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Consumer Responsibility and the Transformation Process of the Electricity Market: Insights From Behavioral Decision Research**

Abstract

Since the 1990s, consumer research has looked for causes that could explain the absence of switching behavior of electricity consumers in liberalized electricity markets. Recent decision theory findings suggest that this absence of switching behavior is due to the so-called status quo bias. The status quo bias reflects the tendency of individuals to prefer the actual situation disproportionately (Samuelson & Zeckhauser, 1988). Using the insights of this particular bias, an economic experiment was designed to empirically test the influence of the status quo bias. In a choice-based conjoint analysis, subjects were repeatedly offered different variations of electricity contracts. 300 subjects were randomly assigned to either the control or the experimental group in four different treatments. In each of a total 15 decision-making situations, one electricity contract had to be chosen from the five different electricity contracts available. The only variation between the control and the experimental groups was that, in each decision situation of the three different status quo treatments, always one of the five electricity contracts was preselected by default. In accordance with a specific decision-making rule, this was always either the most renewable, the most local or the most expensive electricity contract. The results show significant differences between the control and the experimental group with respect to the part-worth utilities and the relative importance of the attributes. In contrast to the expectations of the model of rational choice, the type of framing of the choice task, whether an electricity contract was preselected by default as a status quo or not, seemed to influence the decision behavior of the subjects. The results are criticized as to whether competition in the liberalized electricity market is a suitable instrument to promote climate and infrastructure projects in the long term by the individual choice of electricity consumers, or whether political measures that are brought about by a collective decision should be preferred.

Keywords: consumer preferences, status quo bias, behavioral economics, sustainability, choice-based conjoint analysis, experimental economics
(JEL: D12, D90, C90)

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Introduction

In a liberalized electricity market, consumers nowadays can freely and independently choose any combination of electricity contracts. If one relies on investigations of switching behavior and their determinants of consumers in general and electricity consumers in particular, the reasons are manifold. These range, according to the preferences expressed, from a contribution to a more sustainable supply to cost savings in the choice of electricity contracts. Despite this basic willingness to change the current electricity contract to a new one, the actual exchange rates remain significantly below expectations. For example, the exchange rates in countries such as the USA, the UK, Germany, the Netherlands and Switzerland have been below 20 percent since the liberalization of their electricity markets (Bird, Wüstenhagen, & Aabakken, 2002; Momsen & Stoerk, 2014). Decision theory, behavioral and experimental economics as well as psychology can provide a decisive contribution to the absence of switching behavior in electricity contracts. They explain the absence of a willingness to change by means of the so-called status quo bias (hence: SQB). This bias reflects the tendency of an individual to prefer the current state over-proportionately. In the case of electricity contract decisions, individuals seem to stick to the current electricity contract despite supposedly advantageous situations such as a contribution to a more sustainable energy supply or a considerable cost saving (Giulietti, Otero, & Waterson, 2010). In summary: from the perspective of the rational choice model, when individuals have the option of choosing between two alternatives, e.g. two electricity contracts, they should opt for the contract that maximizes their individual utility. If, however, one of the offered alternatives is highlighted as the status quo (hence: SQ), e.g. verbally in the description of the decision situation, preselected as a default or, as it is often the case in reality, when the actual electricity contract is already in the possession of the individual, studies show that the current state is over-proportionately preferred (Madrian & Shea, 2001). In earlier investigations on consumer preferences and switching behavior in the electricity market, the potential influence of the SQB on decision-making was not yet methodologically considered. The central question of this study is whether, considering repeated electricity contract decisions, the exogenous definition of a specific contract by default as an SQ results in a significant increase in the choice of this contract contrary to the decision situation, which does not require such a determination. The present study is organized as follows: After this short introduction, the theory of the phenomenon of the SQB will be introduced. In the following chapter the methodology, on how the measurement of SQ effects is undertaken, will be presented. Using the choice-based conjoint analysis (hence: CBCA), the experimental design and the research hypothesis will be elaborated. Presenting the results in detail, the study shall conclude with a critical assessment of the empirical findings and discuss future roles and handlings of consumer sovereignty and consumer responsibility in the context of the electricity transformation process.

Theory

Since the SQB of Samuelson and Zeckhauser (1988) was empirically examined for the first time, it has aroused great interest in the scientific literature of economics, political science and psychology. Numerous empirical and experimental findings from decision-making research have repeatedly shown that individuals do not always act according to the expectations of the rational choice model (Kahneman, Knetsch, & Thaler, 1991; Tversky & Kahneman, 1974, 1981). They use decision heuristics and are frequently subject to cognitive biases. This work examines if such a distortion in the form of the SQB also occurs when consumers must choose between different electricity contracts in repeated decision-making situations. The SQB describes the tendency of individuals to hold on to the present state when they are confronted with new alternatives (Kahneman et al., 1991; Ritov & Baron, 1992; Samuelson & Zeckhauser, 1988). The SQ can be set exogenously by the experimenter in the present decision-making situation or can be based on the previous decision of an individual (Ritov & Baron, 1992).

