

Sustainability Agreements and Social Norms¹

Roman Inderst², Felix Rhiel³, Stefan Thomas⁴

September 2021

Abstract

Spurred by recent publications of National Competition Agencies (NCAs), there is an ongoing debate on whether and, if so, how competition law and its enforcement shall give due consideration to concerns of sustainability, notably (though not exclusively) environmental sustainability. With respect to horizontal agreements, we define circumstances where sustainability concerns may indeed warrant a somewhat modified approach for the assessment of consumer welfare (CW) implications of a market related measure. We posit that the willingness-to-pay (WTP) for more sustainable products may depend on social norms to a greater extent than the WTP for products, whose valuation is based mainly or even exclusively on their immediate use value for the consumer. What makes the integration of social norms in WTP challenging, however, is the fact that a sustainability agreement can impact this social norm in that it pushes the market towards more sustainable products, which, in turn, may then change the observable behavior of other consumers. Such repercussions may increase individual WTP for sustainable products in the entire consumer cohort. Absent the sustainability agreement, market segmentation or capacity and resource constraints could hamper the emergence of such a new social norm. Also, with such norm-based externalities, there is a first-mover disadvantage, which deserves recognition in the assessment of sustainability agreements.

Keywords: Horizontal agreements; sustainability; willingness-to-pay; conjoint analysis

¹ We thank the Dutch Competition Authority (ACM), notably Theon von Dijk, for providing us with the data underlying the conjoint analysis in this article.

² Goethe University Frankfurt, inderst@finance.uni-frankfurt.de

³ Goethe University Frankfurt, f.rhiel@em.uni-frankfurt.de

⁴ Eberhard Karls University, Tübingen, thomas@jura.uni-tuebingen.de.

I Introduction

As policy makers and supranational authorities, like the European Central Bank,⁵ show increasing concern for sustainability, also competition authorities have taken initiatives. For instance, the European network of competition authorities, including the European Commission, have initiated a taskforce to this aim, and the competition authorities of Greece and the Netherlands have jointly commissioned an expert report on how to measure such sustainability benefits, while the Dutch competition authority, ACM, has already drafted corresponding guidelines.⁶ Even though a particular focus lies on ecological sustainability, there is also broader concern regarding, for instance, fair trade or animal welfare. While some scholars argue that the competition agencies should pursue sustainability as a goal in itself besides the aim of economic efficiency (“multi-goals approach”),⁷ others warn against the dangers of “green-washing” anticompetitive agreements.⁸ Also, some scholars voice skepticism about such “multi-goals approach”. They argue it may gradually dilute antitrust law’s dedication to competition as its goal, and that it may eventually jeopardize the legitimacy of enforcement

⁵ The ECB expounds ways to integrate sustainability in its policy, *see* Christine Lagarde, President of the ECB, *The monetary policy strategy review: some preliminary considerations*, at the ‘ECB and Its Watchers XXI’ conference, Frankfurt am Main, 30 September 2020, available at: <https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp200930~169abb1202.en.html> (last accessed 26 November 2020); Simon Dikau & Ulrich Volz, *Central Banking, Climate Change, and Green Finance*, in: HANDBOOK OF GREEN FINANCE 81 (Jeffrey Sachs, Wing T. Woo, Naoyuki Yoshino & Farhad Taghizadeh-Hesary, eds, Singapore: Springer 2019); Malin Andersson, Claudio Baccianti & Julian Morgan, *Climate change and the macro economy*, Occasional Papers Series, No 243/June 2020, available at: <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op243~2ce3c7c4e1.en.pdf> (last accessed 26 November 2020). Another aspect is the EU’s sustainable finance initiative, *see* Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, OJ 2020 L 198, p. 13, which defines ecologically sustainable financial products.

⁶ For the technical report *see* Roman Inderst, Eftichios Sartzetakis & Anastasios Xepapadeas, *Technical Report on Sustainability and Competition, A report jointly commissioned by the Netherlands Authority for Consumers and Markets (ACM) and the Hellenic Competition Commission (HCC)*, 2021, available at: <https://www.acm.nl/en/publications/technical-report-sustainability-and-competition> (last accessed 13 July 2021) and for the guidelines *see* ACM Draft Guidelines: Sustainability agreements – Opportunities within competition law, available at: <https://www.acm.nl/sites/default/files/documents/2020-07/sustainability-agreements%5B1%5D.pdf> (last accessed 05 October 2020). Also the Hellenic Competition Commission (HCC) has issued a broader statement of principles (HCC, *Staff Discussion Paper on Sustainability Issues and Competition Law*, 2020, available at: <https://www.epant.gr/en/enimerosi/competition-law-sustainability.html> (last accessed 5 October 2020)).

⁷ *See, e.g.*, Simon Holmes, *Climate change, sustainability, and competition law*, 8 J. Antitrust Enforc. 354, 377 (2020); Suzanne Kingston, *Integrating Environmental Protection and EU Competition Law: Why Competition Isn’t Special*, 16 Eur. L.J. 780 (2010); Suzanne Kingston: GREENING EU COMPETITION LAW (Cambridge: Cambridge University Press 2011).

⁸ For instance, Maarten Pieter Schinkel & Loenard Treuren, *Green Antitrust: Why Would Restricting Competition Induce Sustainability Efforts?*, 2021, available at: <https://promarket.org/2021/03/26/green-antitrust-why-would-restricting-competition-induce-sustainability-efforts/> (last accessed 13 July 2020).

measures due to the opacity of the involved balancing exercises.⁹ We do not delve into the debate on the appropriateness of the multi-goals approach in this paper. Instead, we stick to the traditional consumer welfare (CW) paradigm. We argue, however, that the analytical framework for CW analysis should, where appropriate, give more consideration to the way how sustainability agreements can impact social norms and thereby increase willingness-to-pay (WTP) for more sustainable products. To apply such an approach will allow us to stay within the analytical setup of traditional CW measurement, which ensures the transparency of the assessment. This can also help to avoid greenwashing attempts in sustainability agreements.

