

Are Consumers Willing to Pay for Industrial Decarbonisation? Evidence from a Discrete Choice Experiment on Green Plastics

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In pursuit of the Paris Agreement targets of keeping global temperatures below 2 °C, there has been an increasing focus on sectors that are particularly difficult to decarbonise such as aviation, heavy-goods transport, and energy-intensive industries such as steel, cement, chemicals and plastics. Global plastics production has grown rapidly due to the versatility and wide range of applications but has resulted in widespread concerns owing to its attendant waste problems although most attention has focused on local rather than its global impacts. In particular, the debates over single-use plastics have redoubled efforts to shift away from non-biodegradable plastics used in consumer products and reformulate plastics so that they have greener characteristics. The global production of mismanaged plastic waste was estimated to be between 60 and 99 million metric tonnes in 2015 and was projected to reach 155-265 million metric tonnes by 2060 (Lebreton and Andrady, 2019).

Apart from addressing concerns over single-use plastics and waste, shifting to bio-based plastics is considered to offer substantial public health and environmental benefits. However, plastic bottle manufacturers continue to prefer producing fossil-based polyethylene products despite the greater environmental impacts because of its cost, performance characteristics and concerns over public reaction. Insufficient knowledge and skepticism about bio-based products among consumers is also allegedly responsible for the dominance of conventional products.

To better understand the barriers to adoption and opportunities for reformulating plastics, we analyse consumer preferences and willingness to pay for environmentally-friendly attributes of plastic bottles in a discrete choice experiment conducted using a representative sample of 3085 British consumers. A number of features of plastic bottles are considered in order to elicit consumer preferences in the discrete choice experiment: (i) national origin of raw materials; (ii) ecolabel certification; (iii) proportion of CO₂ captured; (iv) share of bio-based plastics; and (v) price. In addition, we explore the relationship between demographic and environmental-specific characteristics and price sensitivity of respondents.

Using alternative model specifications ranging from multinomial logit to mixed logit to generalised multinomial logit, we find that British consumers are willing to pay the highest premium for a plastic bottle if CO₂ were to be completely captured during the production process. To a lesser extent, we also find that differential willingness to pay depends on national origins of the materials and the certification employed. We find a higher WTP for environmentally-friendly raw materials from the USA relative to Indonesia and respondents require compensation to accept plastic bottles produced using castor oil from China relative to American sunflower oil. Consumers are also willing to pay a higher premium if plastic bottles held Fairtrade environmental certification as opposed to Certified Sustainable Palm Oil or Organic certification. Preferences are driven by attributes of individuals – consumers involved in environmental organisations (e.g., through volunteering or donations) and those with knowledge of bioplastics have higher willingness to pay for green plastics.

Industrial decarbonisation will be challenging for many reasons, most notably that as trade-exposed sectors, it is difficult for governments to impose high CO₂ prices on firms in these sectors for fear that they move abroad to jurisdictions with lower prices and overall emissions may actually increase rather than decrease (a phenomenon known as carbon leakage, see Babiker 2005). However, our results indicate that despite concerns over other characteristics, it is actually fully decarbonised plastics that entices consumers to pay the greatest amount and so there might be some scope for producers to market plastics produced without CO₂ and charge a significant premium.

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