In order to establish a basic understanding for the occurrence of a SQB, a major study on the status bias of Knetsch (1989) shall be presented. The following brief description of this study helps clarify the approach undertaken in this paper, as it is based upon these experimental results and methods. While in theory the choice of an individual should be made purely based on personal preferences, the findings of Knetsch (1989) show that there is a significant bias in the choices made, if there is a pre-defined status quo set in advance of a choice decision. Knetsch (1989) demonstrated this by separating a group of students into three treatment groups, in which all students were challenged with the same choice between two goods: a chocolate bar or a coffee cup. While all groups had the same choice situation, the only difference was the nature of the goods the groups were originally equipped with. According to the rational choice model, the number of individuals who either prefer a coffee cup or a chocolate bar should be approximately the same in all three groups. However, the results demonstrate that whether an individual already held one of the two goods mentioned as an SQ had a significant impact on their choice. The feeling of losing the SQ had an heavier weight on the decision-making process as the potential gain from an exchange (Knetsch, 1989).

Similar effects on the occurrence of an SQB could be found when decisions were made regarding: car insurance policies (Johnson, Hershey, Meszaros, & Kunreuther, 1993), organ donations (Johnson & Goldstein, 2003), pension insurance (Madrian & Shea, 2001), political choice processes and investment decisions (Samuelson & Zeckhauser, 1988). While making any of these choices, the SQB occurred regardless of whether it was presented as an actual physical possession, as a formulated contract or by default as a verbal emphasis in the description within a decision-making experiment. Existing studies on the SQB have proposed numerous explanations on how an SQ can influence decision-making behavior. For example, the theory of loss aversion assumes that the SQ assists as a reference point and that gains in relation to the reference point have a weaker influence on the preferences than losses (Geng, 2016; Kahneman et al., 1991). Hearkening back to Samuelson and Zeckhauser (1988), this can be explained through the value function of the prospect theory being flatter in the gain area. In terms of switching from a specific status quo, e.g. an electricity contract, an individual might value the possible gains (getting a monetary bonus, receiving more environmentally friendly energy, etc.) as less significant than the possible losses (being left without any electricity, being anxious about the fact that the bonus will not be payed, etc.). The theory of inertia presupposes a preference of the individual for doing nothing. Maintaining the SQ requires no extra effort and is the simplest option (Ritov & Baron, 1992). The effect of inertia or procrastination increases even more when the decision-making process becomes more complex. Consequently, the act of decision-making is delayed or no decision at all is made. In terms of the status quo bias, this might lead to an individual not switching their electricity contract at all, as they are already comfortable with their current situation. This goes in line with the theory of decision avoidance (Mullainathan, 2007). The theory of decision avoidance is based on the assumption that individuals have a tendency to make no choice, particularly if they have to choose from various alternatives (Anderson, 2003). The endowment effect has been mentioned earlier in the description of the Knetsch's experiment. This effect describes the tendency of an individual to stick with anything that is already in their possession (Samuelson & Zeckhauser, 1988; Knetsch, 1989). In terms of the status quo bias within the switching of an electricity contract, this means that the individual does not switch because they already possesses a contract and value this status much more than they would from changing it. This behavior is also partly explainable through the aforementioned loss aversion. The theory of incomplete preferences unites the SQB with classical consumption theory. This is based on the assumption that individuals with unchangeable but incomplete preference hold on to the SQ because they assume that their choice is already the best (Mandler, 2004). Given the fact that the individual would gain in experience, e.g. learning about potential switching possibilities or becoming aware of future wins that would result from switching, this could lead to a switch from the current status quo. The theories that explain the status quo bias are complemented by the willingness to accept and willingness to pay disparity (WTP-/WTA-Effect). This effect describes that the price an individual is willing to accept for a good (given that it is already in the individual's possession) is systematically higher than the price an individual is willing to pay to for the very same good. Taking the presented theories into account sharpens the understanding that status quo bias is a valuable, discriminant theory of its own. However, even though status quo is a separated phenomenon in itself, it can occur in relation to other findings and biases popular in experimental and behavioral economics (Schade & Burmeister, 2007). The following table summarizes the scope of status quo bias in relation to the theories described above.