Remaining, thus, within the CW paradigm,¹⁰ we provide a rationale for a modified consideration of efficiencies in the case of sustainable products. Focusing on horizontal (sustainability) agreements, we argue that this modified approach is still within the Commission's Horizontal Guidelines.¹¹

Our approach focuses on the acknowledgement of a potential market failure that arises when consumers' WTP for sustainable features of a product depends on social norms, which are again shaped by the observed or anticipated consumption of all consumers together: When a consumer expects many others to contribute to sustainability by purchasing the respective more expensive, sustainable products, she is more likely to feel that her behavior falls short of social (and own) expectations if she still purchased a cheaper, less sustainable variant. When consumers' WTP is shaped by such consideration, any measurement that is conducted under a status quo assumption, in which most consumers still purchase a less sustainable variant, will not adequately reflect the respective WTP that would exist should the social norm change. Such change of a social norm, however, can be induced by the very sustainability agreement that is the subject matter of the antitrust analysis. Take, for example, a sustainability agreement that ensures that less sustainable products phase out, or which introduces

⁹ On that *see*, for example, Edith Loozen, *Strict competition enforcement and welfare: A constitutional perspective based on Article 101 TFEU and sustainability*, 56 C.M.L.Rev. 1265 (2019); Okeoghene Odudu, *The Wider Concerns of Competition Law*, 30 Oxford J. Leg. Stud. 599 (2010); Stefan Thomas, *Normative Goals in Merger Control: Why Merger Control Should Not Attempt to Achieve 'Better' Outcomes than Competition*, in COMPETITION ENFORCEMENT: IS THERE A FINAL FRONTIER? (Ioannis Kokkoris, ed., Cheltenham: Edward Elgar, forthcoming), available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3513098 (last accessed 5 October 2020).

¹⁰ We acknowledge that there is also the opinion in the literature that, even without concerns for sustainability, challenge the view of the priority of consumer welfare in competition law, *see*, e.g. Lina M. Khan, *The New Brandeis Movement: America's Antimonopoly Debate*, 9 J. Eur. Comp. L & Prac. 31 (2018); Sandeep Vaheesan, *The Twilight of the Technocrats' Monopoly on Antitrust?*, 127 Yale Law Journal Forum 980, 990 (2018).

¹¹ We thus sidestep the question of whether, under the current legal regime, environmental considerations could be considered in separation from consumer welfare and could even trump the latter, and we also steer clear of the discussion whether the current scope and objectives of competition law and its application should be widened. Our focus on an approach that remains within the consumer welfare paradigm does not reflect a position on either issue. That said, even proponents of the view that the current mandate needs to be widened should find it instructive to first reflect on the limits of an approach that (still) centers on consumer welfare.

more sustainable variants. This observation has two implications, as we show: First, an effects-based analysis (based on WTP) must take such a shift into account; and second, such dynamics can justify a cooperative agreement in the first place. Precisely, our argument rests on the following two steps:

First, we claim that sustainable products (or more specifically: sustainability-related attributes of products) are much more susceptible to such social norms than when utility derives mainly or exclusively from the direct use value. We support this presumption by drawing on contributions in environmental and behavioral economics as well as psychology. And we illustrate this by re-conducting a conjoint analysis that was performed by the Dutch competition authority for the well-known “Chicken of Tomorrow” case, which we review in detail below. There, participants in a choice experiment were told whether the particular (more or less sustainable, in terms of animal welfare) product was chosen by a small or large number of other consumers. A more in-depth analysis suggests that consumers are more willing to choose products with *less* sustainable attributes when the prevailing social norm, as captured by the behavior of other consumers, is *lower* (that is, more consumers making the same, from a sustainability perspective: inferior, choice). In a regime change, if a large fraction of consumers purchased the more sustainable variant, the WTP analysis would have to consider the change in attribute, the change in numbers, and an interaction effect, as we document.

Second, we argue that the presence of such preferences (or preference changes) could give rise to a market failure. Constrained by market segmentation or capacity, an individual firm may not be able to change the prevailing consumption and thus the prevailing norm sufficiently so as to boost WTP for more sustainable variants sufficiently. In particular, absent an agreement there may be a first-mover disadvantage, resulting in failure to introduce and promote sustainable products. We argue that such efficiencies, which are akin to network effects, fall under the framework of the Horizontal Guidelines, albeit the particular foundation being novel. We acknowledge, however, that such network effects may also arise for different reasons, such as when the offering or servicing of a more sustainable variant relies on market-wide solutions, which however is much less specific to sustainability. We are also careful to not rule out other efficiencies that arise from horizontal agreements, in particular with respect to sustainability. Also, a comprehensive analysis of sustainability agreements must factor in potential inefficiencies that can result from a homogenization of product features, most notably on price. Since our approach rests on the CW paradigm, we do not conceive of sustainability as something which can directly offset such potential decreases in consumer rent that can concomitantly result from the agreement. Rather we look at sustainability as a product feature, and we assess what impact agreements might have on social norms that, in turn, can have repercussions on consumers’ WTP and thereby welfare. Eventually, any beneficial or harmful effect, that will result from a sustainability agreement, is then measured against this WTP. To the extent that decreases in consumer rent are greater than the increase in WTP that might result from a shift in the social norm due to a sustainability agreement, the measure is anticompetitive and, provided that a CW standard alone applies, should be blocked. A more elaborate way of looking into the

repercussions, which sustainability agreements can have on social norms, should therefore give a better understanding of consumers' WTP in the future, increase the accuracy of the CW analysis, and potentially expand the scope of including sustainability concerns.

The remainder of this article is organized as follows. In Section II we introduce the concept of norm-based preferences for sustainable products. Based on this we delineate the scope for efficient horizontal agreements in Section III, which in turn serves as the basis for a (re-)framing in legal terms in Section IV. There, we also carefully discuss the potential difficulties that arise from a welfare comparison under the assumed preferences and how reference to legal norms allows to resolve possible ambiguities. In Section V we offer concluding remarks. Section VI contains some more technical background material.

II Norm-based preferences for sustainable products

II.i Introduction

Our analysis focuses on products that possess an attribute, which is related to sustainability. This could be environmental sustainability, referring to the preservation of nature and biodiversity or to a reduced use of resources. As we noted in the Introduction, in a wider sense sustainability features may also refer to, for instance, animal welfare or fair trade. A common denominator is that these attributes go beyond a pure use value. When we speak of “use value” we refer to product characteristics that provide a direct benefit for the life of the consumer, such as the reduction of fuel costs in an engine, or an increased user-friendliness of a heating system. Sustainability, however, vastly lies outside the scope of such use value since it relates to the effects of a product on the environment in general (or, e.g., on animal welfare) without any directly corresponding benefit for the consumer of the product. We refer to such product characteristics as “non-use benefits” or “non-use value”.

