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Pay today, or delay the pay: Consumer preference for double flat-rate pricing plans

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ABSTRACT

Double flat-rate pricing plans are a pricing strategy used in a variety of industries, including digital add-on services for durable products. These pricing plans consist of two distinct components: a nonrecurring flat rate and a recurring flat rate. A nonrecurring flat rate consists of a one-time, initial, nonrecurring provisioning fee. A recurring flat rate is a recurring (usually monthly) subscription fee that entitles consumers to unlimited access to the service without additional usage-based charges. While previous research has extensively studied single flat-rate pricing plans, consumer preference for double flat-rate pricing plans compared to single flat-rate plans has not yet been studied. We conduct two discrete choice experiments for utilitarian products in different industries and find that—contrary to the increasing use of double flat-rate pricing plans—consumers tend to prefer single flat-rate plans. Moreover, we find substantial preference heterogeneity for the two pricing plan components. Nonrecurring flat-rate fees have a greater influence on consumer choice than recurring flat-rate fees. We discuss the theoretical implications for behavioral pricing and consumers' tariff choice decisions, as well as the managerial implications for firms' pricing menu decisions.

1. Introduction

Digital technologies have transformed many business models from a one-time sale to a subscription model (e.g., McCarthy et al., 2017). The software industry has overwhelmingly transitioned to subscription-based business models, both for traditional enterprise software vendors and for software and services sold to individual consumers (Pettey, 2018). For example, Adobe and Microsoft have predominantly transitioned to subscription-based plans for their creative and office-related products, respectively. This shift to subscription models is not limited to digital products, as durable products are increasingly being sold as subscriptions. For example, car manufacturers and third parties offer cars through subscription business models. Similar models can be found for consumer electronics, home appliances, or work tools.[1] However, the pricing of subscription-based services differs from the pricing of physical goods (Hoffman et al., 2002). The transition to subscription-based business models has the advantage for firms of establishing a relationship with customers that allows for increased retention, which also potentially increases the pricing options for firms, such as the choice between linear and nonlinear pricing plans (Lambrecht & Skiera, 2006; Train et al., 1987).

A pricing strategy commonly used in the provision of subscription-based services is the nonlinear double flat-rate pricing plan, which consists of two distinct components: a nonrecurring flat rate and a recurring flat rate. To gain access to a service, consumers have to pay an initial, nonrecurring fee (i.e., the nonrecurring flat rate), which may include hardware required for the service. The second component is a recurring subscription fee (usually monthly), which entitles the consumer to unlimited use of the service without additional usage-based charges (i.e., the recurring flat rate).[2]

A recent development that is increasing companies' use of double flat-rate pricing plans is the strategy of durable goods manufacturers, such as in the automotive industry, to offer digitally enabled add-on services. These additional services are often offered through double flat-rate pricing plans. For example, Tesla used to offer its customers the "Enhanced Autopilot" for an initial fee of $6,000, which can be

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[1] Examples include Volvo Subscription (Volvo Car USA, 2024) or Miles (MILES Mobility GmbH, 2024) for car manufacturers. Other examples include Grover (Grover Tech, 2024) for consumer electronics, Levande (Levande, 2024) for home appliances and Tool Crate (Tool Crate, 2024) for work tools.

[2] Examples include Ōura Health Oy, which sells its health-tracking rings starting at $299 and requires an additional $5.99 monthly subscription (Ōura Health Oy, 2024), or Ring, which sells home security devices that also require a subscription to extend the functionalities (Ring LLC, 2024).

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upgraded to the "Full Self-Driving Capability" for a monthly subscription fee of $99 (Tesla, 2024).

Most subscription-based services offer consumers a choice between different tariff options, such as between a single or a double flat-rate pricing plan. For example, as an alternative to the aforementioned double flat-rate pricing plan, Tesla used to offer its customers the choice of paying $12,000 upfront for its "Full Self-Driving Capability" or subscribing to the service for $199 per month (Tesla, 2024). Therefore, when designing pricing plans, companies need to understand consumer preferences for different pricing options and predict their choices.

Economic theory predicts that rational consumers make accurate estimates of their demand under each tariff option and self-select the tariff that maximizes their consumer surplus, i.e., choose a tariff that minimizes their bill amount given their expected usage behavior (Brown & Sibley, 1986; Lambrecht & Skiera, 2006; Train et al., 1989). However, the literature provides evidence that individual decisions often systematically deviate from the standard economic model (DellaVigna, 2009) and that consumers choose non-optimal tariffs that do not minimize their costs. For example, several studies document a flat-rate bias—consumers choose a flat rate when they could have saved money with a pay-per-use tariff (e.g., DellaVigna & Malmendier, 2006; Lambrecht & Skiera, 2006; Nunes, 2000; Train et al., 1987). Other studies have found a pay-per-use bias, suggesting that consumers who chose a pay-per-use tariff could have saved money with a flat-rate tariff (Dowling et al., 2021; Miravete, 2003).

In contrast to the marketing and economics literature that has focused on single flat-rate plans and the associated pay-per-use and flat-rate biases, research on consumer preferences for double flat-rate plans is lacking. Therefore, given the increasing prevalence of double flat-rate pricing plans, research is warranted to examine consumer preferences for these pricing options.

In this paper, we study consumer preferences for double flat-rate pricing plans relative to pricing plans that include a single flat-rate component. In studying these preferences, we take into account possible tariff-choice biases arising from the intertemporal nature of these pricing plans. We expect that due to the intertemporal choices in double flat-rate pricing plans (i.e., the trade-off between costs at different times), consumer preferences for double flat-rate pricing plans are driven by payment timing preferences, preferences regarding the temporal distribution of the costs of pricing plan components, and time-(in)consistent preferences (DellaVigna, 2009; O'Donoghue & Rabin, 1999, 2000).

We examine the preferred structures of double flat-rate pricing plans by conducting two discrete choice experiments for utilitarian products in two different industries and price segments (the market for electric vehicle services and telecommunication services). In this regard, we analyze different configurations of double flat-rate pricing plans by varying the price levels of the nonrecurring and recurring flat rates, including single flat-rate tariff options.

We find that contrary to the increasing use of double flat-rate pricing plans, consumers tend to prefer single flat-rate plans. In addition, consumers attach greater relative importance to the nonrecurring flat-rate fees than to the recurring flat-rate fees. That is, consumers prefer to avoid the immediate disutility caused by the cost of the initial nonrecurring flat-rate fees and instead spread the cost of the service over the entire contract duration via the recurring flat-rate fees. Our results contribute to the existing literature on consumer tariff choice decisions and behavioral pricing. Moreover, our findings can help firms offer pricing plans that better meet the heterogeneous needs of consumers and improve realizable revenue.

2. Theory and hypotheses

2.1. Classification of different nonlinear tariffs

Nonlinear tariffs are generally characterized by their base pricing plan components and their usage dependence. The base pricing plan components can be distinguished into the nonrecurring (initial) fees and the recurring (base) fees. The usage-dependence specifies whether the unit price of the service is usage-(in)dependent. See Table 1 for an overview of different nonlinear tariffs. The billing amounts of two-part tariffs and three-part tariffs (above their usage allowance) are usage-dependent. That is, in addition to an ex-ante access/base fee, consumers have to pay a marginal price rate above zero per unit consumed. However, since the base fee of three-part tariffs also includes a predefined usage allowance, bill amounts within the usage quota are usage-independent (i.e., the per-unit charge within the allowance is zero). In contrast, bill amounts of single flat-rate and double flat-rate tariffs are usage-independent with a fixed recurring (flat-rate) fee (i.e., they allow unlimited use of the service for which additional units consumed do not incur additional usage-based charges) (Ascarza et al., 2012; Just & Wansink, 2011; Lambrecht et al., 2007; Lambrecht & Skiera, 2006; Schlereth et al., 2011). However, the (initial) nonrecurring fee is only part of the double flat-rate pricing plan.

2.2. Related literature and hypotheses

In double flat-rate pricing plans, consumers have to evaluate the composition of the fees for the initial, one-time payment (nonrecurring flat rate) and the monthly recurring payments (recurring flat rate) and thus have to make trade-off decisions about costs at different times. Based on the discounted utility model, the total discounted sum of the utility of the payments should be a predictor of consumers' preferences within these intertemporal choices, where rational agents should be indifferent to the distribution of the discounted utility of the costs over the lifetime of their customer relationship (Frederick et al., 2002; Samuelson, 1937). However, using the standard economic model as a frame of reference, there is extensive evidence for individuals' decisions that do not confirm the forecast of the rational choice theory, as consumers do not exponentially discount with a time-consistent discount factor (DellaVigna, 2009; Frederick et al., 2002; Rabin, 2002). Therefore, we predict that the preferences for double flat-rate pricing plans are influenced by behavioral biases related to payment timing preferences, preferences regarding the temporal distribution of payments in pricing plans, and time-inconsistent, present-biased preferences (DellaVigna, 2009; O'Donoghue & Rabin, 1999, 2000).

We derive hypotheses regarding the relative importance and (dis)utility of the two components of double flat-rate pricing plans, i.e., the nonrecurring flat rate and the recurring flat rate, based on the literature on pre- and post-payment preferences for products and the literature on tariff choice behavior. This literature has analyzed consumer preferences with respect to the temporal distribution of the costs of pricing plan components as well as pricing plan preferences associated with time-inconsistent preferences. Even though pre- and post-payment for products typically result in ownership after a predetermined fixed number of payments (Bardhi & Eckhardt, 2012; Nitzan & Ein-Gar, 2019), previous findings on payment timing preferences may have important implications for pricing plan preferences (Schulz et al., 2015).

Relative importance of nonrecurring flat-rate fee compared to recurring flat-rate fee

Research on payment timing preferences suggests that consumer behavior is influenced by the temporal separation between the costs and benefits of a transaction (Lambrecht & Tucker, 2012; Patrick & Park, 2006; Prelec & Loewenstein, 1998) and that payment timing plays an important role in the utility a consumer experiences during consumption (Prelec & Loewenstein, 1998). In particular, a recurring fee may be perceived differently than a single nonrecurring fee. A phenomenon observed in consumers' tariff choice decisions is that consumers enjoy a service more when they are not constantly reminded of the cost of the service—the so-called "taxi meter effect"—which may explain consumers' preference for a single flat-rate tariff over a pay-per-use tariff (Lambrecht & Skiera, 2006; Uhrich et al., 2013).