Table 1. Status Quo Bias and Related Theories

Status Quo Bias (Samuelson & Zeckhauser, 1988)	Loss Aversion (Kahneman et al., 1991)
	Inertia Theory (Ritov & Baron, 1992)
	Decision Avoidance (Anderson, 2003)
	Endowment Effect (Knetsch, 1989)
	Incomplete Preferences (Mandler, 2004)
	WTP-/WTA-Effect (Kahneman et al., 1991)

Previous studies on the SQB show that this is robust and important for the sake of explaining deviations from the rational choice model (Kahneman et al., 1991; Schade & Burmeister, 2007). While an occurrence of the SQB has already been extensively investigated in simple decision-making situations, this process has, according to the knowledge of the authors, not been applied to repeated decision-making situations. For this purpose, the CBCA is particularly suitable. This is assumed for two reasons. On the one hand, the CBCA allows a controlled survey methodology to experimentally evaluate the influence of an SQ in repeated decision situations under rational conditions. With the aim of determining part-worth utilities and relative importance of attributes, it is assumed that individuals select the option that maximizes their utility when assessing different alternatives in repeated decision situations (Lancaster, 1966; McFadden, 1974). On the other hand, the use of the object of electricity contract decision can be used to analyze whether the consumer expectations for a change are actually present in the population, or whether a deviation in the form of the SQB can be detected in an experimental survey situation. This approach is unique and has not been investigated before. First, the experimental design allows empirical testing of any status quo effects between a traditional CBCA and adjusted CBCA, in which one of the alternatives was preselected as status quo. By speaking of adjusted CBCA, it is simply meant that the CBCAs were the same for the control and the treatment group. The only difference was that in the adjusted CBCA, one electricity contract was preselected, that is the most renewable electricity contract. Second, the dimensions of the status quo alternatives varied so that different effects of status quo bias could be measured. As described in the first argument, one electricity contract was preselected, that is the most renewable electricity contract. To have different status quo alternatives, there was also the case that, apart from the status quo contract being the most renewable electricity contract, it could also be the most local or the most expensive electricity contract. Finally, by offering respondents choices between different sorts of alternatives in terms of electricity contracts over a sequence of choice tasks, the investigation through a CBCA offers a more natural and realistic choice situation. Here, different alternatives are available, just like in the comparison and evaluation of electricity contracts on the real market. Before next chapter's statement of the research design and the hypotheses, the following section presents the method of data collection in form of the CBCA, the estimation of the part-worth utilities, and the relative importance of the attributes.

Method

In the present study, a CBCA is used to collect consumer preferences and to investigate an SQB in repeated decision-making situations. To date, there is only a minor amount of investigations that have used CBCA to experimentally test an SQB in the elicitation of consumer preferences and in repeated decision-making situations (Boxall, Adamowicz, & Moon, 2009; Meyerhoff & Liebe, 2009). There is, however, an extensive amount of scientific literature on the procedure of CBCA and its use in various areas (Backhaus, Erichson, & Weiber, 2015; De Bekker-Grob, Ryan, & Gerard, 2012; Hensher, Rose, & Green, 2005; Louviere, Hensher, & Swait, 2000). Therefore, this chapter shall only provide a brief introduction to the basic principles of the CBCA, the decision-making model used, and the estimation method for the determination of the part-worth utilities. The CBCA is a quantitative method to elicit consumer preferences and goes back to Lancaster's (1966) new consumer theory. This theory argues that a consumer derives a good's utility not from the good as a whole, but from the individual features that describe it. In a CBCA, individuals are requested to choose one of several alternatives over a series of decision situations (Street & Burgess, 2007). The different alternatives are specified by a limited quantity of attributes and corresponding attribute levels. As the quantity of possible combinations of the alternatives increases exponentially with increasing attribute quantities, design techniques are used, which ensure that the information obtained from the decision situations is optimized (Backhaus et al., 2015). In accordance with the rational choice model, the individual chooses the alternative that maximizes its utility (McFadden, 1974). According to this, the utility of an alternative is composed of a deterministic and stochastic component (Balderjahn, Hedergott, & Peyer, 2009). The deterministic component is based on an additive, compensatory utility function for evaluating the attributes and attribute levels (Balderjahn et al., 2009; Guadagni & Little, 2008; Malhotra, 1984). The stochastic component of the utility function cannot be ascertained by observation and can be characterized by unobserved attributes, unrecognized heterogeneity, misspecifications of the underlying function or measurements errors (Enneking, 2003; Gensler, 2006). Since the difference between the stochastic utility components has not been observed, a precise indication of the selection decision of the individuals is only possible with a certain probability (Gensler, 2006). The choice probability of an alternative is not determined by the total utility, but by the utility difference between the alternatives. As for the analysis of any status quo effects between the groups, individual part-worth utilities are necessary. The estimation of the part-worth utilities was conducted through a hierarchical Bayes model. This model allows, with the support of Bayesian statistics, an estimation of individual part-worth utilities (Allenby & Rossi, 2006). Multiple studies show that using hierarchical Bayes modelling is superior to traditional approaches in terms of flexibility and accuracy of part-worth utilities (Gensler, 2003; Schumacher, 2015). Since the hierarchical Bayes model is standardized and implemented in the Sawtooth Software package, this was used for the estimation of the individual part-worth utilities. The relative importance of an attribute is the range among the maximum and minimum part-worth utility of an attribute in relation to the total range amount of the part-worth utilities of all attributes (Backhaus, Erichson, Plinke, & Weiber, 2016). The range corresponds to the extent of the utility difference in the variation of an attribute level, which can be maximized by the levels of this attribute. This means that from an attribute that has a large span between the minimum and maximum part-worth utility, a modification in that attribute results in a big deviation of the utility value of this alternative (Himme, 2009).