Environmental and resource economics, in particular, acknowledge that individuals have such preferences for non-use benefits or non-use values, e.g., derived from the knowledge of the existence and preservation of particular species. Non-use values may be more deeply motivated by altruism or bequest motives,¹² such as the prevention of negative externalities on others, including subsequent generations. Our first key presumption is that the extent to which consumers regard or disregard such further-reaching consequences of their choices

¹² More precisely, non-use value refers to a valuation not based on actual, planned, or possible use by oneself (though possibly by others); *see*, for instance, DAVID W. PEARCE, GILES ATKINSON AND SUSANA MOURATO, COST-BENEFIT ANALYSIS AND THE ENVIRONMENT: RECENT DEVELOPMENTS (Paris: OECD Publishing 2006).

should depend on prevailing norms. And we further claim that such norms are shaped by the anticipated or observed behavior of others.

There is clearly an abundance of research in social sciences on how norms are formed and how they affect individual behavior,¹³ and such concepts have also found their ways into economics.¹⁴ The relevance of expected or observed behavior by others has also been confirmed repeatedly in experiments, especially in games of contributions to a public good, where it has also been associated with notions of fairness and reciprocity. For instance, in an early contribution Sugden hypothesizes that individuals follow a conditional moral rule of “contributing of what I wish others to contribute, but not needing to contribute more than the person who contributes the least”.¹⁵ There is also an abundant number of field experiments that relate individual behavior to that of others.¹⁶ Norm-based preferences find additional support in the area of psychological game theory.¹⁷ One key concept in this literature is that individuals experience disutility when “letting down” the expectation of others.¹⁸ To conclude, in the context of environmental economics, Nyborg et al. have explored explicitly

¹³ For an early reference on how theories of normative conduct can be harnessed in the context of social norms and public policy see Robert B. Cialdini, Raymond R. Reno & Carl A. Kallgren, *A Focus Theory of Normative Conduct: Recycling the Concept of Norms to Reduce Littering in Public Places*, 58 *J. Person. & Soc. Psych.* 1015-1026 (1990).

¹⁴ It should be remembered that Adam Smith is also the author of the book “The Theory of Moral Sentiments”.

¹⁵ Robert Sugden, *Reciprocity: The Supply of Public Goods Through Voluntary Contributions*, 94 *The Economic Journal* 772-787 (1984). For a theoretical foundation of such considerations of equity and reciprocity see, for instance, Gary E. Bolton & Axel Ockenfels, *ERC: A Theory of Equity, Reciprocity, and Competition*, 90 *Amer. Econ. Rev.* 166-193 (2000).

¹⁶ For instance, recycling behavior has been found to strongly correlate with beliefs about recycling in the community; see Robert B. Cialdini, *Crafting Normative Messages to Protect the Environment*, 12 *Current Directions in Psychological Science* 105-109 (2003); Robert B. Cialdini, *Don't Throw in the Towel: Use Social Influence Research*, 18 *American Psychological Society Observer* 33-34 (2005) and the various studies quoted in P. Wesley Schultz, *Knowledge, Information, and Household Recycling: Examining the Knowledge-Deficit Model of Behavior Change*, in: *NEW TOOLS FOR ENVIRONMENTAL PROTECTION: EDUCATION, INFORMATION, AND VOLUNTARY MEASURES* (Thomas Dietz & Paul C. Stern, eds, Washington, DC: National Academy Press 2002). Other studies analyze the normative social influence on clothing decisions (e.g., Hanna Kim, Eun-Jung Lee & Won-Moo Hur, *The Normative Social Influence on Eco-Friendly Consumer Behavior: The Moderating Effect of Environmental Marketing Claims*, 30 *Clothing and Textiles Research Journal* 4-18 (2012)).

¹⁷ See John Geanakoplos, David Pearce & Ennio Stacchetti, *Psychological Games and Sequential Rationality*, 1 *Games and Economic Behavior* 60-80 (1989); Pierpaolo Battigalli & Martin Dufwenberg, *Dynamic Psychological Games*, 144 *J. Econ. Th.* 1-35 (2009).

¹⁸ Admittedly, such a feeling of guilt may often refer particularly to interpersonal relationships and thus situations with personal interactions (e.g., as in the advisor-experiment performed in Roman Inderst, Kiryl Khalmetski & Axel Ockenfels, *Sharing Guilt: How Better Access to Information May Backfire*, 65 *Management Science* 2947-3448 (2019)).

how the behavior of others generates network effects through a change in norms.¹⁹ With this background we next formalize the assumptions on preferences that we use in this article.

II.ii Formalization

In what follows we provide a simple formalization of such preferences. Subsequently, we add empirical support with preferences extracted from a conjoint analysis relating to animal welfare. For our formalization we suppose, for the sake of simplicity, that a consumer will buy either a sustainable or a non-sustainable product, so that there is a single sustainability attribute that can take on only two values: Either the product is sustainable or it is non-sustainable. Apart from this attribute and the price, there is only one additional contextual variable that may influence consumer WTP: information about the number of other consumers that choose the sustainable or the non-sustainable variant. We refer to the respective variants as S (sustainable) and ns (non-sustainable), and to the possible number of consumers choosing the same alternative as L (large) or S (small). For instance, $WTP_{s,L}$ denotes the WTP for the sustainable variant when this is chosen by a large number of other consumers (and the non-sustainable variant by a small number). We next formulate our key assumption with regards to consumer's WTP.

Assumption on WTP and social norms: $WTP_{ns,L} - WTP_{ns,S} > 0$, i.e., the WTP for the non-sustainable variant is higher when the consumer expects this (still) to be chosen by a large (instead of only a small) number of other consumers. This reflects the basic notion that, when the social norm changes towards sustainability, so that only a small number of consumers still choose the non-sustainable variant, this depreciates individual WTP for the non-sustainable variant.

We are agnostic about how the WTP for the sustainable product changes in the number of consumers who make this choice. On the one hand, as the social norm tends more towards sustainability, a consumer's choice of the sustainable product becomes less special, so an associated "warm glow" effect may decrease. On the other hand, the fact that also other consumers make this choice may reassure an individual consumer that she

¹⁹ Karine Nyborg, Richard Howarth & Kjell Arne Brekke, *Green Consumers and Public Policy: On Socially Contingent Moral Motivation*, 28 Resource and Energy Economics 351-366 (2006). Earlier contributions stipulate, instead, that an exogenous fraction of consumers has "green preferences". It should be acknowledged that a relationship between the choice of others and a consumer's individual choice may also have other foundations, such as imitation or learning about the existence of the respective products. For instance, in an analysis of optimal environmental taxation, Sartzetakis and Tsigaris (Eftichios S. Sartzetakis & Panagiotis Tsigaris, *Environmental Externalities in the Presence of Network Effects: Adoption of Low Emission Technologies in the Automobile Market*, 28 Journal of Regulatory Economics 309-326 (2005)) motivate networks effects mainly on the basis of required additional (infrastructure) investment. There exists a large literature in economics dealing with such network effects more generally, going back at least to Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 Am. Econ. Rev. 424-440 (1985).

does not contribute more than what is fair and equitable. If the first argument prevailed, we suppose that the overall effect of the social norm is still such that the relative (or incremental) WTP for the sustainable variant increases when more consumers choose a more sustainable behavior (see also below). Furthermore, while this is not directly relevant for our main argument, our empirical analysis below reveals that, at least in this context, the social norm has a stronger impact on the WTP for the non-sustainable product than it has on the WTP for the sustainable product: $WTP_{ns,L} - WTP_{ns,S} > WTP_{s,L} - WTP_{s,S}$.