Table 1
Common nonlinear tariffs, including double flat-rate tariffs.

		Tariff			
		two-part tariff	*three-part tariff*	*single flat-rate tariff*	*double flat-rate pricing plan*
Pricing Plan Component	Nonrecurring (initial) fee	no	no	no	yes
	Recurring (base) fee	yes	yes	yes	yes
Usage Dependence	Usage-dependent	yes	yes *(after usage allowance exceeded)*	no	no
	Usage-independent	no	no *(within usage allowance)*	yes	yes

The underlying explanations for the taxi meter effect can be found in the theory of mental accounting (especially mental budgeting and the decoupling of payment and consumption). With the theory of mental accounting, Thaler (1999) formulated assumptions about how individuals process financial transactions using mental accounts and budgets. Consumers are assumed to compare the cost or disutility of paying for a particular good or service with the utility of consuming the good or service. Consequently, consumers evaluate the total utility of the good by subtracting the costs associated with consumption (i.e., the pain of paying) from the benefits of consumption (Heath & Soll, 1996; Lambrecht & Skiera, 2006; Prelec & Loewenstein, 1998; Thaler, 1985). Since budgets/mental accounts allow individuals to mentally pre-pay costs, it is assumed that the enjoyment of consumption decreases with the temporal proximity of the time of payment and the time of consumption (Lambrecht & Skiera, 2006; Prelec & Loewenstein, 1998). In addition, consumers want to avoid (unpleasant) payment experiences for past consumption (Prelec & Loewenstein, 1998).

The taxi meter effect can thus explain a potential preference for prepayment of products that would lead consumers not to be indifferent about the distribution of payments for the two components of double flat-rate pricing plans (Lambrecht & Tucker, 2012; Prelec & Loewenstein, 1998; Schulz et al., 2015; Schulze & Gedenk, 2005). In line, by drawing from reference dependence and time-inconsistent preferences, Lambrecht and Tucker (2012) also show that if consumers are faced with pricing plan decisions that involve multiple periods, they do not evaluate the sum of the periods' costs but segregate each event of a sequence of events separately. Specifically, by analyzing nonmonetary "hassle costs," they show that consumers' period-level bracketing leads individuals to prefer low service costs in periods of nonmonetary inconvenience. Schulz et al. (2015) analyze consumers' payment preferences within advance payment systems. Explained by the "silver lining principle" (Thaler, 1985), they find that consumers prefer (up to a certain threshold) tariffs with a continuous stream of higher advance payments, which results in a refund (compared to an additional one-time payment) at the end of the billing period. Even though in double flat-rate pricing plans, nonrecurring fees are not prepayments that may be refunded later, their findings underline the importance of one-time, nonrecurring pricing plan components for consumer pricing plan preferences.

Based on these theoretical considerations, we hypothesize:

H1: In tariff choice decisions between *double flat-rate pricing plans, consumers attribute higher relative importance to nonrecurring flat-rate fees than to recurring flat-rate fees.*

Hence, *H1* predicts that, on average, nonrecurring flat-rate fees have a greater influence on consumers' choices than recurring flat-rate fees.

2.3. Disutility of nonrecurring flat-rate fee compared to disutility of recurring flat-rate fee

As discussed, consumers may prefer to pay for products in advance (Lambrecht & Skiera, 2006; Lambrecht & Tucker, 2012; Prelec & Loewenstein, 1998; Schulz et al., 2015; Schulze & Gedenk, 2005). On the other hand, following the regulatory focus theory (e.g., Higgins, 1999), Patrick and Park (2006) assume an avoidance ("prevention") focus for utilitarian purchases. If the product is perceived as utilitarian, the benefits of prepayment are not significant enough to compensate for the contrasting effect of discounting (assuming a common discount factor). In particular, if the product is durable and will be used over a long period of time, time discounting allows for the depreciation of the costs as later payments result in a lower present value. Consequently, this can result in a preference for post-payments (Patrick & Park, 2006; Schulz et al., 2015). Since double flat-rate pricing plans, in many instances, are offered for longer durations, consumers might prefer to post-pay the service with a continuous stream of recurring fees and avoid the prepayment with initial nonrecurring fees.

Related explanations can be found in an individual's time (−inconsistent), present biased preference, which indicates an individual's preference for immediate versus delayed utility (Frederick et al., 2002; O'Donoghue & Rabin, 2000). The time preference is formally represented as a single discount rate in the discounted utility model since constant discounting is assumed. However, it has been shown that this discount rate is not constant but rather declines over time (Frederick et al., 2002; Loewenstein & Prelec, 1992). Individuals tend to discount (quasi) hyperbolically, which may lead consumers to attribute greater utility to low payments in initial periods (i.e., immediate utility) (Frederick et al., 2002; Lambrecht & Tucker, 2012; Loewenstein & Prelec, 1992). Therefore, present-biased consumers prefer instantaneous gratification by avoiding immediate costs, even if this leads to consumer welfare losses (O'Donoghue & Rabin, 1999).

In the context of (tariff) choice decisions, it has been shown that sophisticated consumers may be aware of their lack of self-control and address time-inconsistent preferences with commitment (or precommitment). As a result, consumers systematically restrict their choice options in order to commit to a certain level of consumption by committing/preferring a specific tariff (Bryan et al., 2010; DellaVigna & Malmendier, 2004, 2006; Lambrecht & Skiera, 2006; O'Donoghue & Rabin, 2000). Consumers are willing to accept additional costs specifically for the commitment, which can lead to a preference for a single flat-rate in situations where high consumption is intended, such as online newspapers or health club memberships (Bryan et al., 2010; DellaVigna & Malmendier, 2006; Schulze & Gedenk, 2005). In situations where individuals target strategic self-control to lower consumption of, e.g., the consequences of overconsumption of "vice" goods, the commitment effect can lead to a pay-per-use bias (Wertenbroch, 1998; Zhang et al., 2022).

On the other hand, consumers may have a preference for flexibility, that is, an aversion to the loss of flexibility (Dowling et al., 2021; Gerpott, 2009; Krämer & Wiewiorra, 2012). The flexibility effect can be seen as the reverse interpretation of commitment. Consumers may prefer to individually reduce and adapt their usage amounts, which could result in a lower bill amount compared to a usage-independent pricing plan, and try to avoid the regret that they might experience due to higher than intended service usage resulting from the commitment effect (Gerpott, 2009; Just & Wansink, 2011; Krämer & Wiewiorra, 2012). Therefore, consumers who try to avoid committing to a contract for a long period of time should prefer a continuous stream of recurring fees and avoid prepayment of (high) initial nonrecurring fees.

In summary, previous research is inconclusive in predicting consumers' tariff preferences for nonrecurring flat-rate fees compared to

recurring flat-rate fees. Table 2 summarizes the literature on payment timing preferences in the context of tariff choice, exemplary industry contexts in which the phenomenon has been studied, and its implications for consumer preferences for recurring versus nonrecurring fees.

Given our focus on utilitarian products, previous research suggests that the immediate disutility caused by the cost of the initial nonrecurring flat-rate fees exceeds the disutility of the monthly recurring payment (recurring flat rate). That is, when evaluating different configurations of double flat rates, present biased consumers, on average, prefer to avoid the immediate disutility caused by the costs of the initial nonrecurring flat-rate fees and instead choose to delay the costs for the service over the total contract duration via the recurring flat-rate fees. Therefore, we predict that an increase in the one-time, nonrecurring flat-rate fee leads to a greater decrease in utility than an equivalent increase in the recurring flat-rate fee. Formally, we hypothesize:

H2: The disutility caused by the immediate *costs of the nonrecurring flat-rate fee is higher than the disutility caused by the costs of the recurring flat-rate fees.*

3. Empirical studies – choice-based conjoint experiments

To study the preferences for double flat-rate pricing plans and to test our hypotheses, we conducted two distinct online choice-based conjoint experiments for utilitarian products across different industries. Discrete choice experiments are well-established experimental methods in marketing and economics to examine tariff choice behavior and pricing-plan preferences (e.g., Iyengar et al., 2008; Schlereth & Skiera, 2012; Schlereth et al., 2011). These experiments allow the assessment of heterogeneous preferences by requiring respondents to make (hypothetical) choices between multiple (systematically varied) sets of (product) alternatives for which each product alternative is represented by a bundle of predefined product attributes. Discrete choice experiments measure preferences indirectly and follow a decompositional approach (Cattin & Wittink, 1982; Eggers et al., 2018; Louviere & Woodworth, 1983). With the jointly considered evaluation of the product alternatives, individual respondents' utility functions and the preference of each attribute and their corresponding levels can be estimated. The obtained total utility from an alternative is decomposed into part-worth utilities, respectively utility coefficients, which represent the utility of a product's attribute levels and, consequently, the consumer's preference (Eggers et al., 2018).

3.1. Experimental design

The two distinct online choice-based conjoint experiments show a similar experimental design. However, both studies differ in their design of the price levels, which are based on the respective market context. Therefore, we first discuss the research context of both studies and then outline the stimuli design of the studies, including the common design elements for both experiments as well as each study's specific design elements.

3.1.1. Research context

Study 1: Electric mobility service – Private charging tariffs. The first experiment was conducted in the context of complementary mobility services for electric vehicles (EVs). Electric mobility services and their pricing, especially in the area of private charging infrastructure, are essential for the market success of electric vehicles. Even though it is crucial for service operators to offer services and build up business models, which makes electric mobility competitive and desirable (Kley et al., 2011; Madina et al., 2016), complementary electric mobility services have received little attention in the research (Hinz et al., 2015).