Design and Hypotheses

In order to be able to integrate an SQ into the examination design, an adjusted CBCA was developed. It is quite challenging to empirically design a choice situation that realistically simulates the choice between different electricity contracts. Therefore, several studies were investigated to find a suitable design that should feel most realistic for participants (Burkhalter, Kaenzig, & Wüstenhagen, 2009; Kaenzig, Heinzle, & Wüstenhagen, 2013; Menges, Schroeder, & Traub, 2005) Building on existing knowledge derived from these studies, the assumption was made that the utility a consumer derives from an electricity contract can be described by the attributes "Electricity mix", "Additional costs per month", and "Location of generation". The attribute "Additional costs per month" reflects cost alternatives and captures how much subjects are willing to pay for a preferred electricity contract. The attribute "Location of generation" covers how subjects evaluate the geographical locality of the presented electricity contracts. The attribute "Electricity mix" records what percentage of renewable and fossil energies the subjects prefer.

Table 2. Attributes and Levels

Attributes	Levels				
Electricity mix	0 % renewable	25 % renewable	50 % renewable	75 % renewable	100 % renewable
Additional costs per month	$ 0	$ 3	$ 6	$ 9	$ 12
Location of generation	0 % local	25 % local	50 % local	75 % local	100 % local

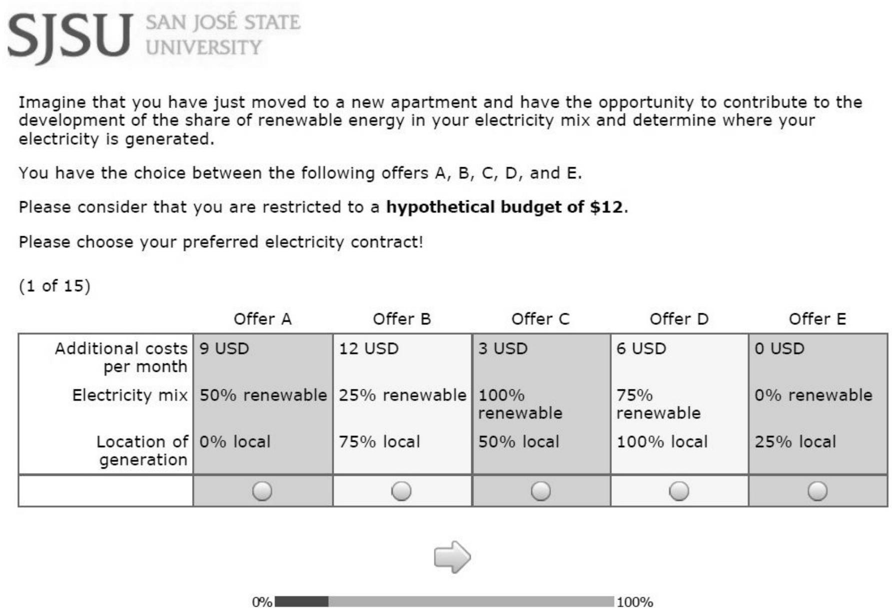
In accordance with the fundamental approach of the CBCA, consumers reveal their preferences by opting for one of five offered electricity contracts with different attribute level combinations, in a total of 15 different choice tasks (Grabicki & Menges, 2017). This particular amount of alternatives and choice tasks was used because it lies within the recommended amount subjects can handle (Orme, 2014). The "complete enumeration" algorithm was used to build the choice tasks, ensuring that the attributes are equally distributed over the choice tasks and have minimal overlap (Sawtooth Software, 2009). The choice tasks between the groups were identical, while the order of the alternatives within the choice tasks of each group was randomized. To analyze an SQB, the subjects of the economic decision experiment were assigned to various treatments. The treatments were composed of one control group (T1) and three experimental groups (T2 to T4). In the latter, a current contract was preselected as an SQ in all 15 different choice tasks. This default setting was predefined by the experimenter in accordance with a specific decision-making rule and was always either the most renewable („100 % renewable"), the most local („100 % local") or the most expensive („$ 12 USD") electricity contract (Grabicki & Menges, 2017). An exact description of the experimental design can be found in the following overview.