Suppose now that competition ensures that the non-sustainable variant is supplied at a given price, e.g., a price equal to marginal cost, as it is a mature product that is supplied by a number of firms. That means it is not supposed to vary in the different scenarios. If now a sustainable product is introduced, we ask which price increment is “justified” so as to make consumers still prefer the sustainable variant. A first immediate answer is to refer to the difference $WTP_{s,S} - WTP_{ns,L}$, i.e., the difference in WTP when the non-sustainable variant is still chosen by a large number of consumers (and the non-sustainable variant only by a small number). However, when the introduction of the sustainable variant achieves a high market penetration, a different answer is more appropriate: Then, the sustainable product can command a strictly higher price increment, namely $WTP_{s,L} - WTP_{ns,S}$. That is, when we take the new status-quo, with a large number of consumers choosing the sustainable product, the incremental WTP for the sustainable variant is strictly higher. Put differently, as we shift the social norm, the incremental WTP for the sustainability attribute increases by the difference (in differences)

$$\begin{aligned} & [WTP_{s,L} - WTP_{ns,S}] - [WTP_{s,S} - WTP_{ns,L}] \\ &= [WTP_{ns,L} - WTP_{ns,S}] + [WTP_{s,L} - WTP_{s,S}] > 0. \end{aligned}$$

Here, the first term is strictly positive by our key assumption relating WTP to social norms: The individual WTP for the non-sustainable variant decreases as more consumers choose the sustainable variant, thereby shifting the social norm. With regards to the second term, recall that we provided arguments for why it could be negative or positive, while still ensuring that the overall sum of both terms is strictly positive.

II.iii Empirical illustration

We introduce now an empirical study. In January 2015, the Netherlands Authority for Consumers and Markets (ACM) decided that a planned agreement between producers, traders, and retailers about minimum requirements regarding the welfare of chickens, which they dubbed “the Chicken of Tomorrow”, did not qualify for the exemption from the cartel prohibition. As part of the case work, the ACM conducted a discrete choice experiment in 2014, based on which (via a conjoint analysis) consumer WTP for the more sustainable chicken was estimated (and compared to a price increase that was suggested by the coordinating firms).

We are thankful to the ACM for granting us access to these data. In the technical Appendix to this article we briefly review these data and also conduct such a conjoint analysis (via a conditional logit model).²⁰ Thereby, we extract the WTP for four different sustainability attributes: whether chickens have outdoor access, whether they have more living space, whether they have a longer lifespan, and whether they are anaesthetized with certainty when being slaughtered. The ACM included in the description of the different hypothetical choices also information on which of the two alternatives was chosen either by a “large” or by a “small” number of consumers. In our analysis we include this variable and relate it to the four sustainable attributes. This allows to estimate separately the impact on WTP for a more and a less sustainable variant.

The empirical results are consistent with the social norm effect. In particular, we find that the WTP for a less sustainable product is strictly higher when it is chosen by a large number of consumers. It decreases, instead, when the more sustainable variant becomes the product that is supposedly chosen by a larger number of consumers. In sum, the incremental WTP for a more sustainable product increases when this is chosen by a large number of consumers (and the less sustainable variant by a small number). What is more, as conjectured above, the analysis also reveals that in this context the “large-number effect” is stronger with the non-sustainable variant. More formally, we analyze this by including into the regression analysis an interaction effect for each sustainable attribute and the “large-number indicator”. This becomes consistently negative, indicating that whether the particular variant is chosen by more consumers has indeed a larger effect on the WTP for a less sustainable variant. In the technical Appendix we present additional details.

III Market failure and the potential of efficient horizontal agreements

We now build on the introduced and empirically documented (norm-based) preferences. To delineate the scope for a potential market failure and thereby potential efficiencies arising from an agreement, we start with a simple thought experiment. For this we consider four firms that may potentially enter into a horizontal agreement to introduce a more sustainable variant. We first suppose, in an obviously extreme way, that each of these four firms serves a different market, e.g., distinct neighboring geographical markets. Assume that the respective firms face competition from a market fringe that supply the non-sustainable variant in these distinct geographical markets. While this presently excludes competition among the considered four firms, since they are active in neighboring, albeit different, markets, we (re-)introduce such competition in a subsequent step.

²⁰ In the Appendix we note also that the results are robust to other procedures, such as a random coefficient model (as used in Machiel Mulder & Sigourney Zomer, *Willingness to Pay for Broiler Welfare*, 20 *Journal of Applied Animal Welfare Science* 137-154 (2017)), or a Bayesian approach.

To keep the thought experiment particularly simple, we suppose that all consumers have the same valuation, which thus differs only with respect to the sustainable or the non-sustainable variant. Also, we assume that the relevant product is only sold in these four distinct geographical markets, and that consumers on each market can observe the purchasing behavior of the other consumers in their respective markets. The non-sustainable variant is always offered (by the market fringe) at the competitive, cost-based price of, say, 3 Euros. When all consumers buy the non-sustainable variant, we suppose that each consumer's WTP is 5 Euros for the non-sustainable variant and 6 Euros for the sustainable variant, where the difference of one Euro may represent a (minimum) "warm glow" effect that is independent of the prevailing norm. When now only one of the considered four firms starts to introduce such a sustainable variant, it can, by assumption, cover at most 25 % of the total volume (i.e., one relevant geographical market out of four neighboring geographical markets). Then, the norm changes accordingly, so that now any consumer observes or anticipates that the more sustainable variant is chosen by 25 % of all consumers of this product (i.e., all consumers in one out of the four relevant geographical markets). In line with our preceding discussion, we suppose that this reduces the WTP for the non-sustainable variant: A consumer still purchasing the non-sustainable variant experiences less utility, so that, for instance, the WTP for the non-sustainable variant equals 4.5 Euros (i.e., it decreases by 50 Cent). Note that, again in line with the preceding discussion, we could also (or in addition) suppose that the shift in the norm increases the WTP for the sustainable variant by some amount. From the perspective of the firm introducing the sustainable variant (on its own), what matters is the difference in WTP, here with respect to the non-sustainable offer by the fringe, which is now $6 - 4.5 = 1.5$ Euro.