Therefore, for the first conjoint experiment, we referred to the market for private charging solutions and those service providers that charge prices via double flat-rate pricing plans. Consequently, we asked the study participants to imagine that they own an EV and are looking for offers of private charging solutions for their electric cars. They found a suitable provider that charges prices via double flat-rate pricing plans consisting of two cost components. First, the initial, nonrecurring flat-rate fee involves the initial setup of the service and accounts for the necessary hardware of the private charging station. The second fee is the monthly recurring flat-rate fee, which entitles the customers to the continuous use of the charging station, independent of their usage. This hardware is available to customers for the duration of the contract.

Study 2: Telecommunication service – Internet service provider. The second choice-based conjoint experiment was conducted in the context of telecommunication services. We expected a low perceived product risk and lower perceived complexity of the service due to high consumer knowledge. Furthermore, the product category is in a lower price segment compared to study one. Participants were asked to imagine that they were looking for a new internet service provider. They have found a provider that satisfies their needs in terms of internet speed and service. They were informed that the provider charges a fee for the initial setup of the service, which also accounts for mandatory hardware, that is, a Wifi router. This hardware is provided during the time of contract duration (nonrecurring flat rate). The monthly recurring fee (recurring flat rate) entitles customers to the continuous use of the hardware service.

3.1.2. Common (stimuli-) design elements for both experiments

As indicated in Table 3, both online choice-based conjoint experiments share the same number of choice tasks, stimuli per choice tasks, and a similar composition of attributes and levels. In both experiments, we selected two attributes (a), each having six levels (l), which represent the two cost components of the double flat-rate pricing plan. We decided on an equal number of levels between each attribute to avoid the systematic "number-of-levels-effect," i.e., attributes with more levels lead to greater importance (Currim et al., 1981; Eggers & Sattler, 2011). Upfront, the participants were informed about the pricing plan options and possible levels each component could take.

We chose a traditional full-profile choice-based conjoint design with 12 random tasks for utility estimation and three fixed tasks[3] to assess predictive validity (see Appendix A for the fixed task design of Study 1 and Study 2) for both experiments. Within each choice task, participants had to choose between two different pricing plans or a no-choice option.

For both experiments, 50 distinct questionnaires were generated. To avoid strictly dominant alternatives within one choice task (i.e., both pricing components within one concept are lower than in the second concept), we identified and modified these within the generated choice sets.

In line with most service contracts in the Western European country, where both studies were conducted, and as it is common in many access services (Becker et al., 2015), we informed the participants that the minimum contract duration is 24 months. We further informed participants that the contract continues to run at the chosen monthly costs after the minimum contract period. Consequently, other than Lambrecht and Tucker (2012), we defined a minimum contract duration and no specific end of the contract. Therefore, consumer choices include individual contract duration expectations, which elicit trade-offs among the pricing plan components and their corresponding levels as consumers decide between immediate and delayed costs.

Each of the two conjoint experiments was followed by a survey with questions about, among other questions, the perceived risk (Ma et al., 2015) and complexity of the service (Burnham et al., 2003), the task difficulty (Soster et al., 2014; Sprott et al., 2009), as well as various demographics. The items are on seven-point Likert scales. We further

[3] Fixed Tasks are choice sets that are held constant for every respondent to assess the predictive validity, respectively the accuracy of the model in the form of hit rates. Hit rates indicate the ratio of correctly predicted choices and observed holdout choices (Orme & Chrzan, 2017).

Table 2
Related literature and implied preferences for recurring versus nonrecurring fees.

	Findings	Rationale	References	Exemplary industry context	Implication for double flat-rate pricing plan
Pre-and post-payment preferences	*Present bias (Time-inconsistent preferences)*	Individuals discount (quasi) hyperbolically. Preference for instantaneous gratification	Frederick et al. (2002); Prelec and Loewenstein (1998)		*Preference for recurring fee*
	Preference for Pre-payment	Mental prepayment avoids the (unpleasant) causal connection between consumption and cost.	Prelec and Loewenstein (1998)	e.g., *household appliances* vs. *vacation, telecommunication services, health club*	*Preference for nonrecurring fee*
	Preference for post-payment	The benefits of prepayment cannot compensate for the contrasting effect of discounting if the product is utilitarian, durable, and used over longer periods.	Patrick and Park (2006); Prelec and Loewenstein (1998)		*Preference for recurring fee*
Tariff choice behavior	*Commitment effect and Flexibility effect*	Tariff serves as commitment device due to anticipated missing self-control • *Preference for usage-independent tariff* if high consumption is intended • *Preference for usage-based tariff* if consumption restriction is intended	DellaVigna and Malmendier (2006)	*health club*	*If commitment to a long contract duration is intended, then preference for nonrecurring fee*
			Zhang et al. (2022)	*digital media service*	*If commitment to a short contract duration is intended, then preference for recurring fee*
		Commitment aversion: Preference for flexibility to adjust usage and bill amounts	Dowling et al. (2021); Gerpott (2009); Krämer and Wiewiorra (2012)	*telecommunication service, car-sharing services*	*Preference for recurring fee*
	Taximeter effect	Consumers perceive higher utility during consumption if they are not constantly reminded of the costs incurred by the service.	Lambrecht and Skiera (2006)	*telecommunication service*	*Preference for nonrecurring fee*
	Temporal distribution of pricing plan components	Preference to be compensated for nonmonetary costs in the periods in which to nonmonetary costs emerge.	Lambrecht and Tucker (2012)	e.g., *telecommunication service & transportation*	*Preference for recurring fee*
		In advance payment systems, consumers prefer higher advance payments to receive a refund.	Schulz et al. (2015)	*utility service*	*Preference for nonrecurring fee*

Table 3
Overview of choice experiments.

Study	Method	Choice Tasks	Stimuli per Task	No. of Attributes and Levels	Sample Size	Research Context
Study 1	online discrete choice experiment	15	two + no choice option	two price attributes, each with six price levels	627	Automotive: Electric mobility service – Private charging tariff
Study 2					396	Telecommunication: Internet service provider

asked the participants about the planning horizon they consider when choosing between the pricing plan options.

3.2. Specific (stimuli-) design elements of Study 1 and Study 2

Study 1: Electric mobility service – *Private charging tariffs*. We determined the attribute levels in the electric mobility context based on market prices for private wall boxes in accordance with the literature on charging infrastructure (Schroeder & Traber, 2012) and experts from a Western European utility company, which charges prices for a similar service via double flat-rate tariffs. The initial nonrecurring flat-rate fees varied between €0 and €2.499, increasing with equivalent intervals of €500. Monthly recurring flat-rate fees ranged from €0 to €75, increasing with equal intervals of €15. We included a price level of €0 for both levels to account for the potential extreme cases of pre-and post-payment preferences when deciding between different configurations of double flat-rate pricing plans. This also allowed us to capture consumers' preferences for consolidated or partitioned pricing plans (Iyengar et al., 2011) or single flat-rates, respectively. We neglected the electricity costs since these do not demand a double flat-rate tariff choice trade-off, as they are usually settled via advance payment systems (Schulz et al., 2015). To account for realism, we prohibited level combinations with bill amounts lower than €1,800 after 24 months.

A summary of the attributes and possible levels of Study 1 can be found in Table 4.

Study 2: Telecommunication service – *Internet service provider*. The attribute levels within the context of the telecommunication industry were based on the current market prices of various internet service providers in a large Western European country. The initial nonrecurring flat-rate fee varied between €0 and €119.99, with increasing equal intervals of €24. Monthly recurring flat-rate fees ranged from €0 to €4.99, increasing with equal intervals of €1. In line with Study 1, we included a price level of €0 for both levels. Costs for the internet and phone plan were excluded in the choice tasks of the conjoint experiment, which was mentioned in the questionnaire. In contrast to the conjoint experiment in Study 1, we chose a level design, in which certain level combinations lead to the equivalent bill amount after 24 months. For example, the level combination of €47.99 (nonrecurring flat-rate fee) and €1.99 (recurring flat-rate fee) yields the quasi-same total bill amount of €71.99 (nonrecurring flat-rate fee) and €0.99 (recurring flat-rate fee) after 24 months. To account for market realism, we prohibited level combination with bill amounts lower than €71.75 after 24 months. See Table 5 for details of the attributes and levels of Study 2. Fig. 1 shows an illustration of a choice task within Study 2.

Table 4
CBC design Study 1 – Double flat-rate pricing plan attributes and levels.

CBC-Study	Attribute (*a*)	Level (*l*)					
Study 1 –	nonrecurring flat-rate fee	€0	€499	€999	€1,499	€1,999	€2,499
Electric mobility services	monthly recurring flat-rate fee	€0	€15	€30	€45	€60	€75

Table 5
CBC design Study 2 – Double flat-rate pricing plan attributes and levels.

CBC-Study	Attribute (*a*)	Level (*l*)					
Study 2 –	nonrecurring flat-rate fee	€0	€23.99	€47.99	€71.99	€95.99	€119.99
Internet service provider	monthly recurring flat-rate fee	€0	€0.99	€1.99	€2.99	€3.99	€4.99

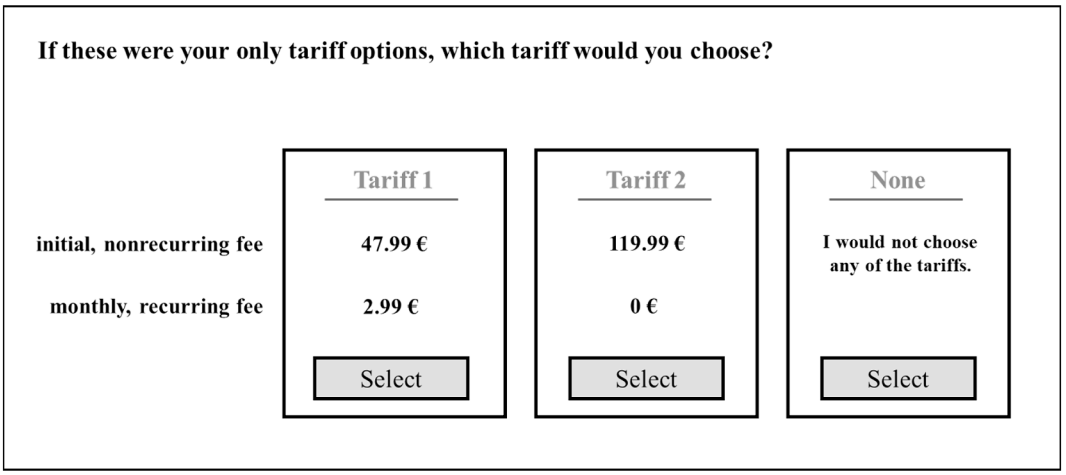

Fig. 1. Illustration of a choice task within Study 2.