Table 3. Experimental Design

	Control group	**Experimental groups**		
	Treatment 1	Treatment 2	Treatment 3	Treatment 4
Framing	No Status quo (n = 75)	Status quo „100 % renewable" (n = 75)	Status Quo „100 % local" (n = 75)	Status Quo „$ 12" (n = 75)

In the control group, no preselection took place, and the subjects could choose between the different electricity contracts without prejudice. A hypothetical budget of $12 was chosen to make the decision situation as real as possible. Additional costs from $3 up to $12 were chosen as a reasonable range a subject would be willing to invest in a preferred electricity contract, based on the assumption that the fix monthly electricity costs lie around $30 for a student living in a very small or shared apartment. These numbers are comparable to previous investigations of the electricity market and should therefore further make the decision-making process more realistic for participants (Burkhalter et al., 2009; Kaenzig et al., 2013). The following figure (Figure 1) sketches the first of of a total of 15 choice tasks for T1, in which no status quo was preselected . In the remaining three treatments (T2 to T4) always one contract was preselected with a little prefilled radio button to simulate that this option was the default.

Apart from this small, exogenously predetermined default setting of the SQ in the three experimental groups, the choice tasks were identical in all treatments. All subjects were confronted with the same questions, the same decision-making alternatives, and the same restrictions. According to the rational choice model, this framing of the decision situation should not influence the decision-making behavior of the individuals. Based on the presented specific decision-making rule for determining the SQ option, the following null hypotheses are formulated to investigate an SQB.


SJSU SAN JOSÉ STATE UNIVERSITY

Imagine that you have just moved to a new apartment and have the opportunity to contribute to the development of the share of renewable energy in your electricity mix and determine where your electricity is generated.

You have the choice between the following offers A, B, C, D, and E.

Please consider that you are restricted to a **hypothetical budget of $12**.

Please choose your preferred electricity contract!

(1 of 15)

	Offer A	Offer B	Offer C	Offer D	Offer E
Additional costs per month	9 USD	12 USD	3 USD	6 USD	0 USD
Electricity mix	50% renewable	25% renewable	100% renewable	75% renewable	0% renewable
Location of generation	0% local	75% local	50% local	100% local	25% local

0% 100%

Figure 1. Example of choice task in Treatment 1

H1: *The relative importance of the attributes does not differ between the status quo framing, in which a specific attribute level is preselected as the status quo and the neutral framing in which no status quo is preselected.*

H1a: *The relative importance of the attributes does not differ between the status quo framing and the neutral framing, even though the attribute "electricity mix" is highlighted in the status quo framing by preselecting the most renewable electricity contract.*

H1b: *The relative importance of the attributes does not differ between the status quo framing and the neutral framing, even though the attribute "location of generation" is highlighted in the status quo framing by preselecting the most local electricity contract.*

H1c: *The relative importance of the attributes does not differ between the status quo framing and the neutral framing, even though the attribute "additional cost per month" is highlighted in the status quo framing by preselecting the most expensive electricity contract.*

The experiment was conducted in August 2016 as a laboratory experiment in the field, on the campus of San José State University in California, USA. Potential participants were recruited from passing students in one of the main administrative buildings on campus. The students were asked if they wished to participate in a scientific study that would last about 10 to 15 minutes. For completing the study, participants were guaranteed a fixed payment of $3. Upon agreeing to join, participants were led to a mobile laboratory work station with a laptop and received an introduction to the decision environment. The students were explicitly informed they would only be able to participate once. Even though it was not exactly counted how many agreed to participate out of all students asked, the participation rate is assumed to lay around 70%. In general, students were very cooperative regarding participation. Overall, 300 students took part in the four different treatments. On average, the students were 22 years old and currently in their third semester. The percentage share of the male students was 53%, while it was 47% for the female students. The three largest courses of studies represented were engineering (22%), business and economics (21%) and psychology (10%).

Results

To investigate the influence of an SQB regarding the relative importance of the attributes, T1 as the control group is compared with the corresponding experimental groups (T2 to T4). The non-parametric Mann-Whitney U test is applied to determine whether the relative importance of the attribute levels differs between the control and experimental groups, and if these differences are significant (Grabicki & Menges, 2017). This test is used when decisions are interpersonally compared between the samples, if the distributions are not-parametric, that is not following a normal distribution. The effect size r is operationalized through the ratio of the standardized test statistic U and the square root of the participants' number n. This transformation is possible if the size of the sample consists of at least 4 observations, and the sum of the observation is larger than 19 (Kokoska & Nevison, 1989). The interpretation of the effect size follows the traditional approach of Cohen, wherein $|r| > 0.5$ means large effect size, $|r| > 0.3$ medium effect size and $|r| > 0.1$ small effect size (Field, 2013; Fritz, Morris, & Richler, 2012). The following table shows the medians of the relative importance of the attribute levels for T1 and 2, the p-values and the effect sizes based on the decisions of the underlying CBCA.

The relative importance of the attributes is determined from the estimated part-worth utilities. This is necessary to estimate the extent to which the influence of the attribute levels is based on the weighting of their superordinate total attribute for the decision selection. To analyze the SQB, the relative importance of the three attributes „Additional costs per month“, „Location of generation“, and „Electricity mix“ of T1 are confronted with the relative importance of the very same attributes of the three different SQ framings from T2 to T4 (Grabicki & Menges, 2017). In the following, the medians of the relative importance of the three attributes for T1 and T2 are shown in table 5. It is clear that the relative importance between T1 and T2 is significantly different.