Suppose next that in addition to the considered (first) firm, also another firm introduces and promotes the sustainable variant, so that now 50 % of all consumers purchase the sustainable variant (i.e., all consumers in two out of four relevant geographical markets). Again in line with the preceding discussion, we suppose that this decreases the utility experienced with the non-sustainable variant, say to 4 Euros, so that now the WTP for the sustainable variant exceeds that for the non-sustainable variant by $6 - 4 = 2$ Euros. Each of the two firms introducing the sustainable variant can thus command over a price premium of 2 Euros compared to the (competitive) price of the non-sustainable variant, which equals 3 Euros. Recall that the respective price premium was only 1.5 Euro, resulting in a maximum price of $3 + 1.5 = 4.5$ Euros, if only one firm introduced the sustainable variant. When the latter is insufficient to cover investment costs, but 2 Euro are sufficient, then the sustainable variant is introduced only when this is done simultaneously by at least two firms. If even then the WTP is insufficient, it may be necessary to have at least three firms introduce the sustainable variant jointly, thereby covering three of the four neighboring geographical markets (i.e., 75 % of the entire product market) and shifting the norm accordingly, with a corresponding effect on WTP.

A key feature of this thought experiment is that firm benefits from introducing the sustainable variant increase when it is also introduced by other firms, thereby covering a larger share of the total output. In economic terms,

the firms' investment decisions in the sustainable variant become strategic complements: The incentives to invest increase when such investment is expected also from other firms. This can give rise to multiple equilibria, where either all (or many) firms choose the respective investment, or where they all refrain from investing. In this simple case, allowing firms to coordinate on the preferred outcome would lead to the introduction of the sustainable variant, while otherwise such investments may not be made.

While we have, so far, considered an essentially static framework, where firms must make their investment decisions simultaneously, this can also be given a dynamic interpretation. Here, the "first mover" introduces the sustainable variant at a time when consumers' WTP is still low, given the prevailing social norm. The firm must hope to either expand the market share sufficiently on its own or that other firms follow suit and help shifting the norm. A second mover can instead enjoy the higher WTP right from the start, given the already achieved market penetration of the sustainable variant. In this case, given the assumptions of the thought experiment, there is thus a "first mover disadvantage".

As already noted in the Introduction, the induced consumer preferences thus give rise to a positive network effect that lifts consumers' WTP for the sustainable variant. In the subsequent section we relate this to known economic efficiencies that are associated with (horizontal) agreements. We note, however, that for our thought experiment we have, so far, relied on a scenario without competition among the firms involved in the agreement. In the absence of competition among those four firms (due to their being active on neighboring, albeit different geographical markets), it might be argued that such sustainability agreement would not even restrict competition, and that it would therefore fall outside the cartel prohibition anyways. Yet, the thought experiment was only meant, as a first step, to describe the repercussions which a coordination on the new sustainability standard can bear on the social norm and thus on consumers' WTP and, ultimately, the suppliers' incentives to supply more sustainable goods.

Clearly, when any given firm could, after introducing the sustainable variant, capture the whole market, the discussed network effect would be absent: There is no longer a positive externality from other firms' introduction of the sustainable variant. One might want to argue, therefore, that under the assumption of competition between the four firms, the idea of a social norm depending on a sustainability agreement must be moot. Yet, we think that such scenario of a competing firm being able to capture the whole market is a theoretical scenario in many instances. Even when firms compete on the same relevant market, each individual firm may realistically face constraints in capturing the total market, such as limited capacity, or when consumers have sufficiently strong (horizontal) preferences for individual firms and their products. In those cases, even though the four firms being competitors, an element of the discussed strategic complementarity between firms' investment incentives remains and with it potential benefits from coordination on introducing the sustainable variant.

We are, however, mindful of the fact that, when competitors engage in such communication and coordination, it can become necessary to check whether, as a result, innovation and sustainable investments may rather be stifled than fostered.²¹ And we also acknowledge that there may be other economic justifications for horizontal agreements that foster sustainable changes, which ultimately benefit consumers, that would otherwise not materialize. The scope of the present article is thus clearly limited, as we identify a potential source for an efficiency that tends to be neglected in standard WTP analysis. With this focus we next analyze its legal foundations.

IV A legal framing of the concept

IV.i Measuring sustainability agreements against CW

We now want to outline that our approach to the dealings with the impact of sustainability agreements on social norms and, consequently, WTP, reconciles with the determinants of the established CW paradigm. As a starting point we base our approach on CW as the relevant gauge for antitrust assessment. That said, we are aware of the ongoing debate about the goals of antitrust and whether or not CW is the appropriate gauge.²² We do not, however, enter into the debate about whether competition as a process is a goal in itself that could serve as a benchmark for antitrust enforcement besides or instead of CW.²³ Rather, we point to the fact that the paradigm of freedom to compete is, in itself, incapable of explaining why and to what extent horizontal agreements (or mergers²⁴) that restrict the freedom to compete can be accepted in a given case. As the law of Article 101(3)

²¹ For the detailed formal analysis of either case *see* Roman Inderst, Eftichios Sartzetakis & Anastasios Xepapadeas, *When Does Firm Co-operation Foster or Forestall Sustainable Development?*, (forthcoming) (2021).

²² The Neo-Brandeis-School, for example, argues that the effects doctrine focuses too much on CW thereby rendering antitrust policy too restricted in scope, *see* Lina M. Khan, *The New Brandeis Movement: America's Antimonopoly Debate*, 9 J. Eur. Comp. L & Prac. 31 (2018); Sandeep Vaheesan, *The Twilight of the Technocrats' Monopoly on Antitrust?*, 127 Yale Law Journal Forum 980, 990 (2018).

²³ On the one hand, the Court of Justice emphasizes that the demonstration of concrete consumer harm is not a precondition for an antitrust theory of harm ECJ of 6 October 2009, Joined Cases C-501/06 P, C-513/06 P, C-515/06 P and C-519/06 P [*GlaxoSmithKline v Comm'n*] ECLI:EU:C:2009:610. On the other hand, the EU-judicature emphasizes that competition ultimately serves the consumer, *see* GC of 7 June 2006, Joined Cases T-213/01 and T-214/01 [*Österreichische Postsparkasse*] ECLI:EU:T:2006:151, ¶ 115: “[T]he ultimate purpose of the rules that seek to ensure that competition is not distorted in the internal market is to increase the well-being of consumers.”