4. Results

4.1. Study 1: Electric mobility service

Participants in the first conjoint experiment were acquired via a Western European panel provider. The panel targeted a population-representative sample by gender and persons older than the age of 18. Furthermore, a regional differentiation was made between rural and urban areas, with a quota of urban residents set at 50 %. We defined urban areas as large cities with at least 100,000 inhabitants.

We received 681 responses. Based on 627 completed questionnaires, the sample mean age was 45.15 (SD = 14.80). The median stated planning horizon when deciding between the tariff options was stated to be 24 months (M = 27.27, SD = 61.95), which equals the indicated minimum contract duration in the experimental scenario. A total of 21.53 % of the participants stated that they had a university degree, and ~ 51 % stated that they had a yearly gross income of at least €25,000.

The conjoint experiment data were checked for straight-liners, as suggested by Allenby et al. (2014). However, we could not observe any straight-line behavior, which might also be due to the respondents' compensation. Participants of the study perceived the services in the electric vehicle market to be rather complex (M = 4.431, SD = 1.377) and stated that they were risk averse to the product (M = 4.218, SD = 1.589).

Based on the 12 choice tasks, we estimated a hierarchical Bayes (HB) model[4] for which we assumed a negative linear relationship between price and utility. Consequently, the pricing plan attributes were coded as single linear utility coefficients.[5] The three fixed tasks were excluded from utility estimation and used for the predictive validity of our utility model. The HB estimation consisted of 100,000 burn-in Markov chain Monte Carlo (MCMC) iterations and 100,000 iterations after convergence. The model received a mean root likelihood of 0.700. The first choice hit rates were 74.32 % for fixed task 1 and 74.16 % (76.08 %) for fixed task 2 (fixed task 3).

Table 6 summarizes the results of the HB estimation and displays the average relative importance of each pricing plan attribute *a* and the average linear utility coefficients. Fig. 2 illustrates the distribution of the relative importance (boxplot 1) and the distribution of the linear utility coefficients (boxplot 2) of the nonrecurring and recurring flat-rate fees.

Results for H1: To test Hypothesis 1, we use a paired sample *t*-test to

Table 6
Relative importance and linear utility coefficient– Electric mobility service.

	Relative importance		Linear utility coefficient	
Attribute (*a*)	Mean	SD	Mean	SD
Nonrecurring flat-rate fee	58.06	15.46	−44.395	18.483
Monthly recurring flat-rate fee	41.94	15.46	−10.848	4.940
None			−16.353	139.003
n = 627				

[4] For both studies Hierarchical Bayes model estimations were conducted using Sawtooth Software.

[5] We followed the suggestions by Orme and Chrzan (2017) and recoded the prices (i.e., divided the recurring fees by 10 and the nonrecurring fees by 1000) in the HB estimation to improve convergence.

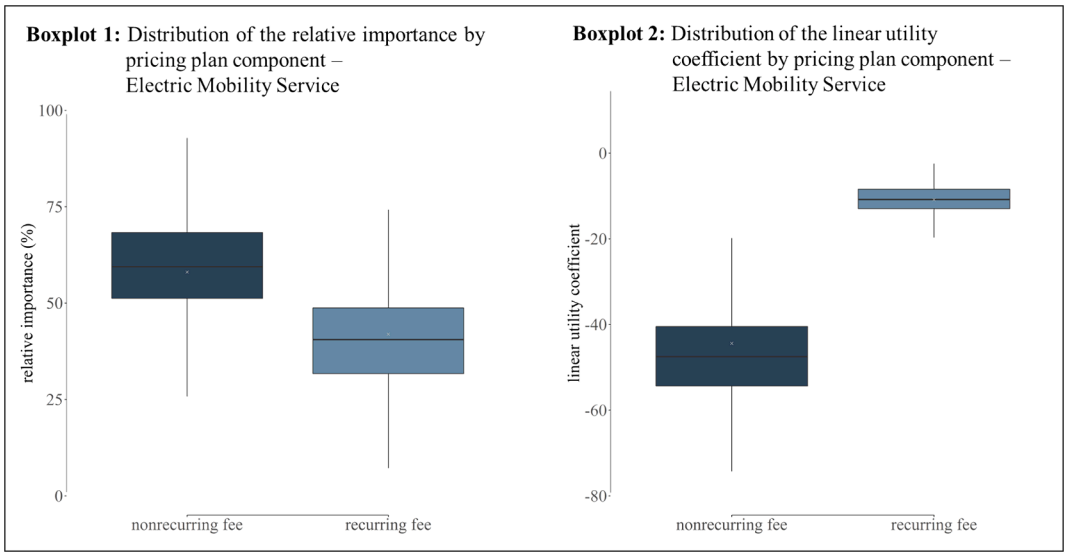

Fig. 2. Distribution of relative importance and linear utility coefficients – Electric mobility service.

compare the individual relative importance of the attributes. The relative importance of an attribute describes the bandwidth of utility change when an attribute level changes from the least (most) to the most (least) preferred attribute level (Cattin & Wittink, 1982; Steiner & Meißner, 2018). Hence, the relative importance of an attribute is given by the relative range of the attribute utilities (Eggers et al., 2018). Drawing from Fig. 2 Boxplot 1 and Table 6, we found that with 58.06 %, the nonrecurring flat-rate fee received greater average importance than the recurring flat-rate fee (41.94 %). Supporting *H1*, this difference was significant ($t(626) = 13.054$, $p < 0.001$). Consequently, the nonrecurring flat-rate fee had a greater influence on respondents' choices than the recurring flat-rate fees.[6] These results further indicate that, on average, consumers tend to avoid high setup fees. That is, they prefer to avoid the immediate disutility caused by the costs of the initial nonrecurring flat-rate fees. However, since attribute importance is based on the selected levels within one attribute (Eggers et al., 2018), *H2* can only be tested by having a detailed look at the utility coefficients.

Results for H2: In order to test Hypothesis 2, we analyzed whether the utility coefficient for the price of the nonrecurring flat-rate fee was smaller than the price coefficient of the recurring flat-rate fee, that is, whether it leads to a significantly higher decrease in utility for each increase in the price level. Boxplot 2 of Fig. 2 and Table 6 reveal that an increase by one price level in the nonrecurring flat-rate fee leads to an average decrease of 44.395 in utility. With an increase by one price level within the recurring flat-rate fee, the utility decreases by 10.848. We used a paired sample *t*-test to compare the individual linear price coefficients. The price increase by one level led to a significantly higher decrease in utility for the nonrecurring flat-rate fee than for the recurring flat-rate fee ($t(626) = -39.402$, $p < 0.001$), supporting *H2*.

When interpreting these coefficients, it must be taken into account that an increase by one level in the nonrecurring flat-rate fee is equivalent to €500 (over the entire contract period), while a one-level increase in the recurring flat fee is equivalent to €15 per month. Considering the median stated planning horizon of 24 months, an increase by one level in the nonrecurring fee results in a €500 increase in the total bill amount. As a result, each €1 increase in the nonrecurring flat-rate fee can be interpreted as a 0.089 decrease in utility. A one-level increase in the recurring fee results in an increase of €360 (=24 months * €15) in the total bill amount. This results in a decrease in utility of 0.030 for every €1 increase in the recurring flat-rate fee. Therefore, when choosing between different double flat-rate plans, consumers discounted the recurring flat-rate fees more than the nonrecurring flat-rate fees. Our results indicate that a €1 increase in the recurring flat-rate fee resulted in a 66.29 % lower decrease in utility than a €1 increase in the nonrecurring flat-rate fee. Consequently, consumers exhibited choice behavior consistent with a present bias. On average, consumers preferred to avoid the immediate disutility caused by the cost of the initial nonrecurring flat-rate fee, and instead preferred to spread the cost of the service over the total contract duration via the recurring flat-rate fee.

4.2. Study 2: Telecommunication service

The second conjoint experiment in the industry context of a telecommunication service provider was conducted via a crowdsourcing platform in the same Western European country as Study 1. We received a total of 585 responses. We screened out respondents who failed the attention check, which consisted of two single-choice questions with three possible answers about the product and pricing structure. 143 participants who failed the attention check were not admitted to the (main) conjoint study. In addition, we deleted 46 participants with incomplete questionnaires. Straight-line behavior in the remaining conjoint answers could not be observed.

The remaining sample of 396 participants has a mean age of 35.030 (SD = 11.556). A total of 42.17 % of the participants stated that they had a university degree, and over 50 % stated that they had a yearly gross income higher than €25,000.

The median stated planning horizon when deciding between the tariff options was again 24 months (M = 25.119, SD = 13.843)—the minimum contract duration as indicated in the survey. Participants perceived the product risk as rather low (M = 3.021, SD = 1.444), and the perceived complexity of the services was, on average, 3.988 (SD = 1.397).

In line with Study 1, we estimated a hierarchical Bayes (HB) model based on the conjoint data of the 12 choice tasks of experiment two. The fixed tasks were excluded from utility estimation and used for predictive validity measures of the models. The HB estimation consisted of 100,000 burn-in Markov chain Monte Carlo (MCMC) iterations and 100,000 iterations after convergence. Again, we coded both pricing plan attributes

[6] See Appendix B and Appendix D for a robustness check based on a HB part-worth model.

as single linear utility coefficients.[7] The model received a mean root likelihood of 0.623. The first choice hit rates were 69.95 % for fixed task 1 and 72.73 % (70.20 %) for fixed task 2 (fixed task 3). Fixed task 1 and fixed task 2 are additionally used for reliability testing. A total of 74.75 % of the participants consistently chose the same product concept in the two fixed tasks.