Table 4. Comparison of Relative Importance Between Treatment 1 and Treatment 2

	Medians of relative importance		Mann-Whitney U test	
Attributes	Treatment 1	Treatment 2	p-value	r
Additional costs per month	33.34	21.86	.000***	-0.39
Electricity mix	42.80	57.30	.000***	-0.52
Location of generation	24.53	18.73	.002**	-0.26
Note: Null hypothesis 2a: Test of null hypothesis using Mann-Whitney U test (asymptotic significances). ***/**/* := Significant on 0,1%-/1%-/5%-level.				

For the present case, i.e. that the SQ contract in T2 is the optimal renewable electricity contract in all 15 choice tasks, the relative importance of the attribute „Electricity mix" increases from 42.80 to 57.30 (p <.000). At the same time, the relative importance of the attribute „Additional costs per month" drops from 33.34 to 21.68 (p <.000), the relative importance of the attribute "Location of generation" from 24.53 to 18.73 (p <.002) respectively (Grabicki & Menges, 2017). Hypothesis 1a, the relative importance of the attribute preselected by a specific attribute level („100% renewable") as an SQ in T2 does not change in comparison to T1, can be rejected.

Below in table 6 the relative importance medians of the attributes for T1 and T3 are displayed. The SQ framing is T3, in which the most local electricity contract is highlighted as the SQ (Grabicki & Menges, 2017). The relative importance of the two treatments shows significant differences.

Table 5. Comparison of Relative Importance Between Treatment 1 and Treatment 3

	Medians of relative importance		Mann-Whitney U test	
Attributes	Treatment 1	Treatment 3	p-value	r
Additional costs per month	33.34	20.50	.000***	-0.31
Electricity mix	42.80	32.34	.005**	-0.23
Location of generation	24.53	35.06	.000***	-0.40
Note: Null hypothesis 2b: Test of null hypothesis using Mann-Whitney U test (asymptotic significances). ***/**/* := Significant on 0,1%-/1%-/5%-level.				

For the present case, i.e. that the SQ contract in T3 is the most local electricity contract in all 15 choice tasks, the relative importance of the attribute „Location of generation" attribute increases from 24.53 to 35.06 (p <.000). At the same time, the relative importance of the attribute „Additional costs per month" drops from 33.34 to 20.50 (p <.000), the relative importance of the attribute "Electricity mix" from 42.80 to 32.43 (p <.005) respectively (Grabicki & Menges, 2017). Hypothesis 1b, the relative importance of the attribute preselected by a specific attribute level („100% local") as an SQ in T3 does not change in comparison to T1, can be rejected.

Finally, the medians of the relative importance of the attributes of T1 and T4 are shown. The SQ framing is T4 and reflects the situation wherein the most expensive electricity contract is highlighted as an SQ. The relative importance of the attributes of the two treatments, apart from the attribute „Location of generation", show significant differences (Grabicki & Menges, 2017).

Table 6. Comparison of Relative Importance Between Treatment 1 and Treatment 4

	Medians of relative importance		Mann-Whitney U test	
Attributes	Treatment 1	Treatment 4	p-value	r
Additional costs per month	33.34	44.08	.015*	-0.20
Electricity mix	42.80	33.66	.031*	-0.18
Location of generation	24.53	22.26	.186	-0.11

Note: Null hypothesis 2c: Test of null hypothesis using Mann-Whitney U test (asymptotic significances). ***/**/* := Significant on 0,1%-/1%-/5%-level.

For the present case, i.e. that the SQ contract in T4 is the most expensive electricity contract in all 15 choice tasks, the relative importance of the attribute „Additional costs per month" increases from 33.34 to 44.08 (p <.015). At the same time, the relative importance of the attribute "Location of generation" drops from 24.53 to 22.26 (p <.186), the relative importance of the attribute "Electricity mix" from 42.80 to 33.60 (p <.031) respectively (Grabicki & Menges, 2017). Hypothesis 1c, the relative importance of the attribute which is preselected by a specific attribute level („$12 USD") as an SQ in T4 does not change in comparison to T1, can be rejected.

A final regression analysis with three regression models confirms the results from the relative importance of attributes analysis. The relative importance of the attribute „Additional costs per month" in model 1, the relative importance of the attribute „Electricity mix" in model 2, and the relative importance of the attribute „Location of generation" in model 3 are selected as dependent variables.