²⁴ We relate our paper to sustainability agreements, but the basic principles could be transferred to mergers, since the impact on horizontal competition is comparable. A merger cannot be prohibited if the consumer harm is fully offset by merger-specific efficiencies, *see* European Union Commission Horizontal Merger Guidelines, OJ 2004 C 31 p. 5, ¶ 77; IOANNIS KOKKORIS & HOWARD A. SHELANSKI, *EU MERGER CONTROL*, ¶ 12.01 (Oxford: Oxford University Press 2014); MICHAEL ROSENTHAL & STEFAN THOMAS, *EUROPEAN MERGER CONTROL*, Chapter C ¶ 496 (Munich/Oxford: C.H.

TFEU demonstrates, offsetting efficiencies that increase consumer surplus as a result of the horizontal competitive constraint are acknowledged as a defense. This shows that even primary legislation on antitrust in the EU is accommodating of efficiencies and their benefit to consumers. A similar stance can be found in other important antitrust jurisdictions, like the U.S. Also, the Commission's guidelines on horizontal restraints under Article 101 TFEU (and the Horizontal Merger Guidelines) reflect a practical approach towards antitrust enforcement that is based on CW.²⁵ We therefore find sufficient ground in the established enforcement principles to rely on CW in our paper.²⁶ We do not engage into a further analysis of whether total welfare might be preferable as an enforcement standard, since the latter has not percolated into the enforcement practice of the EU-Commission.²⁷

The basic principle behind a CW analysis, as underlying this paper, is to measure whether, as a result of the horizontal agreement, consumer surplus would be greater than absent the agreement. While in most cases CW analysis will focus on the effect which the agreement has on price, consumer surplus can, obviously, also be increased by an increase in consumers' WTP. That is where our approach takes effect in that an agreement, by

Beck/Hart 2010). With respect to horizontal agreements *see* European Union Commission Guidelines on the applicability of Article 101 TFEU to horizontal co-operation agreements, OJ 2011 C 11 p. 1, ¶ 49 and several other references to "efficiency gains" in these guidelines.

²⁵ *See supra* note 24.

²⁶ *See also* Neelie Kroes, speech, *European Competition Policy – Delivering Better Markets and Better Choices*, European Consumer and Competition Day, London, 15 September 2005: "Consumer welfare is now well established as the standard the Commission applies when assessing mergers", available at: https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_05_512 (last accessed 05 October 2020); Joaquín Almunia, speech, *Competition and consumers: the future of EU competition policy*, European Competition Day, Madrid, 12 May 2010: "All of us here today know very well what our ultimate objective is: Competition policy is a tool at the service of consumers. Consumer welfare is at the heart of our policy and its achievement drives our priorities and guides our decisions.", available at: https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_10_233 (last accessed 05 October 2020). *See also* Svend Albæk, also Svend Albæk, *Consumer Welfare in EU Competition Policy*, in AIMS AND VALUES IN COMPETITION LAW (Caroline Heide-Jorgensen, Christian Bergqvist, Ulla Neergaard & Sune Troels Poulsen (eds.), DJØF Publishing Copenhagen 2013); José Luís da Cruz Vilaça, *The intensity of judicial review in complex economic matters* 6 J. Antitrust Enforc. 173, 184 (2018): "I believe such statements are useful for clarifying what the Court considers to be the major goal of EU competition rules, [...] although perhaps not always 100 per cent consistent, the case-law places in general sufficient emphasis on consumer welfare as a goal.". For the US *see* HERBERT HOVENKAMP, *THE ANTITRUST ENTERPRISE: PRINCIPLE AND EXECUTION* (Cambridge, MA: Harvard University Press 2005) p. 2: "The only articulated goal of the antitrust laws is to benefit consumers [...]".

²⁷ There is an ongoing scholarly debate on whether total welfare or consumer welfare is the appropriate standard for antitrust enforcement, *see* Louis Kaplow, *On the Choice of Welfare Standards in Competition Law*, in THE GOALS OF COMPETITION LAW 3-26 (Daniel Zimmer ed., Cheltenham: Edward Elgar 2012).

influencing a social norm, can effectively elevate consumers' WTP to an extent that may offset concomitant consumer harm, e.g., by an increase in price or a lack of choice.

Another aspect warrants consideration, which has to do with the dimension of time. The effect which a sustainability agreement has on a relevant social norm will hinge on the implementation of the agreement. The inherent dynamic in this approach is that the very measure that is the object of the WTP analysis will potentially bear on WTP itself in that it impacts on a social norm. Depending on the circumstances, such change of a social norm will take time to materialize. This means that CW analysis will entail an element of prognosis of future consumers' WTP, if the agreement is evaluated from an ex-ante perspective.²⁸ This leads to a conceptual issue of defining the relevant consumer cohort. While consumers may still display a low WTP for the sustainable good immediately after the sustainability agreement has been made, this could change over time. Later consumer generations, that make their purchases after the sustainability agreement has impacted on the social norm, may value sustainability higher and develop a correspondingly greater WTP than earlier consumer generations have. It is inherent in our approach, therefore, to aggregate the WTP of the relevant consumer group as measured or forecasted at different points in the future. In our paper "Prospective Welfare Analysis", we have elaborated on the conceptual design of such intergenerational welfare balancing in antitrust.²⁹ There, we outline why and under which circumstances such a forecast and aggregation of future preferences reconciles with the determinants of the CW paradigm, and how it can be made operable.

IV.ii Comparing different WTPs

In order to check whether and to what extent consumers' WTP might rise thanks to a shift of a social norm, it can be necessary to provide the consumer with additional information about her purchasing decision and the social context in which it will take place should the sustainability agreement be implemented. As fact of the matter, the idea behind the integration of social norms in WTP analysis is based on the assumption that WTP is determined by factors that go beyond the mere use value of the product. The appreciation of the non-use value, however, will depend on the veracity and amount of information that is available to the consumer about this non-use value. It is therefore the case that consumers' WTP for sustainability (and other non-use values of a product) will often depend on the context in which the consumers make their decisions, and the WTP

²⁸ We think that the ex-ante perspective is the most relevant for sustainability agreements since firms will want to assess the legality of their measure before implementing it. This may involve contacts with the antitrust agency. If a sustainability agreement is assessed from an ex-post perspective, the dimension of time is still relevant in that it must be assessed whether consumers' WTP has changed in the past as a result of the sustainability agreement via influencing a relevant social norm.

