gender, age, household size, postal code, education, employment status, type of residence, ownership or tenant status, size of residence, and urban/rural location. This information will be used as control variables in the econometric analysis as well as for investigating the distributional effects of the results obtained. The first section will also gather information on respondents' general attitudes about the environment vis-à-vis other issues, their degree of environmental concern and political affiliation. The second section will be comprised of domain-specific sub-sections regarding energy, transport, circular economy, and food system issues. Figure 1 provides a simplified schema of the survey design.

Figure 1. OECD EPIC Household Survey Design



8. Following recommendations of the scientific advisory committee, Section 2 could include questions eliciting respondents' awareness of relevant environmental policies their jurisdictions, familiarity with relevant environmental labels, their current behaviours in the domain, and perceived norms surrounding domain-specific environmental behaviours. The final part of Section 2 will include discrete choice experiments in each domain (see subsequent section for more details).

9. The specific environmental behaviours and relevant policies targeted will be determined with input from an expert committee comprised of experts on the methodology of discrete choice experiments as well as subject matter experts on relevant policy topics. Policy relevance will also be sought via consultations with participating countries during the survey design stage. Constraints regarding the overall length of the survey will require prioritising the inclusion of certain items over others.

Methodology

10. A number of methodological considerations will be taken into consideration during the survey development process. The specific approaches used will be determined under the guidance of the scientific advisory committee for the project, which will make recommendations for methodological best practice in light of the analytical objectives of the work. Methodological choices will involve various aspects of the survey design, e.g. for the discrete choice experiments, the number of choice sets, number of attributes, levels of attributes, and analytically efficient combinations therein. There is also the possibility of fielding different versions of the survey (e.g. via an experimental design, the inclusion of country-specific policy questions of interest, andr culturally adapted questions) and incorporating dynamic question sequences or branched structures.

11. Using random utility theory as a point of departure for modelling and analysing behaviour, the EPIC Household Survey project will primarily rely on a stated preferences empirical approach to data collection.[2] As opposed to revealed preference approaches, which make use of data on observed

[2] Revealed preferences in the form of self-reported behaviour will also be elicited in the survey. Conditional on data availability, it may be possible to conduct analyses linking the stated preference data obtained from the survey to other revealed preference data, i.e. observed behaviour, from sources such as national statistical databases (e.g. per capita

behaviours, stated preference approaches use data gathered by asking individuals to report how they would behave in a given hypothetical situation. There are advantages and drawback to both approaches (OECD, 2006; 2018). Although revealed preference approaches have high reliability and validity because they reflect the real-world constraints faced by individuals, this also constitutes a limitation insofar as researchers are limited to observing only those choices that are available in real-world contexts. The main challenges of stated preference approaches manifest as various forms of response bias, perhaps the most important of which is that people's stated behaviour may differ from their actual behaviour (hypothetical bias). This is a well-known issue in stated preference methods and a number of strategies have been employed to mitigate it, including making survey instruments incentive compatible,[3] informing respondents that their responses will be used to help develop public policies, and using cheap talk scripts to inform respondents about hypothetical bias and encourage them to reflect on their choices carefully in light of it. A number of other biases have been documented (e.g. strategic bias, social desirability bias, anchoring, order effects, etc.). To the extent that a number of ex-ante strategies exist to address such biases, careful survey design can mitigate these issues.

12. Despite these challenges, stated preference approaches, and discrete choice experiments (DCEs) in particular, offer a number of significant advantages over revealed preference approaches when it comes to ex-ante policy evaluation (OECD, 2006). In DCEs, subjects are asked to make hypothetical choices by selecting a preferred alternative from a menu of options (Bateman et al., 2002; OECD, 2018; see also Alpízar et al., 2003). In general, the flexibility in designing discrete choice experiments make them well-suited to analysing choice in the context of relatively complex, multi-dimensional issues such as those that will be treated in the EPIC Household Survey. To the extent that they describe hypothetical decisions, there is, for example, flexibility to include elements in the choice sets that reflect policies that may be under consideration but have not yet been implemented. Importantly, this last feature of discrete choice experiments allows for an evaluation of the impact of hypothetical policy interventions (e.g. how the probability of choosing public transport changes with a given increase in the fare price, or how the probability of choosing to use a private vehicle changes with a given increase in parking price or congestion charge).

13. Discrete choice experiments also offer advantages over other stated preference approaches such as more straightforward contingent valuation approaches. First, DCEs are useful for reflecting the types of choices that respondents are likely to face in the real world given the specific characteristics, availability and prices of these different options, e.g. choosing between reusable vs. single-use packaging products or private vs. public transport. Second, they generate data that provides a richer picture of preferences than simpler stated preference elicitation methods. The data generated by choice experiments allows for an estimation of how much respondents value the characteristics of the options being considered, how respondents make trade-offs between these characteristics and how sensitive their choices are to changes in the characteristics of the options presented. Finally, the disaggregated nature of the data at the household level can permit an analysis of the distribution of these values and sensitivities across the population according to location or socio-demographic variables such as age, income, and gender. Such an analysis could provide useful information regarding the role of individual-specific factors in determining environmental behaviours and preferences for different types of environmental policy instruments. Differences in patterns across different country contexts will also be explored given the cross-country nature of the data.

energy use or waste generation), which could be merged with survey data to examine correlations between the two at the most granular level feasible. To the extent that the availability these revealed preference data is known in advance, the survey could be designed so to as to maximise the compatibility between these two data sources.