The independent variables are identical in all the examined models and are composed of the variables controlled in the experiment. Dummy variables were coded. This made is possible to differentiate which alternatives were selected as a status quo in comparison to the neutral treatment. The interpretation of the regression table will be explained via usage of the example of the second model. The dependent variable "Electricity mix" (model 2) increases significantly if the most renewable electricity contract (100% renewable) is preselected as an SQ in comparison to the neutral framing where no status quo had been preselected. At the same time, this

Table 7. Regression Models

	Coefficients (Standard error)		
Independent variables	Model 1	Model 2	Model 3
Constant	35.76*** (1.97)	39.22*** (1.99)	25.03*** (1.81)
(D) Status quo = 100% renewable	-13.42*** (2.78)	20.11*** (2.81)	-6.68** (2.55)
(D) Status quo = 100% local	-10.86*** (2.78)	-8.28*** (2.81)	19.15*** (2.55)
(D) Status quo = $12 USD	8.32*** (2.78)	-5.56* (2.81)	-2.77 (2.55)
n	300	300	300
R^2	.210	.297	.291
adjusted R^2	.202	.290	.284
Note: Dependent variables: Relative importance of attribute „Additional costs per month“ (Model 1), “Electricity mix” (Model 2) and “Location of generation” (Model 3)“. ***/**/* := Significant on 0,1%-/1%-/5%-level.			

status quo selection decreases significantly if both the most expensive ($12 USD) or the most local (100% local) electricity contract is preselected as the SQ (Grabicki & Menges, 2017). Similar effects were obtained in model 1 and 3. The adjusted R-squared values of the analyzed models all lie between 0.2 and 0.3 so that according to Kokoska and Nevison (1989), small effect sizes are obtained. The selection of the referring attribute level as a status quo has a significant influence on the increase of the specific relative importance, not depending on which relative importance is used as the dependent variable. Overall, the strongest status quo effect can be obtained for the relative importance of the attribute “electricity mix”, when the most renewable electricity contract is preselected as a status quo.

Conclusions

The goal of the empirical investigation was to elicit consumer preferences for the choice of an electricity contract and to determine whether this choice is systemically biased by an SQB. The only implementation to date using a CBCA and the establishment of an SQ on the basis of three defined specific decision-making rules, allows a controlled examination of the occurrence of an SQB, based on the part-worth utilities of the attribute levels and the relative importance of the attributes (Grabicki & Menges, 2017). Referring to the rational choice model, the decision-making behavior was investigated, assuming that an individual maximizes his utility from an alternative by choosing the most preferred option in all 15 choice tasks. The elicitation of consumer preferences and the deviations of these in favor of an

SQB was thus modeled as a decision-making process. Consumer preferences were expressed and operationalized in favor or against an SQ, based on the part-worth utilities and the relative importance. The underlying hypotheses were tested using non-parametric tests and linear regression models. All three hypotheses 1a to 1c can be rejected based on the findings and collected results. This means that, independent of the preselection of a specific status quo option in one of the three, both the part-worth utilities and the relative importance of attribute were different in comparison to the neutral framing wherein no status quo was preselected. The empirical findings show remarkable and significant differences to the expectations according to standard theoretical assumptions of the rational choice model. The results of the experiment demonstrate that the SQB plays a substantial part in the choice of an electricity contract. Most of the respondents opted for the contract that had been preselected as an SQ contract. This was regardless of the chosen status quo alternative's dimension. The strongest status quo bias can be found for T2 in which the most renewable electricity contract was preselected. This is not only interesting from a methodological perspective, but moreover, practical implications for further scientific investigations need to be concluded. The results confirm previous research on the presence of an SQB and supplement the existing literature with the occurrence of the SQB in multiple selection decisions. On the one hand, methods of preference elicitation, particularly CBCAs, can be biased through framing effects such as the SQB. In contexts where only the presentation of the offered alternatives is altered by highlighting one of these alternatives as a specific status quo option the axiom of invariance is violated. This needs to be considered when modeling further research that uses preselected options as a status quo framing. This axiom states that regardless of the presentation of a decision situation, the results of the choice remain the same. The CBCA is based on a multi-attributive decision model. This requires that the decision-maker choose an option via a compensatory decision process among the alternatives, where disadvantageous attribute levels can be compensated by advantageous attribute levels. However, if the decision-maker is biased by specific attribute levels through a status quo option, one can argue whether this compensatory assumption is violated. This is important to consider for further research, because without the knowledge that the compensatory assumption does not apply in all cases, future empirical results might be misinterpreted.