²⁹ Roman Inderst & Stefan Thomas, *Prospective Welfare Analysis – Extending Willingness-to-Pay Assessment to Embrace Sustainability*, 25 September 2020, J. Comp. L. & Econ. (forthcoming), available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3699693 (last accessed 13 July 2021).

expressed will hinge on the quality and the amount of information about the sustainability impact of the purchase.

In our paper “Reflective Willingness to Pay”³⁰, we describe the economic methods that can be used to extract WTP in relation to such non-use values based on greater consumer reflection. There, we have explained why it can be expedient to provide to the consumer additional information about the environmental impact when measuring her WTP in order to extract her specific appreciation for sustainability features of a product. Upon greater reflection about sustainability, the consumer might display a greater WTP for a sustainable product than what might emanate from actual purchasing decisions, i.e., from “revealed preferences.” Such information can include the fact that, thanks to the sustainability agreement, a greater number of consumers will, in the future, purchase a more sustainable good.

To the possible concern that the concept of different WTPs, depending on the context, such as the number of other consumers making a more sustainable choice, risks rendering such a measure meaningless, we offer several responses. We first acknowledge that our concepts and their discussion should indeed be probed also in this respect. We then offer, in our specific context, a solution that lies outside an economic analysis, namely by referring to wider legal objectives in EU-law, as outlined in our paper on “Reflective Willingness to Pay”. We now harness these results also for the present analysis.

Focusing, again, on norm-based preferences, suppose for a brief thought experiment that a government intervention triggered (e.g., by employing role models) a change of social norms. Then, holding consumption fixed, the perceived utility may go up for those who take the laudable choice, and it may go down for those who make the alternative choice. As a further consequence, consumers may then adjust their actions. If we ignored the possible objectives that have led the government to employ such a policy, and if we were even unaware of the change of circumstances, we would be hard-pressed to argue that one outcome was preferable to the other.³¹ Likewise, leaving again the framework of norm-based preferences, consumers’ expressed preferences and thus the thereby construed WTP may change with the choice context, as discussed previously with reference to the concept of “reflective WTP”. This clearly renders void the notion that measured preferences should be regarded as the manifestation of “true” preferences with which a person is endowed at a particular moment and that, absent errors, dictate her choices, irrespective of other contextual factors. The

³⁰ Roman Inderst & Stefan Thomas, *Reflective Willingness to Pay – Preferences for Sustainable Consumption in a Consumer Welfare Analysis*, J. Comp. L. & Econ. (forthcoming), available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3755806 (last accessed 13 July 2021).

³¹ Referring to such policies, which frequently fall under the heading of “behavioral nudging”, should not be construed as an argument in favor, as they obviously raise fundamental questions of individual freedom, which cannot be adequately discussed solely within a (consumer) welfare analysis.

prevailing norm, or more generally the observed actions of others, may be regarded as such a contextual factor. There is thus some familiarity between our approach and recent developments in the literature of behavioral welfare economics, which has also stressed the relevance of such contextual factors and consequently the inherent ambiguity in extraction measures of welfare from observed choices.³²

Ultimately, the “reflective WTP” approach, including the integration of social norms as proposed in this paper, therefore leads to a conceptual query that has not, to our knowledge, received much attention so far in the context of antitrust enforcement. The outcome of WTP analysis can be that one and the same consumer has different WTPs depending on the context, including the behavior of other consumers. One WTP figure can suggest a greater endorsement of the sustainability feature of a product than another WTP figure that is extracted under different contextual factors. This leads to the question in what way enforcers can rely their decision on two or more diverging WTP figures relating to the same consumer or consumer group. Such diverging WTPs are not a contradictory result in a WTP analysis. The enforcer therefore must choose between two or more equally “true” WTPs when measuring the impact of an agreement on CW. At this point, an exogenous gauge is needed to inform the enforcer on which WTP is preferable. In our paper “Reflective Willingness to Pay” we point out that, with respect to sustainability, the wider legal order should be reflected in the enforcer’s choice. Sustainability has percolated into the European legal order in several ways.³³ Even when none of the provisions, in which sustainability is endorsed as a societal goal of great importance, amounts to an enforcement goal that should or could be directly pursued by the antitrust laws, the societal conviction echoed in these legal provisions can serve to legitimize the decision of an enforcement agency to prefer a reflective WTP, which attributes greater weight to sustainability, over a “less sustainable WTP”.

To repeat: This conclusion does not rely on a recognition of sustainability as an enforcement goal in itself, which should or could be pursued *besides* CW by way of enforcement of the antitrust laws. Such a multi-goals approach would leave it to the enforcement agency or court to balance CW against sustainability. The present analysis and that in our companion papers, instead, remain within the CW paradigm. Sustainability is thereby accepted inasmuch as it influences consumers’ WTP. Within such an approach the consumer therefore remains the ultimate arbiter on the outcomes of the competitive process.

³² A prominent exponent is Douglas Bernheim, *The Good, the Bad, and the Ugly: A Unified Approach to Behavioral Welfare Economics*, 7 *Journal of Cost Benefit Analysis* 12-68 (2016). Bernheim refers to the choice context as “decision frames” (*ibid*, p. 36) and stresses, as we do, that this should not suggest arbitrariness, but rather a careful recognition of the respective circumstances.

³³ See, e.g., the cross-sectional clause of Article 11 TFEU (ex Article 6 TEC), or Article 3(3) Sentence 2 TEU, or Article 191 TFEU. While these provisions do not provide the antitrust enforcer direct legal powers, they are a legal demonstration of a social conviction about the relevance of sustainability.

V Concluding remarks

It was our intention to demonstrate how sustainability agreements can bear on consumers' WTP by causing a shift in social norms. Since this directly impacts on any subsequent CW analysis, we argue that an integration of such repercussions into an assessment of the effects of a horizontal agreement falls squarely within the scope of the CW paradigm. We therefore argue that such an extension of WTP analysis can be a meaningful way for an agency to integrate sustainability considerations into its assessment. As opposed to a multi-goals approach, such an extension stays within the confinements of the CW paradigm. Therefore, within this concept, consumers' WTP remains the ultimate gauge to measure the degree to which a market outcome can be shaped in order to produce greater sustainability. Consumer surplus is kept as the common unit of measure for both, harm and benefit, without introducing any contravening externality into the assessment.