Table 7 summarizes the results of the HB estimation and displays the average relative importance of each pricing plan attribute a and the average linear utility coefficients. Fig. 3 illustrates the distribution of the relative importance (boxplot 3) and the distribution of the linear utility coefficients (boxplot 4) of the nonrecurring and recurring flat-rate fees.

Results for H1: Using the same approach as our first study, we tested Hypothesis 1 by comparing the attributes' relative importance based on the results of the HB model. In line with Study 1, our results supported *H1*. Drawing from Fig. 3 and Table 7, we found that, with a mean difference of 9.507, the nonrecurring flat-rate fees had a significantly higher average importance (54.754 %) than the recurring flat-rate fee (45.246 %) ($t(395) = 6.734$, $p < 0.001$).[8] When consumers decided between different double flat-rate pricing plan configurations, the nonrecurring flat-rate fees had a greater influence on respondents' choices than the recurring flat-rate fees. Hence, *H1* also holds for product categories in a lower price segment with a low perceived product risk.

Results for H2: For Hypothesis 2, we followed the same approach as in Study 1. We analyzed whether the price coefficient of the nonrecurring flat-rate fee is smaller than the price coefficient of the recurring flat-rate fee and, consequently, leads to a significantly higher decrease in utility for each price level increase. As explained in the study design, for an assumed contract duration of 24 months, a one-level increase in the nonrecurring fee resulted in the same increase in the bill amount as a one-level increase in the recurring fee (i.e., approximately €24 over 24 months). This made the interpretation of the price coefficient more intuitive compared to Study 1. For the nonrecurring flat-rate fee, an increase of one price level resulted in a decrease in utility of 91.212. For the recurring flat-rate fee, an increase of one price level resulted in a decrease in utility of 17.886. In support of *H2* and consistent with our findings in Study 1, we observed a significantly greater decrease in utility for the nonrecurring flat-rate fee than for the recurring flat-rate fee ($t(395) = 49.66$, $p < 0.001$).[9]

Considering the median reported planning horizon of 24 months, an increase of one price level in the nonrecurring fee led to a (quasi) equivalent increase in the total bill after 24 months as an increase of one price level in the recurring flat-rate fee. For an assumed contract duration of 24 months, a €1 increase in the nonrecurring flat-rate fee resulted in a decrease of 3.801 in utility, while a €1 increase in the recurring fee resulted in a smaller decrease in utility of 0.745.

Again, we found that consumers exhibited choice behavior consistent with a present bias. Consumers discounted recurring flat-rate fees more than nonrecurring flat-rate fees, regardless of the two product categories analyzed.

Table 7
Relative importance and linear utility coefficient – Internet service provider.

	Relative importance		Linear utility coefficient	
Attribute (a)	Mean	SD	Mean	SD
Nonrecurring flat-rate fee	54.75	14.05	−91.212	23.614
Monthly recurring flat-rate fee	45.25	14.05	−17.886	6.379
None			−12.191	92.416
$n = 396$				

5. Market simulation to determine the optimal pricing plan menu and its economic impact

By analyzing the relative importance of the attributes and the price coefficient, our results showed that nonrecurring flat-rate fees have a greater influence on respondents' choices than recurring flat-rate fees (*H1*). We also observed a significantly higher decrease in utility for the nonrecurring flat-rate fee than for the recurring flat-rate fee, leading to consumer choice behavior consistent with a present bias (*H2*). Next, we analyze consumers' overall preferences for a double flat-rate vs. a single flat-rate pricing plan and their impact on the optimal subscription pricing plan menus. Using a market simulation based on the individual-level results of the part-worth model from Study 2, we first aimed to show how choice probabilities and realizable revenues change for different pricing plan configurations.[10] Second, we aimed to provide the optimal pricing plan menu that leads to the maximum realizable revenue based on our scenario.

In general, for any given market scenario, the share of preference for a given pricing plan is estimated using the logit model:

$$(1)\ p(i|M) = \frac{\exp(U_i)}{\sum_{j \in M} \exp(U_j)}$$

In this model, p represents the probability of choosing pricing plan i from a choice set with M alternatives. U_i is given by the overall utility of a pricing plan i whereas U_j represents the utility of each alternative (Eggers et al., 2018; Orme & Chrzan, 2017; Steiner & Meißner, 2018).

For all market scenarios, we abstracted from potential competitors but included a no-choice option. For the revenue calculations, we further assumed a market size of 396 consumers, which equals the sample size of Study 2. The total revenue is then given by the share of preference for a pricing plan i times the total number of consumers in the market times the bill amount of the respective pricing plan after 24 months.

As in most subscription-based services, consumers can independently self-select into different tariff options (Train et al., 1989). As offering additional payment options is assumed to be an effective strategy for service providers to capture heterogeneous consumer preferences (e.g., Patrick & Park, 2006), we compared the results of three market scenarios: a single-tariff menu, a two-tariff menu, and a three-tariff menu. The revenue-maximizing results of the three simulation scenarios are summarized in Table 8. The table also shows the respective optimal plan menu and the corresponding share of preference, as well as the revenue by plan. In addition, the cumulative share of preference and revenue for each optimal solution is shown. The three scenarios are discussed in detail below.

5.1. Single tariff menu

In the first simulation for the single tariff menu, we specified a market scenario in which we assumed that there is one tariff option (a double flat-rate pricing plan) and the no-choice available on the market. For this given scenario, we simulated the share of preference and total revenues (after 24 months) for each possible pricing plan configuration.

[7] We again followed Orme and Chrzan (2017) and recoded the prices (i.e. divided the nonrecurring fees by 100) in the HB estimation to improve convergence.

[8] See Appendix C and Appendix D for a robustness check based on a HB part-worth model.

[9] See Appendix C and Appendix D for a robustness check based on a HB part-worth model.

[10] Results of the part-worth model can be found in Appendix C. The market simulation was conducted using the choice simulator of Sawtooth Software Lighthouse Studio 9.12.0.

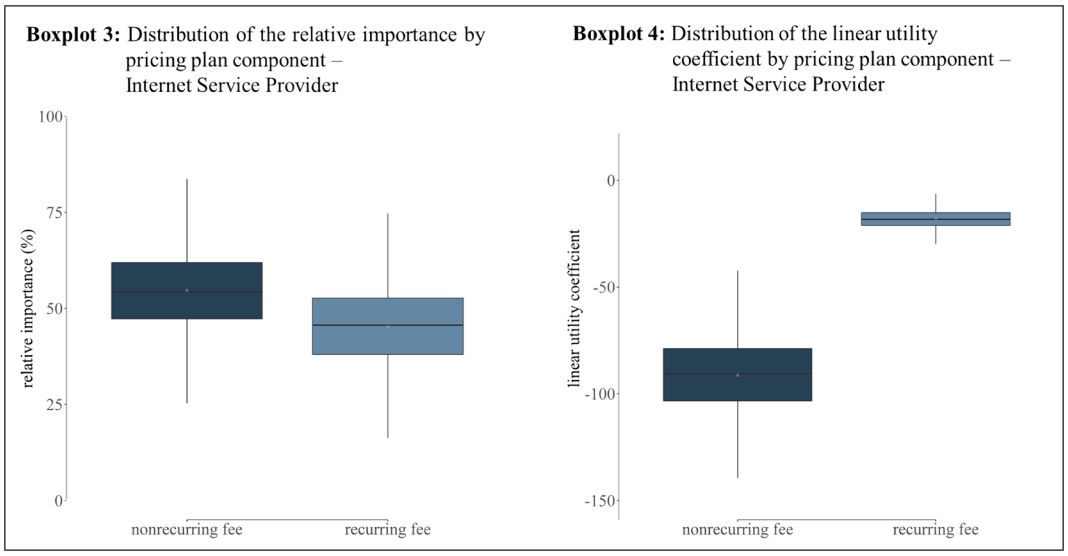

Fig. 3. Distribution of relative importance and linear utility coefficients – Internet service provider.

Table 8
Optimal pricing plan menu – Internet service provider.

	Pricing Plan Menu	Share of Preference	Revenue	Total Share of Preference	Total Revenue
Single-Tariff Menu	Nonrecurring fee = €0 Recurring fee = €4.99	61.96 %	€29,384.4	61.96 %	€29,384.4
Two-Tariff Menu	Nonrecurring fee = €0 Recurring fee = €4.99	45.91 %	€21,775.1	73.28 %	€34,778.4
	Nonrecurring fee = €119.99 Recurring fee = €0	27.37 %	€13,003.3		
Three- Tariff Menu	Nonrecurring fee = €0 Recurring fee = €4.99	40.68 %	€19,293.5	74.73 %	€35,465.2
	Nonrecurring fee = €119.99 Recurring fee = €0	25.63 %	€12,176.4		
	Nonrecurring fee = €23.99 Recurring fee = €3.99	8.43 %	€3,995.2		

Fig. 4 displays the share of preference simulations results of all tariffs and their corresponding bill amounts ranging between €71.75 and €119.99 after 24 months. A general trend of decreasing share of preference with an increase in bill amount could be observed. However, in line with our previous findings, the share of preferences depended on the pricing plan structure.

Therefore, Table 9 provides a detailed view of the average share of preference for the pricing plans in a market with the alternative none (i.e., no choice) option.

Sorted in descending order based on the size of the preference share for a pricing plan, it could be observed that among the pricing plans that resulted in bill amounts of ~€72 after 24 months, the pricing plan with a nonrecurring flat-rate fee of €0 and a recurring flat-rate fee of €2.99 received the highest preference share (M = 0.874, SD = 0.258).[11] The lowest average choice probability (M = 0.749, SD = 0.363) was given by the pricing plan option with nonrecurring fees of €71.99 and no recurring fees.