[3] Incentive compatibility refers to making survey responses correspond with real monetary outcomes for the respondent, e.g. when the compensation a respondent receives for survey completion depends in part on the choices he/she makes in a discrete choice experiment.

14. In DCEs, subjects are asked to make hypothetical choices by selecting a preferred alternative among a menu of options (Bateman et al., 2002; OECD, 2018; see also Alpízar et al., 2003). The stated preference data generated by the discrete choice experiments will allow for an assessment of preferences regarding various aspects of environmentally-related behaviours and policy design elements, such as travel time and comfort for transport mode options, or the cost, convenience, and frequency of recycling programmes. A mobility-related example of a DCE is provided in Box 1.

Box 1. Example choice set from a mobility-related discrete choice experiment

Choose the option below that best suits your preferred mode of travel. Compare current transport options and shared mobility options.

Public Transport On board time: **40mins** Fare: **NZ$2.5** Walking time (from/to stop or station): **20 mins** Waiting time: **20 mins** Number of transfers: **1** Mode: **Bus**	**Shared Mobility** On board time: **15 mins** Fare: **NZ$8** Walking to and from the stop: **10 mins** Lost time (waiting + detour time): **15 mins** Passengers on board: **4**
Private Car Travel time: **30 mins** Fuel / energy cost: **NZ$2** Parking cost: **No cost** Congestion level: **Less than 20% of time stopped in traffic** Congestion charge / tolls: **NZ$5**	**Other (non-motorised)** Travel time: **45 mins** Availability of cyclepath: **Good** Ease of crossing in traffic: **Pedestrian crossing** Mode: **Walk**

This choice experiment consists of a sequence of four choices between transport options. Respondents were asked to choose from among four modes: private car, non-motorised transport (i.e. walking or biking), public transport and one of the forms of shared mobility described above (i.e. shared taxi or taxi-bus). Each option was described in terms of several attributes, e.g. travel time and cost, the value of which varied across subsequent rounds of the experiment. This variation generated the heterogeneity in the data needed to estimate the choice model described in Section 3 and elucidate the role of each attribute on respondents' utilities.

Source: OECD/ITF (2017) and OECD (2020).

15. With regards to the survey implementation, focus groups will be convened in order to ensure the relevance of the policy issues addressed and attributes selected. Pilot test(s) will be carried out to ensure the smooth running of the survey technology and to assess the appropriateness of the selected attribute levels. Sample sizes will be determined based on expected rates of attrition and invalid responses. Sample selection methods may aim for samples representative of the general population, or they may involve the oversampling of certain subgroups given expectations regarding sources of sample selection bias and/or policy-relevant analytical objectives (e.g. targeting household heads vs. all individuals, or oversampling those from certain income brackets in order to obtain useful policy insights for that subsample). Based on the aforementioned methodological choices, a power analysis can be carried out to estimate the minimum sample size required for the econometric analysis (de Bekker-Grob et al., 2015).

16. The project will be guided by a steering committee comprised of WPIEEP Delegates who will provide input regarding the policy issues of greatest interest in their respective countries. A scientific committee will also be assembled in order to guide the methodological choices made regarding the design and implementation of the survey as well as the analysis of the resulting data.

4 Provisional budget and timeline

17. The cost of implementing the survey will depend on the number of countries that participate, the sample size targeted in each country, the survey length and the content itself (e.g. the possible inclusion of open-ended questions). Based on quotes obtained from international survey providers, we estimate a maximum cost of EUR 300K for the implementation of the survey instrument. This cost would finance all aspects of the survey implementation, including the recruitment of representative samples, the programming of the online questionnaire, any required translations, the conducting of focus groups, and the delivery of the survey data. An additional EUR 145K is envisaged for staffing needs to support the project for the 2021-2022 biennium.

18. The entire project will consist of three main steps, notably the preparation phase, the implementation of the survey, and the econometric analysis of the data. An indicative timeline for the project is outlined in Table 1.

Table 1. Provisional timeline for the OECD EPIC Household Survey

Q2 2021 – Q3 2021	Preparatory work • Integrate feedback from March WPIEEP Meeting • Finalise list of participating countries • Establish steering and scientific advisory committees • Develop preliminary draft of survey instrument • Prepare call for tender for the survey provider
Q3 2021 – Q4 2021	Questionnaire development and selection of survey provider • Finalise survey instrument in conjunction with scientific advisory committee • Release call for tender for the survey provider • Complete selection process for survey provider
Q4 2021 – Q1 2022	Implementation • Prepare the survey in conjunction with the survey provider (i.e. sample selection process, scripting, translation of survey instrument) • Testing of survey (focus groups, pilot tests) • Fielding of survey • Delivery and verification of data
Q2 2022 – Q4 2022	Data analysis and dissemination • Conduct econometric analysis • Report results to WPIEEP delegates • Disseminate results

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