We should reemphasize that in this paper we have confined ourselves to this singular aspect in the assessment of sustainability agreements. It must be considered that any sustainability agreement will, most likely, precipitate further effects that can be harmful or beneficial for consumers. Also, we acknowledge that we have not considered any distributive implications which a sustainability agreement might have. In order to obtain a full understanding of the implications of a sustainability agreement on consumer rent, it is therefore necessary to also behold these other effects on consumer rent. As we have repeatedly stressed, since the analysis remains within the bounds of CW analysis, it neither endorses nor precludes other approaches. Where we take a stance, however, is in emphasizing that such approaches, which may have a greater focus on externalities, need to be carefully reconciled with the principles of CW analysis.

VI Technical material for the conjoint analysis

As mentioned in the main text, we received from the ACM data that were used in the assessment of the “Chicken of Tomorrow” case. For this, a discrete choice experiment was conducted in 2014, drawing on a household panel with an ultimate participation of 1,603 panel members.³⁴ Participants were subject to repeated choice situations. Every choice set consisted of two purchase options characterized by a price and four other attributes that relate to different aspects of animal welfare. These variables as well as their possible values are depicted in the following table. There, we also describe how we have transformed two of these variables so that all variables are captured by a (binary) indicator variable, indicating a lower or a higher degree of animal welfare (sustainability).³⁵ Hence, the indicator describes a relative improvement in animal welfare for the specific attribute.

Attribute	Indicator = 0	Indicator = 1
Lifetime in days	40	60, 80
Outdoor access	No	Yes
Number of mature chicken per square meter	15, 20	10
Anaesthesia method	There is a chance that the chicken is not sufficiently anesthetized.	The chicken is always sufficiently anesthetized.

Table 1: Sustainable attributes in the conjoint analysis.

Subjects were provided with two pieces of additional information in each choice situation. The first information is of lesser relevance for our analysis and details whether the respective attributes are certified independently (the base line in our analysis) or instead by legislation or a collectively agreed label. The second information is instead of major importance for our analysis: In each choice set it was indicated which option was supposedly chosen by a “small” number of consumers and which option by a “large” number. Finally, which is again of less relevance for our analysis, each choice set contained also the option of “not buying”.³⁶ To investigate the choice behavior of the respondents in the conjoint dataset we closely follow the (standard) procedure adopted

³⁴ We refer to the published original case document of the ACM (Machiel Mulder, Sigourney Zomer, Tim Benning & Jorna Leenheer, *Economische effecten van ‘Kip van Morgen’*, 2014, Authority of Consumers and Markets, available at: <https://www.acm.nl/nl/publicaties/publicatie/13759/Onderzoek-ACM-naar-de-economische-effecten-van-de-Kip-van-Morgen> (last accessed: 13 July 2021)) as well as to the study by Machiel Mulder & Sigourney Zomer, *supra* note 20, for a detailed description of the underlying panel and the drawn sample.

³⁵ The grouping was conducted so as to generate a relatively balanced number of responses in the respective two remaining categories.

³⁶ Such an “outside option” is important to derive the absolute WTP for a given purchase option, consisting of various attributes. As is standard, for the outside option the individual part-worths are set to zero, which is achieved by setting the corresponding indicator variables equal to their baseline levels (of zero).

also in the original ACM case work, applying a conditional logit model.³⁷ We provide a very brief semi-formal description.

It is assumed that respondents make their choices so as to maximize their utility. The utility function of individual i for alternative j is specified by a deterministic part V_{ji} , which consists of a linear combination of product-specific attributes and their respective coefficients, as well as a stochastic part ε_{ji} . The latter is assumed to be iid extreme value distributed, and this feature gives rise to the conditional logit model.³⁸ A specific feature of our utility model, as described in the main text, is that we allow for an interactive effect between the attribute “number of consumers” and the different sustainability attributes.

Variable	Estimate	Standard error	WTP estimate
Price	0.279***	(0.004)	
Lifetime	0.218***	(0.043)	0.781
Outdoor access	0.744***	(0.040)	2.667
Living space	0.451***	(0.036)	1.616
Anaesthesia method	0.974***	(0.041)	3.491
Number of Dutch consumers	0.547***	(0.069)	1.961
Interaction: No. Dutch cons. – Lifetime	-0.076	(0.043)	-0.272
Interaction: No. Dutch cons. – Outdoor access	-0.237***	(0.068)	-0.849
Interaction: No. Dutch cons. – Living space	-0.285***	(0.058)	-1.022
Interaction: No. Dutch cons. – Anaesthesia	-0.121	(0.070)	-0.434
Legislation/Collective agreement	0.161***	(0.022)	0.577
Outside option	-1.172***	(0.050)	-4.200
N	72,135		
Pseudo R ²	0.246		

Note: $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 2: Regression results for the conjoint analysis and derived WTP.

In Table 2 the obtained estimates for the different attributes are described in the first column and the standard errors in the second column. These coefficients cannot yet be analyzed in terms of WTP. For this it is necessary to divide the respective coefficients by the (absolute value of the) price coefficient. This yields our attribute-specific WTP estimates, as presented in the last column of the table. For instance, when outdoor access is

³⁷ A common alternative is to use a (more flexible) random coefficient model. This can further be varied by taking a Bayesian approach. In ongoing separate work, we have explored these different variants, which do not lead to qualitatively different results.

³⁸ We refer to any standard textbook (such as KENNETH E. TRAIN, DISCRETE CHOICE METHODS WITH SIMULATION (New York: Cambridge University Press 2009)) for a more detailed description. In the specific context of measuring environmental preferences, also Roman Inderst, Eftichios Sartzetakis & Anastasios Xepapadeas, *supra* note 6, provide a short description.

granted, this increases (average) WTP ceteris paribus by 2.67 Euro. An increase in the lifetime has only a considerably smaller effect, raising WTP ceteris paribus by 78 Cent. All attributes are highly significant.

We now calculate the WTP for a product that has no sustainable attribute, when either a small or a large number of consumers is supposed to take the same alternative. For this we need to calculate the WTP relative to the outside option (so that this value is subtracted), and for the “legislation/collective agreement” attribute we choose the baseline (i.e., of a market-based certification). We thus have $WTP_{ns,S} = 4.20$ Euro and $WTP_{ns,L} = 4.20 + 1.96 = 6.16$ Euro, which confirms our key assumption. Finally, we also confirm that, as also conjectured, $WTP_{ns,L} - WTP_{ns,S} > WTP_{s,L} - WTP_{s,S}$. To see that this holds, note that in this comparison all base effects drop out and only the interactive effects remain. From Table 2 we know that these interaction effects are all strictly negative, so that the right-hand side of the inequality is indeed strictly smaller. This holds regardless of whether we choose a product where all or only some attributes are more sustainable.