Similar results could be observed for pricing plans that resulted in bill amounts of ~€96 after 24 months. The pricing plan without a nonrecurring flat-rate fee and a recurring flat-rate fee of €3.99 resulted in the highest preference share (M = 0.760, SD = 0.341). Compared to this pricing plan, the preference share decreased for the four remaining pricing plans in the price segment of ~€96. Compared to the pricing plan with a nonrecurring fee of €71.99 and a recurring fee of €0.99, the pricing plan with no nonrecurring fees and a recurring fee of €3.99 increased the preference by 18.6 percentage points. Additionally, the pricing plan option without a nonrecurring flat-rate fee and a recurring flat-rate fee of €3.99 leads to a similar average preference share like the option with a nonrecurring fee of €47.99 and recurring fees of €0.99, which would be ~ 25 % cheaper after 24 months.

Considering the pricing plans, which resulted in bill amounts of ~€120 after 24 months, we underline the assumptions that tariffs in which low/no nonrecurring fees are compensated with high recurring fees show a higher share of preference. The pricing plan without a nonrecurring flat-rate fee and a recurring flat-rate fee of €4.99 again resulted in the highest preference share (M = 0.620, SD = 0.404). All remaining pricing plans in that price segment had a lower preference share. Compared to the pricing plan with a nonrecurring fee of €71.99 and a recurring fee of €1.99, the preference share could be increased by 19.7 percentage points by offering a pricing plan without nonrecurring fees and high recurring fees.

Taking the assumed market size of 396 consumers into account, we found that for our first scenario, the revenue-optimizing pricing plan results from the pricing plan with zero nonrecurring fees and recurring flat-rate fees of €4.99. With an overall preference share of approximately 62 % (i.e., 62 % of the consumers would choose this pricing plan if the alternative were the no-choice option), this offer resulted in €29,384.4 in revenue. Therefore, our simulation results indicate that consumers tend to prefer a single flat-rate pricing plan (with no nonrecurring fees) over double flat-rate pricing plans.

[11] See Appendix D: Simulation results are in line with the share of utility-maximizing pricing plans.

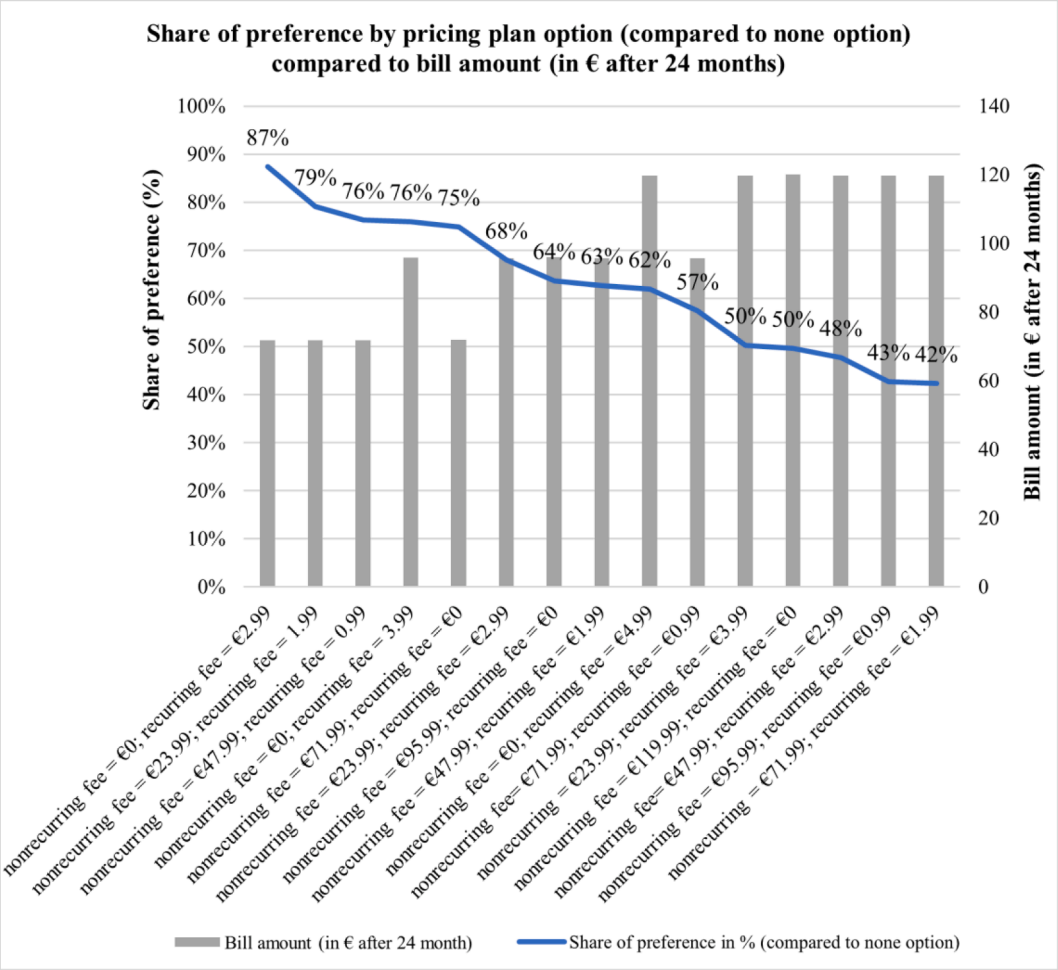

Fig. 4. Share of preference of double flat-rate pricing plans (compared to none option) – Internet service provider.

5.2. Optimal two tariffs and three tariffs menus

In a second (third) setting, we specified a market scenario in which we assume that there are three (four) options available on the market: two (three) different double flat-rate pricing plans and a no-choice option. For this given scenario, we again simulated the share of preference and revenues (after 24 months) for every possible combination of pricing plans.

The optimal pricing plan menu for a two-tariff solution resulted in a total preference share of 73.28 % compared to 61.96 % for the single tariff solution. Offering two different tariffs increased revenue by 18.36 % to €34,778.4 compared to the single-tariff solution. The two tariffs that generated the highest revenues were a tariff without nonrecurring flat-rate fees and recurring flat-rate fees of €4.99, as well as a tariff without recurring fees and a nonrecurring fee of €119.99. Both tariffs resulted in (almost) equal bill amounts after 24 months. As expected and in line with our previous findings, the first tariff (which is the same as the single-tariff menu) yielded a higher preference share (45.91 %) and accounted for higher revenues (€21,775.1) compared to the second tariff (share of preference: 27.37 %; revenue: €13,003.3).

Offering three different tariffs increased the total preference share by 12.77 percentage points (leading to a 20.69 % increase in revenue) compared to the single tariff menu. However, offering three tariffs resulted in only a marginal increase in the total preference share and revenue compared to the two tariff menu. The two most preferred tariffs in this menu were the same as in the two tariffs solution. The third additional tariff in the pricing menu includes a tariff where low nonrecurring fees (€23.99) are compensated with the second-highest recurring fees (€3.99). This tariff resulted in the smallest preference share (8.43 %).

These results again suggest that consumers tend to prefer a single flat-rate tariff over a double flat-rate tariff. In addition, the result suggests heterogeneous preferences, with more consumers preferring a tariff with only a recurring flat rate than a tariff with only a nonrecurring flat rate.

5.3. Discussion of the results of the market simulation

When choosing between different double flat-rate plans, the simulation results of the single tariff solution are in line with our predictions: On average, consumers prefer to avoid the immediate disutility caused by the cost of the initial nonrecurring flat-rate fees and thus choose a plan with a high recurring flat-rate fee and low/no nonrecurring fees. Consumers thus exhibit choice behavior consistent with a present bias. In addition, offering additional plans can be an effective strategy for service providers to optimize the share of preferences and realizable revenues by capturing heterogeneous consumer preferences.

By considering the second tariff in the optimal two-tariff solution, which was characterized by a high nonrecurring fee that compensates for a zero recurring fee, the results further showed that consumers may show an affective response to zero costs (Ascarza et al., 2012) in either of the pricing plan components, as they may perceive "zero as a special price," which may lead to less perceived complexity in the pricing plan, as suggested by Shampanier et al. (2007) and Homburg et al. (2014).

Table 9
Share of preference of double flat-rate pricing plans (compared to none option) – Internet service provider.

Pricing Plan Option	Share of preference (compared to none option)			Bill amount in € (24 months)
	Mean	SD	Median	
Nonrecurring fee = €0; Recurring fee = €2.99	0.874	0.258	0.995	71.76
Nonrecurring fee = €23.99; Recurring fee = €1.99	0.791	0.324	0.971	71.75
Nonrecurring fee = €47.99; Recurring fee = €0.99	0.763	0.338	0.958	71.75
Nonrecurring fee = €0; Recurring fee = €3.99	0.760	0.341	0.960	95.76
Nonrecurring fee = €71.99; Recurring fee = €0	0.749	0.363	0.974	71.99
Nonrecurring fee = €23.99; Recurring fee = €2.99	0.680	0.366	0.887	95.75
Nonrecurring fee = €95.99; Recurring fee = €0	0.637	0.407	0.880	95.99
Nonrecurring fee = €47.99; Recurring fee = €1.99	0.627	0.382	0.798	95.75
Nonrecurring fee = €0; Recurring fee = €4.99	0.620	0.404	0.818	119.76
Nonrecurring fee = €71.99; Recurring fee = €0.99	0.574	0.403	0.707	95.75
Nonrecurring fee = €23.99; Recurring fee = €3.99	0.503	0.401	0.527	119.75
Nonrecurring fee = €119.99; Recurring fee = €0	0.496	0.424	0.496	119.99
Nonrecurring fee = €47.99; Recurring fee = €2.99	0.477	0.394	0.448	119.75
Nonrecurring fee = €95.99; Recurring fee = €0.99	0.427	0.408	0.284	119.75
Nonrecurring fee = €71.99; Recurring fee = €1.99	0.423	0.404	0.285	119.75

n = 396.

Moreover, in line with the findings of Iyengar et al. (2011) and the general assumptions of prospect theory and mental accounting (Kahneman & Tversky, 1979), realizable revenues were optimized with pricing plans characterized by consolidated prices. That is, consumers preferred one of the double flat-rate pricing plan components to have a cost of zero, as opposed to partitioned prices, in which each pricing plan component had a cost greater than zero. Thus, consumers prefer a single flat-rate tariff over a double flat-rate tariff.