However, several points can limit the applicability of these results in other contexts and require further investigations. The experimental investigation took place by using a sample composed solely of students. A potential influence of the selection of student subjects and associated distortion effects cannot be excluded (McNemar, 1946). In particular, the issue of external validity, i.e. the degree to which the results obtained experimentally can be transferred to the population outside the laboratory conditions, remains unresolved (Campbell & Stanley, 1963). In case of a switch in the observed population from a sample composed purely of students to one composed of subjects from the general population, there is the possibility of a deviation from the underlying results. This is because most students probably have a generally low income and are unexperienced consumers when it comes to buying, switching or choosing household commodities like electricity providers and contracts. Another restriction affects the determination of the SQ. In this study, the SQ was determined by means of a specific decision-making rule. For this, the SQ contract was either the most renewable, the most local or the most expensive contract. This leads to at least two discussion points. First, the determination can be extended by further SQ options for a subsequent investigation. All attribute levels that have not been used in the present investigation could be used in following studies. These studies would need a much higher sample size in order to measure reliable effects. Second, setting up the most local or most renewable electricity contract as an SQ can create social desirability among the participants (Phillips & Clancy, 1972). According to these considerations, one may argue that the findings of the SQB only call for a weak SQB, since not all possible SQ options were represented. Additional investigations are necessary at this point. Compared to the empirical findings of an SQB in studies by Boxall et al. (2009) and Dhar (1996), wherein the authors see an increasing SQB as soon as the number of attributes increases, it can be checked whether this effect can also be determined in this study. A further criticism concerns the low-cost hypothesis (Diekmann & Preisendörfer, 2003, 2009). As the presented choice scenarios can be classified as a low-cost situation, according to the hypothesis, it can be assumed that participants opted for a choice set that was more environmentally conscious (in line with the participants' personal mindset), more easily compared to a decision scenario in which high costs are attributed to such a decision. Finally, the study does not consider intertemporal effects, risk considerations or group interaction effects, which may also influence real decisions. The conducted economic decision-making experiment assumes that subjects are fully informed, which is rarely the case in real-life decision-making situations.

Back to the opening question: If decision makers deviate from the idea of a rational choice model by the so-called status quo bias, the results need to be considered in the broader context of environmental and societal development and its effects. In terms of this experimental setup, it could be demonstrated, that within the choice of an electricity contract, subjects' choices were biased. As for actual decisions that people make within the real electricity market, one can argue that there is a difference between stated preferences and actual behavior. On the one hand, the population asks for more renewable or local electricity, and many are aware of the environmental necessity. However, on the other hand this desire is not reflected in actual switching behavior. In general, there are two tools that could help solve this dilemma. One can be the market as a natural regulator; the other would be the state as an institutional regulator or normative decision-making instance on behalf of the so-called greater good. The fact that the free market has led to an undersupply of people contributing to the promotion of renewable energy can be explained in part through the findings of this study. It may be concluded that consumers would rather stick with what they already have. The so-called free riding problem of the promotion of renewable energy, which can be seen as a public good, additionally fuels the current undersupply. In the past, the state has intervened to promote the development of renewable energy using taxes and levies, e.g. the German EEG, wherein every German citizen must indirectly pay for the promotion of renewable energy via some levy on the monthly electricity consumption. This somewhat hard intervention is critical in two ways. Firstly, consumer sovereignty is violated by the government forcing individuals to pay for something they might not even desire. Secondly, private contribution to the development of renewable energy might be crowded out.

A softer form of state intervention could be the idea of libertarian paternalism (Neumann, 2013; Thaler & Sunstein, 2003). Here, the potential persistence of an SQ in buying and switching decisions would be used for the general benefit of increasing the use of renewable energies. According to Glaeser (2006), libertarian paternalism can be regarded as a state action principle for dismantling paternalistic measures, such as regulation by taxes or regulatory interventions. In line with this idea, it would be a possible option to make it compulsory by law that the default electricity contract that suppliers offer is a renewable energy contract. Simultaneously, consumers would still have the liberty to switch to a different contract at any time, conserving a lot more consumer sovereignty compared to hard state interventions as mentioned above. Alternatively, a practical implication and approach would be to automatically transfer the electricity consumer into a new renewable and/or local contract, but at the same time allowing them to stay in the actual contract. Although the setting of so-called defaults in the sense of libertarian paternalism encourages the initiation and promotion of measures to increase the overall welfare of a society, there are limitations to the manipulation of decision-making situations. Whitman (2006) criticizes the fact that by changing the framework conditions, one might argue that the state sees itself in the role to better assess the individual interests and the associated conflicts than the individual per se.

Even without such an intervention from the state, based on the findings of this study, electricity suppliers themselves should consider the option of making a renewable contract the base or status quo contract they offer. It would demonstrate corporate social responsibility if suppliers participated in the development and expansion of renewable energies and in reaching global climate goals. If corporations are aware of existing effects such as the status quo bias, they should look out for solutions on how to overcome this bias in terms of their social responsibility towards later generations. According to Kirchgässner (2013), the default option should be designed to help individuals who are affected by decision anomalies such as the SQB. It should also allow those who are hardly affected to continue making rational decisions. This should apply in all scenarios where either the state or private corporations interfere with the free choice of the consumer, even when these agencies have a so-called higher purpose (e.g. environmental conservation) in mind.

Further research into consumer preferences is needed to determine which criteria of defaults can be regarded as optimal and worthy of recognition both from a practical, methodological and theoretical perspective.

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