6. General discussion

This paper addresses the question of individuals' preferences for the structure of double flat-rate pricing plans by using two distinct choice-based conjoint experiments for utilitarian products in different industries and price segments. We show that consumers attach greater relative importance to nonrecurring flat-rate fees than to recurring flat-rate fees when choosing between double flat-rate pricing plans. Thus, nonrecurring flat-rate fees have a greater impact on consumer choice than recurring flat-rate fees. Our results also suggest that an increase in the nonrecurring flat-rate fee results in a greater decrease in utility than an equivalent increase in the recurring flat-rate fee.

Further, we find that consumers tend to prefer a single flat-rate tariff over a double flat-rate tariff. In this context, our results suggest heterogeneous preferences, with some consumers preferring a single flat-rate tariff with only a recurring fee and others preferring a single flat-rate tariff with only a nonrecurring fee. In line with our result of the higher relative importance and greater reduction in utility caused by the nonrecurring flat-rate fee, more consumers prefer a tariff with only a recurring flat rate than a tariff with only a nonrecurring flat rate.

6.1. Theoretical implications

Our results have theoretical implications for behavioral pricing and consumers' tariff choice behavior. First, we find that in the intertemporal choice of double flat-rate pricing plans, the total sum of the payments is not a perfect predictor of consumers' pricing plan preferences. Thus, consumers are not indifferent to the distribution of costs, as the standard economic model suggests. Second, our results suggest that consumers behave in a manner consistent with a present bias when choosing between double flat-rate pricing plans. The preference for immediate utility is expressed in a tendency to prefer no/low nonrecurring flat-rate fees that are compensated by high recurring flat-rate fees. Third, our results that consumers prefer a single flat-rate to a double flat-rate with substantial heterogeneity in the preferred flat-rate component (recurring vs. nonrecurring) have implications for research on optimal nonlinear pricing and the specific design of (single) flat-rate plans. Our findings complement prior research on consumer preferences for flat-rate versus pay-per-use tariffs (e.g., DellaVigna & Malmendier, 2006; Dowling et al., 2021; Lambrecht & Skiera, 2006; Miravete, 2003; Nunes, 2000; Train et al., 1987), suggesting that consumers may perceive double flat-rate tariffs as having a "pay-per-use" component in the duration of usage. That is, while the (recurring) flat-rate fees are usage-independent with respect to the quantity consumed, consumers may perceive the double flat rates as usage-dependent because they are duration-dependent with respect to the number of billing periods.

6.2. Managerial implications

Our findings have implications for service providers by helping them to offer pricing plans that better meet customer needs and maximize realizable revenues. We show that the share of preference for a double flat-rate pricing plan depends significantly on the pricing plan configuration. Decreasing the nonrecurring flat-rate fee and increasing the recurring flat-rate fee can be an effective strategy to increase the choice probability and realizable revenues. By offering multiple tariffs, companies can capture heterogeneous consumer preferences for different pricing plans and optimize their realizable revenues by over 20 % compared to a single tariff solution. In particular, companies designing their subscription plans need to account for consumers preferences for single flat-rate pricing plans. Therefore, in the area of digital add-on services for durable products, given the preference heterogeneity we measure, firms may need to switch from double flat-rate pricing plans to a menu of different single flat-rate plans, including either recurring or nonrecurring fees.

An important consideration for companies when choosing the type of single flat rate (recurring versus nonrecurring) is the setup costs associated with providing the service. In cases where there are significant costs associated with providing the service to a particular consumer (such as hardware components at the consumer's end), companies may prefer to offer a nonrecurring flat rate. In this case, the company may need to make this nonrecurring flat rate more attractive (i.e., less expensive than a recurring flat rate), since we found that the majority of consumers prefer a nonrecurring fee of zero. Differences in the (temporal) discount rate between the company and the consumer may facilitate such a less expensive nonrecurring flat rate.

6.3. Limitations and future research

Our study has some limitations that provide opportunities for future research. First, although we aimed for a balanced cross-sectional sample, both surveys were conducted in the same country. However, various subscription-based services that use double flat-pricing plans target a broad global consumer base. Country-specific factors may influence preferences for the price components of double flat rates. Second, our findings appear to be generalizable to utilitarian products other than complementary mobility services and telecommunications services.

However, consumers' tariff preferences for a nonrecurring versus a recurring flat rate may differ for hedonic versus utilitarian products. For example, Prelec and Loewenstein (1998) suggest that consumers may purchase hedonic products with pleasurable anticipation which increases the benefits of prepayment. Future research could examine consumer preferences for double flat-rate tariffs in case of hedonic versus utilitarian products. Third, in our study scenario, we define a minimum contract duration of 24 months for both services. It would be interesting to analyze the preferences for double flat-rate pricing plans for services with greater flexibility in terms of contract duration. For example, services that allow customers to cancel the service on a monthly basis are common in many industries. This flexibility might lead to an even stronger preference for the recurring flat-rate fee. In addition, future research can study how the consumers' uncertainty about how long they will use the service may affect their tariff preferences. Fourth, although our studies were conducted during a period of very low interest rates, we do not account for possible discounting effects. Future research can examine the impact of consumer heterogeneity in the time value of money on their tariff preferences. Fifth, although choice-based conjoint experiments have been shown to have high external validity, we can only simulate purchase decisions based on our experiments. Therefore, to validate our findings, we encourage future researchers to conduct field experiments in which different configurations of double flat rates are offered for the same service. Finally, future research can explore the underlying mechanisms that explain the heterogeneity in preferences for recurring versus nonrecurring flat rates. One candidate mechanism could be the dual entitlement principle (Kahneman et al., 1986), which can "justify" the fairness of a high (initial) nonrecurring fee in case of substantial hardware investments by the company (e.g., a wallbox in case of electric vehicle charging solutions). In conclusion, our findings can stimulate future research on tariff choice decisions and behavioral pricing in an increasingly subscription-based service environment.

CRediT authorship contribution statement

Emanuel Schuster: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Martin Spann:** Writing – review & editing, Writing – original draft, Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. – Fixed task design

Tables A1 and A2 depict the fixed tasks design of studies 1 and 2. The 4th, 8th, and 12th choice tasks were held constant for every respondent in order to assess the validity of the model.

Table A1
Study 1 – CBC fixed task design.

	Fixed Task 1 (4th Choice Task)		Fixed Task 2 (8th Choice Task)		Fixed Task 3 (12th Choice Task)	
Attributes	**Concept 1**	**Concept 2**	**Concept 1**	**Concept 2**	**Concept 1**	**Concept 2**
Nonrecurring flat-rate fee	€1,999	€1,499	€499	€999	€499	€0
Recurring flat-rate fee	€15	€30	€60	€45	€60	€75

Table A2
Study 2 – CBC fixed task design.

	Fixed Task 1 (4th Choice Task)		Fixed Task 2 (8th Choice Task)		Fixed Task 3 (12th Choice Task)	
Attributes	**Concept 1**	**Concept 2**	**Concept 1**	**Concept 2**	**Concept 1**	**Concept 2**
Nonrecurring flat-rate fee	€47.99	€119.99	€47.99	€119.99	€71.99	€23.99
Recurring flat-rate fee	€2.99	€0.00	€2.99	€0.00	€1.99	€3.99

Appendix B. – Robustness checks H1 and H2 – Study 1

We estimated a hierarchical Bayes (HB) model, which specified part-worth coding for both attributes. The three fixed tasks were excluded from utility estimation. The HB estimation consisted of 20,000 burn-in Markov chain Monte Carlo (MCMC) iterations and 20,000 iterations after convergence. Table B1 summarizes the zero-centered mean estimates for the part-worth utilities of each attribute a and level l and the mean relative importance of each attribute. The part-worth estimates are interval scaled and indicate the preference order of the levels within each attribute (Steiner & Meißner, 2018). The results support *H1* as we observed that with 60.54 %, the nonrecurring flat-rate fee has higher average importance than the recurring flat-rate fee (39.46 %) ($t(626) = 17.873$, $p < 0.001$).

As robustness test of our results for *H2*, we used the part-worth model to analyze if the increase of the nonrecurring flat-rate fee by one level leads to a higher decrease in utility as compared to the increase of the recurring flat-rate fee by one level. We compared the means of the utility differences within the nonrecurring fees with the utility differences within the recurring fees using a paired *t*-test. In the case when changing from level 1 to level 2 ($t(626) = 25.308$, $p < 0.001$), level 3 to level 4 ($t(626) = 3.229$, $p = 0.001$) and level 5 to level 6 ($t(626) = 18.845$, $p < 0.001$) we found the decrease in utility to be significantly higher for the nonrecurring flat-rate fee. We suggest that the increase of the nonrecurring flat-rate fee by one level leads to

a higher decrease in utility as compared to the increase of the recurring flat-rate fee by one level.

Table B1
Study 1: Hierarchical Bayes part-worth utility model summary & within attribute utility differences.

Part-Worth Model (Study 1 – Electric mobility service)

		average part-worth utilities		utility difference of two consecutive levels within the attributes	relative importance	
Attribute (a)	Level (l)	Mean	SD	Mean Diff.	Mean	SD
Nonrecurring flat-rate fee	*€0*	64.77	21.71		60.54	14.77
	€499	18.34	16.94	46.42***		
	€999	4.03	6.33	14.32***		
	€1,499	−10.73	9.14	14.76***		
	€1,999	−24.52	12.76	13.79***		
	€2,499	−51.89	20.90	27.37***		
Recurring flat-rate fee	*€0*	40.81	21.04		39.46	14.77
	€15	18.73	10.68	22.08***		
	€30	4.29	9.50	14.44***		
	€45	−7.65	7.41	11.94***		
	€60	−21.90	12.35	14.25***		
	€75	−34.27	15.44	12.37***		
NONE		5.77	84.69			

*** $p < 0.01$, $n = 627$

Appendix C. – Robustness checks H1 and H2 — Study 2

To test for the robustness of our results in Study 2, we followed the approach of Appendix B and estimated an HB part-worth model (see Table C1). The nonrecurring flat-rate fee had significantly higher average importance (54.34 %) than the recurring flat-rate fee (45.66 %) ($t(395) = 7.026$, $p < 0.001$), supporting *H1*.

Analogous to Appendix B, we compare the means of the utility deltas of the nonrecurring flat-rate fees with those of the recurring flat-rate fee. Supporting *H2*, we found the mean decrease in utility to be significantly higher for the nonrecurring fee in all cases except in the case when changing from level 4 to level 5, in which the decrease is (slightly) higher for the recurring fee.

Table C1
Study 2: Hierarchical Bayes part-worth utility model summary & within attribute utility differences.

Part-Worth Model (Study 2 – Internet service provider)

		average part-worth utilities		utility difference of two consecutive attribute levels	relative importance	
Attribute (a)	Level (l)	Mean	SD	Mean Diff.	Mean	SD
Nonrecurring flat-rate fee	*€0.00*	58.22	16.31		54.34	12.29
	€23.99	28.66	10.25	29.56***		
	€47.99	7.85	8.06	20.81***		
	€71.99	−14.75	8.50	22.59***		
	€95.99	−30.96	10.31	16.21***		
	€119.99	−49.02	13.82	18.06***		
Recurring flat-rate fee	*€0.00*	47.10	17.35		45.66	12.29
	€0.99	21.42	11.94	25.68***		
	€1.99	6.94	6.19	14.48***		
	€2.99	−8.17	7.82	15.11***		
	€3.99	−25.89	9.30	17.73***		
	€4.99	−41.42	15.56	15.53***		
NONE		−3.79	47.07			

*** $p < 0.01$, $n = 396$

Appendix D. – Robustness check 2 for H1 & H2: Analysis of average utilities & utility-maximizing pricing plans — Study 1 & Study 2

Our results should also be reflected in, first, the overall mean utility of each pricing plan option and, second, a consumer's utility-maximizing pricing plan.[12] For the analysis, we again used the part-worth model results of Study 1 and Study 2, respectively (see Table B1 & Table C1).

To analyze the mean utility of each pricing plan option (i.e., all possible combinations of recurring and nonrecurring fees), we first calculated the total utility of each pricing plan option for each individual by summing the individual's part-worth utilities of the corresponding pricing plan attribute levels (Orme & Chrzan, 2017). We then calculated the mean utility of each pricing plan.

Study 1: The pricing plan with the highest average utility is given by (the cost-minimizing) pricing plan with a nonrecurring fee of €0 and recurring

[12] We only considered those tariffs, which led to bill amounts of €1,800 and more after 24 months for Study 1 and at least ~€72 after 24 months for Study 2. We neglected a consumer's utility of the none-option.

fees of €75. However, the results reveal that the total bill amount of a pricing plan is not a perfect predictor of consumers' pricing plan preferences, which will be outlined in detail in the following for Study 2.

Study 2: Figure D1 shows the mean utility (bars) and corresponding bill amounts after 24 months (line) of all possible pricing plan options. There is a general trend of a decrease in utility for an increase in total bill amount. In line with our previous findings, the pricing plan with the highest average utility is given by a pricing plan with a nonrecurring fee of €0 and recurring fees of €2.99. Further, the direct comparison of pricing plan options reveals that some pricing plan options have a higher (lower) mean utility despite leading to a higher (lower) total bill amount after 24 months.

In the second step, we aimed to identify the share of consumers for whom each respective pricing plan was identified as the utility-maximizing option. An individual's utility-maximizing pricing plan is given by the pricing plan option with the highest total utility among all possible pricing plan configurations (Orme & Chrzan, 2017). For both studies, the utility-maximizing pricing plan options and their share of respondents are summarized in Table D1.

Study 1: In line with our previous results, the majority of consumers (68.42 %) have the highest utility in the (cost-minimizing) pricing plan option without a nonrecurring fee but high recurring fees (i.e., a nonrecurring fee of €0 and recurring fees of €75). The results show consumers' heterogeneous preferences since ~ 25 % of the respondents show the highest utility in pricing plan options with recurring fees of €0, which are compensated with high nonrecurring fees.

Study 2: We observe similar results for Study 2. The majority of consumers (61.36 %) have the highest utility in a pricing plan without initial fees, which are compensated by recurring fees (i.e., a nonrecurring fee of €0 and recurring fees of €2.99). The second largest share of consumers (27.53 %) has the highest utility in a pricing plan that is characterized by zero recurring fees and only nonrecurring fees. Within the group of pricing plans that lead to similar bill amounts of ~ 72€ after 24 months, only ~ 6 % of consumers perceive a double flat-rate pricing plan, in which both pricing plan components are non-zero, as the utility-maximizing option.

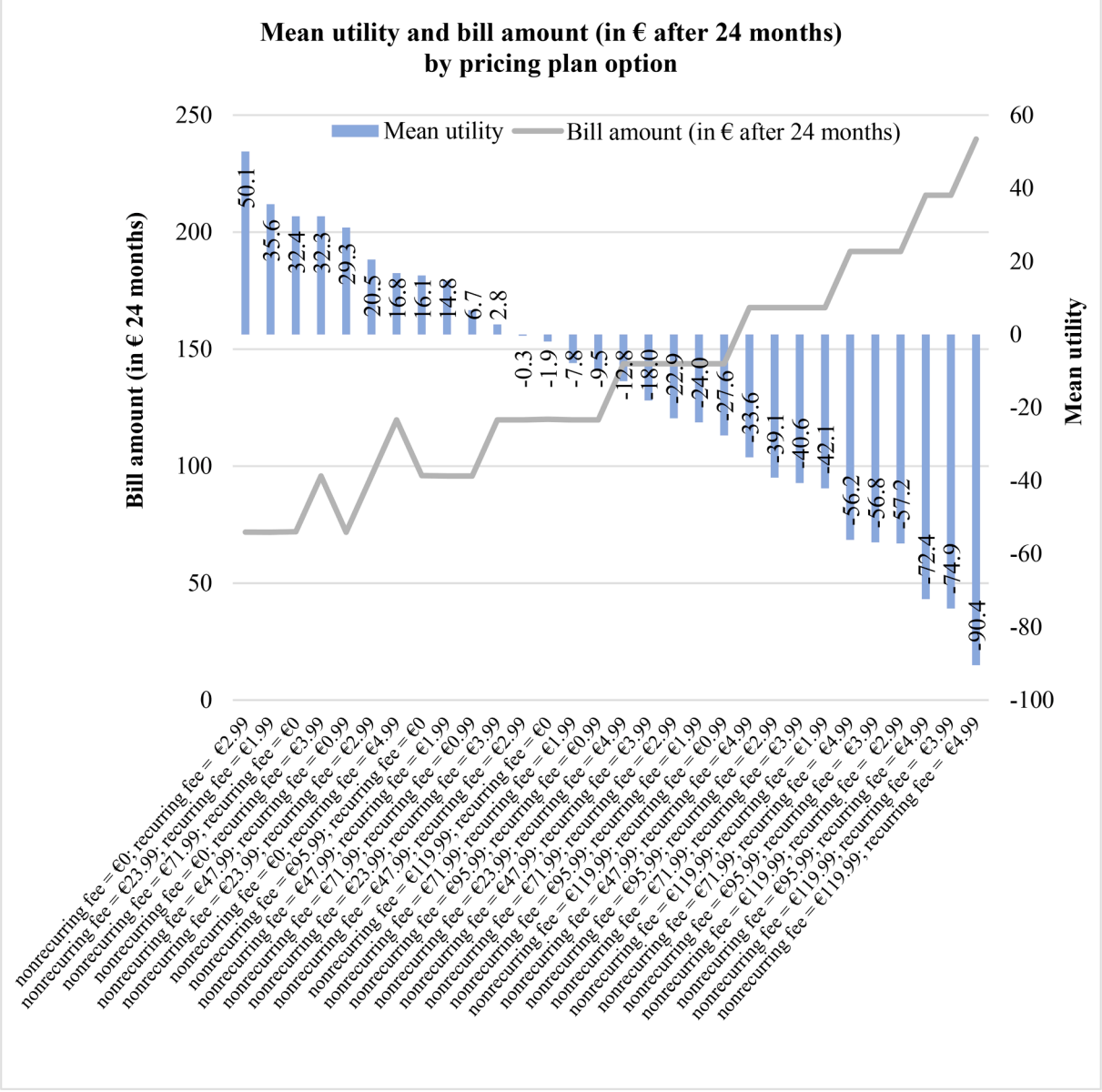

Fig. D1. Mean utility and bill amount (after 24 months) by pricing plan option – Internet service provider

Table D1
Utility-maximizing pricing plan – Study 1 & Study 2.

Study 1 – Electric mobility service		Study 2 – Internet service provider	
Utility-maximizing pricing plan option	No. of respondents & share of respondents	Utility-maximizing pricing plan option	No. of respondents & share of respondents
Nonrecurring fee = €0; Recurring fee = €75	429 (68.42 %)	Nonrecurring fee = €0; Recurring fee = €2.99	243 (61.36 %)
Nonrecurring fee = €1999; Recurring fee = €0	138 (22.01 %)	Nonrecurring fee = €71.99; Recurring fee = €0	109 (27.53 %)
Nonrecurring fee = €2499; Recurring fee = €0	20 (3.19 %)	Nonrecurring fee = €23.99; Recurring fee = €1.99	16 (4.04 %)
Nonrecurring fee = €1499; Recurring fee = €15	15 (2.39 %)	Nonrecurring fee = €0; Recurring fee = €4.99	10 (2.53 %)
Nonrecurring fee = €499; Recurring fee = €60	9 (1.44 %)	Nonrecurring fee = €47.99; Recurring fee = €0.99	7 (1.77 %)
Others	16 (2.55 %)	Others	10 (2.78 %)
Total	**627 (100 %)**		**396 (100 %)**

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